



MAEDA



Maeda - CREC - SELI Joint Venture

Contract No. DC/2007/12 - Design and  
Construction of Tsuen Wan Drainage Tunnel

Monthly EM&A Report (April 2011)

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**Report No** EB000364R0622

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### Monthly EM&A Report (April 2011)

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**Report No** EB000364R0622

**Date** 17 May 2011

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## EXECUTIVE SUMMARY

1. Drainage Services Department (DSD) has awarded the contract for the Design and Construction of Tsuen Wan Drainage Tunnel (hereafter referred to as the "Project") to Maeda-CREC-SELI Joint Venture (MCSJV). MCSJV has appointed Hyder Consulting Limited (HCL) as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) works in accordance with the Environmental Monitoring and Audit Manual (EM&A Manual) and Environmental Permit (EP). Commencement of the construction work had been notified to the Environmental Protection Department (EPD) in January 2008. This Monthly EM&A Report summarises the EM&A works undertaken in April 2011.
2. According to the EM&A Manual, there are four designated air quality monitoring locations, five designated noise monitoring locations and five water quality monitoring locations during the construction phase: (i) Sik Sik Yuen Ho Fung College (ASR 1, NSR 1 and Intake I-1); (ii) Hong Hoi Chee Hong Temple (ASR 3, NSR 3 and Intake I-2); (iii) Squatters (NSR 6 and Intake I-3); (iv) Beach Tower (Long Beach Gardens) (ASR 8, NSR 8 and Outfall O-1); and (v) Greenview Terrace (Block 1) (ASR 9, NSR 9 and Outfall O-1).
3. During the non restricted hours, major construction activities undertaken by the Contractor at Tsuen Wan Drainage Tunnel included site cleaning and tidying at Outfall, I-1, I-2 and I-3; drilling, excavation and rock splitting at spiral ramp at Outfall; tunnel boring machine (TBM) drilling of the tunnel and mucking out of tunnel spoil at Outfall; removal of existing retaining wall and hanging support for existing utilities at fast lane of Castle Peak Road (CPR) at Outfall; excavation and soil nailing for box culvert construction at fast lane of CPR east bound at Outfall; excavation and disposal of excavated material from existing arch bridge underneath CPR at Outfall; placing levelling stone and bagged concrete to formation of sea wall at Portion E; installation of precast sea wall blocks at Portion E; drilling and excavation of vortex shaft at I-3; construction of PB wall structure skin wall and copping beam at I-3; construction of boulder traps at I-3; installation of concrete blocks for temporary bund wall at I-3; drilling, excavation and rock splitting of man access shaft and vortex drop shaft I-2; pipe jacking at Portion G at I-2; pre-bored H-pile construction for skin wall at Portion G at I-2; construction of approach channel structure at I-2; construction of 750 step channel and catchpit at Portion G at I-2; cascade and channel modification concrete structure works at I-1; construction of horizontal pipe pile (pipe roofing) for TBM break-through at I-1; and construction of vehicular access at I-1.
4. As recommended in the EIA report, no TBM operation was undertaken during restricted hours from chainage 3308 m to 3143 m.
5. No exceedances have been recorded for air quality monitoring during the reporting month.
6. No exceedances have been recorded for air borne noise monitoring and ground borne noise monitoring during the reporting month.
7. Exceedances for river water quality monitoring are summarised in the following table:

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Two records at I-1 on 8 and 18 April 2011	One record at I-1 on 6 April 2011

8. Exceedances for marine water quality monitoring are summarised in the following table:

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Three records at O-1(FT) on 8, 11 and 13 April 2011	Nil

9. The status of waste generation in the reporting month is:
- A total of 3,105.4 m<sup>3</sup> C&D material was disposed of to public fill at Tuen Mun. A quantity of 181.0 m<sup>3</sup> and 17,946.7 m<sup>3</sup> inert C&D materials were reused in the Contract and other Contracts, respectively. Detail information could be referred to Section 5.1.1 of this report.
  - About 34.8 m<sup>3</sup> general waste was disposed of to NENT Landfill;
  - No paper/cardboard was recycled in the reporting month;
  - No metal was generated in the reporting month;
  - No plastic waste was disposed of in the reporting month; and
  - About 4,341.4 kg chemical waste was disposed of in the reporting month.
10. In this reporting month, two site inspections and one monthly site audit were carried out by ET and Independent Environmental Checker (IEC) respectively, to ensure proper implementation of environmental mitigation measures specified in the EM&A Manual and compliance with environmental legislation. All observations, which were recorded on the site inspection checklists, were passed to the Contractor together with the ET's recommendations.
11. As advised by the Contractor and verified by ET:
- No non-compliance regarding the site inspection was received in the reporting month;
  - No environmental complaint was received during the reporting month; and
  - No summons and prosecution was received in the reporting month.
12. The major construction works for the upcoming three months will be:
- Site cleaning and tidying at Outfall, I-1, I-2 and I-3;
  - TBM drilling of the tunnel and mucking out of tunnel spoil at Outfall;
  - Drilling, excavation and rock splitting at spiral ramp at Outfall;
  - Removal of existing retaining wall and hanging support for existing utilities at fast lane of CPR at Outfall;
  - Excavation and soil nailing for box culvert construction at fast lane of CPR east bound at Outfall;
  - Removal of existing sea wall and armour rocks for basin scheme at Portion E;
  - Placing levelling stone and bagged concrete to formation of sea wall at Portion E;
  - Installation of precast seawall blocks and panels for construction of outfall apron at Portion E;

- Drilling and excavation of vortex shaft at I-3;
- Construction of PB wall structure skin wall and coping beam and backfilling at I-3;
- Construction of approach channel at I-3;
- Construction of boulder traps at I-3;
- Drilling, excavation and rock splitting of man access shaft and vortex drop shaft at I-2;
- Pipe jacking at Portion G at I-2;
- Pre-bored H-pile construction for skin wall at Portion G at I-2;
- Construction of approach channel structure at I-2;
- Construction of 750 step channel and catchpit at Portion G at I-2;
- Cascade and channel modification concrete structure works at I-1;
- Construction of horizontal pipe pile (pipe roofing) for TBM break-through at I-1; and
- Construction of vehicular access at I-1.



# 1 INTRODUCTION

- 1.1.1 The Drainage Services Department (DSD) proposed to construct a tunnel with an internal diameter of 6.5 m and a length of 5.13 km, with the purpose to alleviate the flooding risk in Tsuen Wan and Kwai Chung.
- 1.1.2 This project is a Designated Project under Schedule 2 Part I Category Q, of the Environmental Impact Assessment Ordinance (EIAO) as part of the proposed Tsuen Wan Drainage Tunnel (TWDT) passes underneath the existing Tai Mo Shan Country Park. An Environmental Impact Assessment (EIA) Study has therefore been undertaken to provide information on the nature and extent of environmental impacts arising from the construction and operation of the proposed designated project and related activities taking place concurrently. From the EIA, the recommendations for monitoring contained herein are made.
- 1.1.3 The Maeda-CREC-SELI Joint Venture (MCSJV) was awarded by DSD with the Contract – Design and Construction of Tsuen Wan Drainage Tunnel.
- 1.1.4 Hyder was commissioned by the MCSJV as the Environmental Team (ET) to implement an EM&A programme in accordance with the EM&A Manual. The proposed tunnel section flows from the junction of Shing Mun Road and Wo Yi Hop Road and discharges to south of Yau Kom Tau underneath Castle Peak Road as shown in Appendix A.
- 1.1.5 The construction works of the Project was commenced in January 2008. This is the thirty-seventh monthly EM&A report summarising the impact monitoring results and audit findings of the EM&A programme in April 2011.

## 2 PROJECT INFORMATION

### 2.1 Project Organization and Management Structure

2.1.1 The organization chart and lines of communication with respect to the on-site environmental management are shown in Appendix B.

### 2.2 Construction Progress

2.2.1 The overall project programme from the detail design to completion of all civil works shall take approximately 54 months. The construction programme is presented in Appendix C.

2.2.2 The major construction activities undertaken in the reporting month were:

- Site cleaning and tidying at Outfall, I-1, I-2 and I-3;
- Drilling, excavation and rock splitting at spiral ramp at Outfall;
- Tunnel boring machine (TBM) drilling of the tunnel and mucking out of tunnel spoil at Outfall;
- Removal of existing retaining wall and hanging support for existing utilities at fast lane of Castle Peak Road (CPR) at Outfall;
- Excavation and soil nailing for box culvert construction at fast lane of CPR east bound at Outfall;
- Excavation and disposal of excavated material from existing arch bridge underneath CPR at Outfall;
- Placing levelling stone and bagged concrete to formation of sea wall at Portion E;
- Installation of precast sea wall blocks at Portion E;
- Drilling and excavation of vortex shaft at I-3;
- Construction of PB wall structure skin wall and copping beam at I-3;
- Construction of boulder traps at I-3;
- Installation of concrete blocks for temporary bund wall at I-3;
- Drilling, excavation and rock splitting of man access shaft and vortex drop shaft I-2;
- Pipe jacking at Portion G at I-2;
- Pre-bored H-pile construction for skin wall at Portion G at I-2;
- Construction of approach channel structure at I-2;
- Construction of 750 step channel and catchpit at Portion G at I-2;
- Cascade and channel modification concrete structure works at I-1;
- Construction of horizontal pipe pile (pipe roofing) for TBM break-through at I-1; and
- Construction of vehicular access at I-1.

2.2.3 As confirmed by the Contractor, no marine mud dredging works for basin scheme at Portion E was conducted in the reporting month.

2.2.4 As recommended in the EIA report, no TBM operation was undertaken during restricted hours from chainage 3308 m to 3143 m.

## 2.3 Mitigation Measures

2.3.1 The implemented environmental mitigation measures and their statuses are given in Appendix D.

## 2.4 Status of License and Permit

2.4.1 A summary of relevant permits and licences for the Project is given in Appendix E.

## 3 SUMMARY OF EM&A REQUIREMENT

### 3.1 Air Quality

#### Air Quality Parameters

- 3.1.1 One-hour total suspended particulates (TSP) levels were measured at the designated air monitoring locations in accordance with the EM&A Manual. Information such as date of monitoring, duration, weather condition, equipment used and monitoring results were recorded on the field data sheet developed for the Project. The monitoring results are presented in Section 4.

#### Monitoring Methodology

- 3.1.2 One-hour TSP monitoring was carried out under typical weather conditions (with no adverse weather such as typhoon signal or rain storm warning) three times every six days using High Volume Air Samplers (HVASs). Monitoring was conducted in accordance with the standard sampling method as set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA.
- 3.1.3 After each sampling, the filter paper loaded with dust was kept in a clean and tightly sealed plastic bag. The filter paper was then re-conditioned in desiccators for 24 hours before obtaining the weight under laboratory conditions.
- 3.1.4 The average concentrations of the TSP were calculated based on the following information obtained from monitoring:
- Flow rate;
  - Weight of the filter paper before and after sampling; and
  - Sampling period indicated by the elapsed-time meter.
- 3.1.5 All samples were kept in good condition (i.e. stored in sealed plastic bags, with brief description of the monitoring dates and locations) for a period of 6 months before disposal. Sample analysis was carried out by ALS Technichem (HK) Pty Limited (HOKLAS Registration Number 066).

#### Monitoring Equipment and Calibration

- 3.1.6 High Volume Air Samplers (HVASs) were used for 1-hour TSP monitoring to comply with the USEPA specifications in Appendix B Part 5 - Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method) of the Code of Federal Regulation dated June 1, 1991.
- 3.1.7 All HVASs were calibrated before commencement of monitoring using standard orifice 5-points calibration method with orifice calibrator to determine the actual flow rate of each HVAS. This was used for the calculation of the TSP level. Calibration Kit Model - TE5025A was used for calibration of the HVAS. Recalibration of the HVAS was carried out after motor maintenance, at least once every six months, which was about the expected life of carbon brush. The air quality monitoring equipment used during the

reporting month is shown in Table 3-1 below. The calibration certificates are included in Appendix F.

Equipment Type	Model	Serial Number	Calibration Orifice Number	Location
HVAS	BM2000HX	4994	1785	ASR 1
HVAS	BM2000HX	5875	1785	ASR 3
HVAS	TE5005X	1059	1785	ASR 8
HVAS	TE5005X	1713	1785	ASR 9

**Table 3-1 Air Quality Monitoring Equipment**

## Monitoring Location

3.1.8 Four designated air quality-monitoring locations were identified in the contract specific EM&A manual. They are listed in Table 3-2 below and shown in Appendix G.

Monitoring Station ID	Name of Premises	Floor Level
ASR1	Sik Sik Yuen Ho Fung College	G/F
ASR3	Hong Hoi Chee Hong Temple	Podium
ASR8	Beach Tower (Long Beach Gardens)	G/F
ASR9	Greenview Terrace (Block 1)	G/F

**Table 3-2 Air Quality Monitoring Locations**

## Action and Limit Levels

3.1.9 The Action and Limit Levels for the 1-hour TSP monitoring are shown in Table 3-3. In case exceedances of Action and/or Limit levels for air quality occur, Event Contingency Plans (ECPs) would be implemented. The ECPs for Action and Limit levels exceedances are shown in Table 3-4.

Station	1-hour TSP Level in $\mu\text{g}/\text{m}^3$	
	Action Level	Limit Level
ASR 1	307	500
ASR 3	327	500
ASR 8	337	500
ASR 9	329	500

**Table 3-3 Action & Limit Levels for Air Quality**

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
<b>ACTION LEVEL</b>				
Exceedance for one sample	<ul style="list-style-type: none"> <li>Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>Inform IEC and SOR;</li> <li>Repeat measurement to confirm finding;</li> <li>Increase monitoring frequency to daily.</li> </ul>	<ul style="list-style-type: none"> <li>Check monitoring data submitted by ET;</li> <li>Check Contractor's working method.</li> </ul>	<ul style="list-style-type: none"> <li>Notify Contractor.</li> </ul>	<ul style="list-style-type: none"> <li>Rectify any unacceptable practice;</li> <li>Amend working methods if appropriate.</li> </ul>
Exceedance for two or more consecutive samples	<ul style="list-style-type: none"> <li>Identify source;</li> <li>Inform IEC and SOR;</li> <li>Advise SOR on the effectiveness of the proposed remedial measures;</li> <li>Repeat measurements to confirm findings;</li> <li>Increase monitoring frequency to daily;</li> <li>Discuss with IEC and Contractor on remedial actions required;</li> <li>If exceedance continues, arrange meeting with IEC and SOR;</li> <li>If exceedance stops, cease additional monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Check monitoring data submitted by ET;</li> <li>Check Contractor's working method;</li> <li>Discuss with ET and Contractor on possible remedial measures;</li> <li>Advise the ET on the effectiveness of the proposed remedial measures;</li> <li>Supervise Implementation of remedial measures.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing;</li> <li>Notify Contractor;</li> <li>Ensure remedial measures properly implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Submit proposals for remedial to SOR within 3 working days of notification;</li> <li>Implement the agreed proposals;</li> <li>Amend proposal if appropriate.</li> </ul>
<b>LIMIT LEVEL</b>				
Exceedance for one sample	<ul style="list-style-type: none"> <li>Identify source, investigate the causes of exceedance and propose remedial measures;</li> </ul>	<ul style="list-style-type: none"> <li>Check monitoring data submitted by ET;</li> <li>Check Contractor's working method;</li> <li>Discuss with ET and</li> </ul>	<ul style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing;</li> <li>Notify Contractor;</li> <li>Ensure remedial</li> </ul>	<ul style="list-style-type: none"> <li>Take immediate action to avoid further exceedance;</li> <li>Submit proposals for remedial actions to IEC within 3 working</li> </ul>

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
	<ul style="list-style-type: none"> <li>• Inform IEC, SOR, Contractor and EPD;</li> <li>• Repeat measurement to confirm finding;</li> <li>• Increase monitoring frequency to daily;</li> <li>• Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SOR informed of the results.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor on possible remedial measures;</li> <li>• Advise SOR on the effectiveness of the proposed remedial measures;</li> <li>• Supervise implementation of remedial measures.</li> </ul>	<ul style="list-style-type: none"> <li>• measures properly implemented.</li> </ul>	<ul style="list-style-type: none"> <li>• days of notification;</li> <li>• Implement the agreed proposals;</li> <li>• Amend proposal if appropriate.</li> </ul>
Exceedance for two or more consecutive samples	<ul style="list-style-type: none"> <li>• Notify IEC, SOR, Contractor and EPD;</li> <li>• Identify source;</li> <li>• Repeat measurement to confirm findings;</li> <li>• Increase monitoring frequency to daily;</li> <li>• Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li> <li>• Arrange meeting with IEC and SOR to discuss the remedial actions to be taken;</li> <li>• Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SOR informed of the results;</li> <li>• If exceedance stops, cease additional monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss amongst SOR, ET, and Contractor on the potential remedial actions;</li> <li>• Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise SOR accordingly;</li> <li>• Supervise the implementation of remedial measures.</li> </ul>	<ul style="list-style-type: none"> <li>• Confirm receipt of notification of exceedance in writing;</li> <li>• Notify Contractor;</li> <li>• In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>• Ensure remedial measures properly implemented;</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Take immediate action to avoid further exceedance;</li> <li>• Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>• Implement the agreed proposals;</li> <li>• Resubmit proposals if problem still not under control;</li> <li>• Stop the relevant portion of works as determined by SOR until the exceedance is abated.</li> </ul>

**Table 3-4 Event/Action Plan for Air Quality**

## 3.2 Noise

### Noise Parameters

- 3.2.1 The construction noise level was measured in terms of equivalent A-weighted sound pressure level ( $L_{eq}$ ) measured in decibels (dB(A)). Monitoring of  $L_{eq(30\text{ min})}$  was carried out at the noise monitoring locations on a weekly basis during normal construction working hours (0700-1900 hours from Monday to Saturday except public holidays). For all other time periods (i.e. restricted hours),  $L_{eq(5\text{ min})}$  would be employed for comparison with the Noise Control Ordinance (NCO) criteria if necessary.
- 3.2.2 The two statistical sound levels  $L_{10}$  and  $L_{90}$ , the level exceeded for 10 and 90 percent of the time respectively, were also recorded during monitoring. Major noise sources observed, both on-site and off-site, were recorded on the field data sheet. All measurements were recorded and presented to the nearest 0.1 dB(A) in this report. Results are presented in Section 4.

### Monitoring Methodology

- 3.2.3 Sound level meters, which comply with the International Electrotechnical Commission Publication 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to the Technical Memorandum (TM) issued under the Noise Control Ordinance, were used. Noise levels for the A-weighted levels  $L_{eq(30\text{min})}$ ,  $L_{10}$  and  $L_{90}$  were measured throughout the impact monitoring. An average, by sound power, of six consecutive 5 minutes readings was used to provide  $L_{eq(30\text{ min})}$  for non-restricted hours (07:00-19:00 hours from Monday to Saturday except public holidays). A facade correction of 3 dB(A) was applied to the measurements that were carried out under free field conditions.
- 3.2.4 During the impact monitoring, parameters such as dates, weather condition, equipment used, measurement results and major noise sources were recorded on the field data record sheet. Monitoring would not be carried out in the presence of fog, rain or strong wind with a steady speed exceeding 5 m/s. In relation to the monitored noise levels, other noise sources such as road traffic might make a significant contribution to the overall noise environment. Therefore, noise monitoring activities would take into account such influencing factors, which were not present during the baseline monitoring period.

### Monitoring Equipment and Calibration

- 3.2.5 Rion Precision Sound Level Meters of Type NL-31 and B&K Integrating Sound Level Meter of Type 2238 in compliance with the International Electrotechnical Commission Publication specifications (Paragraph 3.2.3) were used for noise monitoring in this reporting month.
- 3.2.6 Prior to and following each noise measurement, the accuracy of the sound level meters was checked using an acoustic calibrator (B&K 4231) generating a known sound pressure level at a known frequency. Measurements were considered as valid only if the calibration levels from before and after the noise measurement agreed to within 1.0 dB(A). Sound level meters and calibrators were calibrated annually to ensure they performed to the same level of accuracy as stated in the manufacturer's specifications.



The noise monitoring equipments used during the reporting month are shown in Table 3-5 below. The calibration certificates are included in Appendix F.

Equipment Type	Manufacturer	Type Number	Serial Number	Location
Sound Level Meter	Rion	NL-31	00410224	NSR1, NSR3,
Sound Level Meter	B&K	2238	2562782	NSR6, NSR8 and NSR9
Sound Level Meter	B&K	2238	2448529	
Sound Level Calibrator	B&K	4231	2699361	

**Table 3-5 Noise Monitoring Equipment**

## Monitoring Location

3.2.7 Five designated noise monitoring locations were identified in the contract specific EM&A manual. They are listed in Table 3-6 below and shown in Appendix G. All the locations below are in facade measurement.

Monitoring Station ID	Name of Premises	Floor Level
NSR1	Sik Sik Yuen Ho Fung College	G/F
NSR3	Hong Hoi Chee Hong Temple	Podium
NSR6	Squatters	G/F
NSR8	Beach Tower (Long Beach Gardens)	G/F
NSR9	Greenview Terrace (Block 1)	Podium (up to 6 July 2009) Roof* (since 16 July 2009)

\* The noise monitoring location of NSR9 had been adjusted to rooftop since 16 July 2009.

**Table 3-6 Noise Monitoring Locations**

## Construction Ground Borne Noise

3.2.8 Prediction of construction ground borne noise indicates the criteria will be achieved at most NSRs except exceedances predicted at Hong Hoi Chee Hong Temple (NSR3) and Squatters (NSR6). It is recommended to restrict the TBM operation in non-restricted period (i.e. 0700 – 1900 hours) at these NSRs. In order to ensure proper control of ground borne noise is executed by the contractor, a monitoring requirement is recommended at the Hong Hoi Chee Hong Temple at Intake 2 and Squatters at Intake 3 for compliance checking. Ground borne noise impact monitoring will be carried out only when operation of TBM is conducted within area under monitoring requirement. Detail of the monitoring area and period can be referred to a stand-alone document of *Ground Borne Noise Monitoring Methodology*.

3.2.9 Ground borne noise impact monitoring will be carried out once per week during the monitoring period at NSR 3 and NSR 6, respectively. Parameters such as date, weather condition, equipments used, measurement results and major noise sources will be

recorded on the field data record sheet. Monitoring should be carried out at the ground floor inside the building with all windows, doors and openings being closed. Electrical appliances, such as air conditioners and television, and any other that may emit sound during operation will be switched off or removed to minimise disturbance to the monitoring. If ground borne noise criterion is exceeded, the monitoring shall continue daily until acceptance has been restored against the criterion. Otherwise the monitoring can be discontinued.

3.2.10 The ground borne noise monitoring at NSR 6 was conducted from 1 March 2011 (chainage section 3406 m) to 14 April 2011 (chainage section 2991 m), in order to cover the ground borne noise monitoring zone for NSR 6 between chainage section 3067 m and 3342 m. For NSR 3, the monitoring will be commenced around late June 2011 in estimation according to the progress of works. A layout plan showing the chainage and the location of ground borne noise monitoring station at NSR 6 is shown in Figure 7 of Appendix G.

3.2.11 The criteria including Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites (TM-Places) under the NCO stipulates that noise transmitted primarily through the structural elements of building, or buildings, shall be 10 dB(A) less than the relevant ANLs. Daytime ground borne construction noise criterion of 60 dB(A) therefore applies with reference to Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO) 70 dB(A) criterion for schools and taking account of the minus 10 dB(A) requirement under the NCO TM-Places. Following the same principle for ground borne noise criteria, ground borne construction noise levels inside domestic premises relying on opened window for ventilation will be limited to 65 dB(A), with reference to the daytime airborne noise criterion of 75 dB(A) in accordance with the TM-EIAO.

## Action and Limit Levels

3.2.12 The Action and Limit levels for construction noise are defined in Table 3-7. If non-compliance of the criteria occurs, actions in accordance with the Action Plan in Table 3-8 would be carried out.

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

\* For educational establishments the limit level shall be 70 dB(A) and reduced to 65 dB(A) during examination periods between 0700-1900 hours on normal weekdays.

**Table 3-7 Action & Limit Levels for Air Borne Noise**

Event	Action			
	ET Leader	IEC	SOR	Contractor
Action Level	<ul style="list-style-type: none"> <li>Notify IEC and the Contractor.</li> <li>Carry out investigation.</li> </ul>	<ul style="list-style-type: none"> <li>Review with analysed results submitted by ET.</li> <li>Review the proposed</li> </ul>	<ul style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing.</li> <li>Notify the Contractor.</li> </ul>	<ul style="list-style-type: none"> <li>Submit noise mitigation proposals to IEC.</li> <li>Implement noise</li> </ul>

Event	Action			
	ET Leader	IEC	SOR	Contractor
	<ul style="list-style-type: none"> <li>Report the results of investigation to IEC and the Contractor.</li> <li>Discuss with the Contractor and formulate remedial measures.</li> <li>Increase monitoring frequency to check mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>remedial measures by the Contractor and advise SOR accordingly.</li> <li>Supervise the implement of remedial measures.</li> </ul>	<ul style="list-style-type: none"> <li>Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>Ensure remedial measures are properly implemented.</li> </ul>	<ul style="list-style-type: none"> <li>mitigation proposals.</li> </ul>
Limit Level	<ul style="list-style-type: none"> <li>Identify the source.</li> <li>Notify IEC, SOR, EPD and the Contractor.</li> <li>Repeat measurement to confirm findings.</li> <li>Increase monitoring frequency.</li> <li>Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented.</li> <li>Inform IEC, SOR, and EPD the causes and actions taken for the exceedances.</li> <li>Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and SOR informed of the results.</li> <li>If exceedance stops, cease additional monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss amongst SOR, ET Leader and the Contractor on the potential remedial actions.</li> <li>Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise SOR accordingly.</li> <li>Supervise the implementation of remedial measures.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing.</li> <li>Notify the Contractor.</li> <li>Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>Ensure remedial measures are properly implemented.</li> <li>If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.</li> </ul>	<ul style="list-style-type: none"> <li>Take immediate action to avoid further exceedance.</li> <li>Submit proposals for remedial actions to IEC within 3 working days of notification.</li> <li>Implement the agreed proposals.</li> <li>Resubmit proposals if problem still not under control.</li> <li>Stop the relevant activity of works as determined by the SOR until the exceedance is abated.</li> </ul>

**Table 3-8 Event/Action Plan for Airborne Noise**

3.2.13 The Action and Limit levels for construction ground borne noise are defined in Table 3-9. If non-compliance of the criteria occurs, actions in accordance with the Action Plan in Table 3-10 would be carried out.

Monitoring Station ID	NSR 3	NSR 6
Name of Premises	Hong Hoi Chee Hong Temple	Squatters
Action Level	When one documented complaint is received	
Limit Level	Working days during daytime (0700-1900 hours) ( $L_{eq(30min)}$ )	65 dB(A)

**Table 3-9 Action & Limit Levels for Ground Borne Noise**

Event	Action			
	ET Leader	IEC	SOR	Contractor
Action Level	<ul style="list-style-type: none"> <li>Notify IEC and the Contractor.</li> <li>Carry out investigation.</li> <li>Report the results of investigation to IEC and the Contractor.</li> <li>Discuss with the Contractor and formulate remedial measures.</li> <li>Increase monitoring frequency to daily until exceedance is abated.</li> </ul>	<ul style="list-style-type: none"> <li>Review with analysed results submitted by ET.</li> <li>Review the proposed remedial measures by the Contractor and advise SOR accordingly.</li> <li>Supervise the implementation of remedial measures.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing.</li> <li>Notify the Contractor.</li> <li>Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>Ensure remedial measures are properly implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Submit noise mitigation proposals to IEC.</li> <li>Implement noise mitigation proposals.</li> </ul>
Limit Level	<ul style="list-style-type: none"> <li>Identify the source.</li> <li>Notify IEC, SOR, EPD and the Contractor.</li> <li>Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented.</li> <li>Inform IEC, SOR, and EPD the causes &amp; actions taken for the exceedances.</li> <li>Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and SOR informed of the results.</li> <li>Increase monitoring frequency to daily until</li> </ul>	<ul style="list-style-type: none"> <li>Discuss amongst SOR, ET Leader and the Contractor on the potential remedial actions.</li> <li>Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise SOR accordingly.</li> <li>Supervise the implementation of remedial measures.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing.</li> <li>Notify the Contractor.</li> <li>Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>Ensure remedial measures are properly implemented.</li> <li>If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work</li> </ul>	<ul style="list-style-type: none"> <li>Take immediate action to avoid further exceedance.</li> <li>Submit proposals for remedial actions to IEC within 3 working days of notification.</li> <li>Implement the agreed proposals.</li> <li>Resubmit proposals if problem still not under control.</li> <li>Stop the relevant activity of works as determined by the SOR until the exceedance is abated.</li> </ul>

Event	Action			
	ET Leader	IEC	SOR	Contractor
	exceedance is abated.		until the exceedance is abated.	

**Table 3-10 Event/Action Plan for Ground Borne Noise**

## 3.3 Water Quality

3.3.1 The water quality impact would be insignificant with the protection measures recommended in Section 5.6 of the EIA report. However, in view of the sensitive nature of the rivers/streams and bathing beaches in the Study Area, it is suggested that a programme of monitoring should be established to confirm the effectiveness of these mitigation measures in protecting these water bodies.

### Water Quality Parameters

3.3.2 Monitoring for Dissolved Oxygen (DO), temperature, turbidity, pH and suspended solids (SS) should be undertaken at designated monitoring locations. It should be noted that DO, temperature, turbidity and pH should be measured in-situ whereas SS is assayed in a laboratory.

3.3.3 In association with the water quality parameters, other relevant data should also be measured, such as monitoring location/position, time, weather conditions, and any special phenomena and description of work underway at the construction site etc.

### Monitoring Methodology

3.3.4 In accordance with the EM&A Manual, the water quality monitoring for all specified parameters were measured at all designated monitoring locations including control points at an interval of 3 days per week. DO, temperature, turbidity, pH and SS measurements were undertaken at designated monitoring locations.

3.3.5 It should be noted that water samples for all monitoring parameters were collected, stored, preserved and analysed according to Standard Methods, APHA 17 ed. and/or methods agreed by the Director of Environmental Protection.

3.3.6 Each sample was analysed in accordance with the APHA Standard Methods for the Examination of Water and Wastewater, 18<sup>th</sup> edition, or an equivalent method approved by the EPD. In any circumstance, the sample testing should comply with a comprehensive quality assurance and quality control programme. The laboratory should be prepared to demonstrate the quality programmes to the EPD when requested.

### Monitoring Equipment and Calibration

3.3.7 All the water samples collected were transferred to clearly labelled and pre-cleaned sample containers with necessary preservatives immediately after collection. The sample containers were provided by a HOKLAS accredited laboratory. About 1 L of

samples was collected for all laboratory analysis. Following sampling, samples should be stored in a cool box at temperature between 0 and 4 °C, and transported to the laboratory within the sample retention time as advised by the laboratory under proper chain-of-custody system. The water quality monitoring equipment used during the reporting month is shown in Table 3-11 below.

Equipment Type	Manufacturer	Model	Quantity
pH Meter / DO / Temperature Meter	WTW	PH/Oxi 340i	1
Turbidimeter	EUTECH	TN-100	1

**Table 3-11 Water Quality Monitoring Equipment**

- 3.3.8 All in situ monitoring equipment were checked and calibrated prior to use. They were calibrated by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibrations for all DO meters were carried out before measurement at each monitoring location. For the on-site calibration of field equipment, BS 127:1993, "Guide to field and on-site test methods for the analysis of waters" was observed. The calibration certificates are included in Appendix F.

## Monitoring Location

- 3.3.9 Five designated impact monitoring locations (three river stations and two marine stations) and five control locations (three river control stations and two marine control stations) were identified in the contract specific EM&A Manual for river and marine water quality monitoring. These monitoring stations are listed in Table 3-12 below and shown in Appendix G.

Monitoring Station ID	Name of Premises
<i>River</i>	
I-1	Intake I-1
I-1-C	Control of Intake I-1
I-2	Intake I-2
I-2-C	Control of Intake I-2
I-3	Intake I-3
I-3-C*	Control of Intake I-3
<i>Marine</i>	
O-1 (FT) and (ET)	Outfall O-1 during Flood Tide and Ebb Tide
O-1-C (FT)	Control of Outfall O-1 during Flood Tide
O-1-C (ET)	Control of Outfall O-1 during Ebb Tide

\*The upper stream location (I-3-C\*) had been relocated from end of February 2009 due to coarse stone blockage.

**Table 3-12 Water Quality Monitoring Locations**

3.3.10 Note that there were two control stations for Outfall O-1, one for sampling during flood tide and one for sampling during ebb tide. Only one of those control stations for Outfall O-1 was sampled during each sampling. Control station to be sampled was determined based on the tidal information provided by the Hong Kong Observatory.

## Action and Limit Levels

3.3.11 The Action and Limit levels for water quality monitoring parameters are defined in Table 3-13. In case of any exceedance, appropriate actions would be undertaken in accordance with the Event and Action Plan as described in Table 3-14.

Parameters	Action	Limit
DO in mg/L (Surface, Middle and Bottom)	<u>Surface and Middle</u> 5%-ile of baseline data for surface and middle layer.	<u>Surface and Middle</u> 4 mg/L except 5 mg/L for FCZ or 1%-ile of baseline data for surface and middle layer
	<u>Bottom</u> 5%-ile of baseline data for bottom layer.	<u>Bottom</u> 2 mg/L or 1%-ile of baseline data for bottom layer
SS in mg/L (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's SS at the same tide of the same day	99%-ile of baseline or 130% of upstream control station's SS at the same tide of the same day and specific sensitive receiver water quality requirements (e.g. required

Parameters	Action	Limit
		suspended solids levels for concerned sea water intakes)
Turbidity (Tby) in NTU (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's Tby at the same tide of the same day	99%-ile of baseline or 130% of upstream control station's Tby at the same tide of the same day

Notes:

- For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limit.
- For SS and Tby, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered necessary.

**Table 3-13 Action/Limit Levels for Water Quality**



Event	ET Leader	IEC	SOR	Contractor
Action Level being exceeded by one sampling day	<ul style="list-style-type: none"> <li>Repeat in-situ measurement to confirm finding;</li> <li>Identify source(s) of impact;</li> <li>Inform IEC and Contractor;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC and Contractor; and</li> <li>Repeat measurement on next day of exceedance.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and</li> <li>Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures; and</li> <li>Make agreement on the mitigation measures to be implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Inform the SOR and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and propose mitigation measures to IEC and SOR; and</li> <li>Implement the agreed mitigation measures.</li> </ul>
Action Level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> <li>Repeat in-situ measurement to confirm finding;</li> <li>Identify source(s) of impact;</li> <li>Inform IEC and Contractor;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Prepare to increase the monitoring frequency to daily; and</li> <li>Repeat</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and</li> <li>Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures;</li> <li>Make agreement on the mitigation measures to be implemented; and</li> <li>Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Inform the Engineer and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and propose mitigation measures to IEC and SOR within 3 working days; and</li> <li>Implement the agreed mitigation measures.</li> </ul>

Event	ET Leader	IEC	SOR	Contractor
	measurement on next day of exceedance.			
Limit Level being exceeded by one sampling day	<ul style="list-style-type: none"> <li>Repeat in-situ measurement to confirm finding;</li> <li>Identify source(s) of impact;</li> <li>Inform IEC, Contractor and EPD;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC, SOR and Contractor;</li> <li>Ensure mitigation measures are implemented; and</li> <li>Increase the monitoring frequency to daily until no exceedance of Limit level.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and</li> <li>Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures; and</li> <li>Request Contractor to critically review the working methods;</li> <li>Make agreement on the mitigation measures to be implemented; and</li> <li>Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Inform the Engineer and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and SOR and propose mitigation measures to IEC and SOR within 3 working days; and</li> <li>Implement the agreed mitigation measures.</li> </ul>
Limit Level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> <li>Repeat in-situ measurement to confirm finding;</li> <li>Identify source(s) of impact;</li> <li>Inform IEC, Contractor and EPD;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and</li> <li>Assess the effectiveness of the implemented mitigation</li> </ul>	<ul style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures; and</li> <li>Request Contractor to critically review the working methods;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of</li> </ul>	<ul style="list-style-type: none"> <li>Inform the SOR and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and SOR</li> </ul>

Event	ET Leader	IEC	SOR	Contractor
	IEC, SOR and Contractor; <ul style="list-style-type: none"> <li>• Ensure mitigation measures are implemented; and</li> <li>• Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</li> </ul>	measures.	the implemented mitigation measures; and <ul style="list-style-type: none"> <li>• Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level.</li> </ul>	and propose mitigation measures to IEC and SOR within 3 working days; <ul style="list-style-type: none"> <li>• Implement the agreed mitigation measures; and</li> <li>• As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities.</li> </ul>

**Table 3-14 Event/Action Plan for Water Quality**

## 4 MONITORING RESULT

### 4.1 Air Quality

4.1.1 The air quality monitoring schedule of the reporting period is given in Appendix H.

#### 1-hour TSP Monitoring

4.1.2 Results of 1-hour TSP level are shown in Table 4-1. All measurements were recorded and presented to the nearest 0.1  $\mu\text{g}/\text{m}^3$  in this report. Detailed results including weather conditions and graphical presentations are presented in Appendix I.

Station	Monitoring Date	Monitoring Result ( $\mu\text{g}/\text{m}^3$ )	Action/Limit Levels ( $\mu\text{g}/\text{m}^3$ )
ASR 1	04-Apr-11	81.3	307/500
		118.8	
		100.7	
	08-Apr-11	69.7	
		55.5	
		107.1	
	14-Apr-11	90.4	
		91.6	
		147.2	
	20-Apr-11	102.0	
		77.4	
		86.5	
	26-Apr-11	81.3	
		180.7	
		109.7	
29-Apr-11	151.0		
	139.4		
	116.2		
ASR 3	04-Apr-11	88.1	327/500
		122.4	
		209.4	
	08-Apr-11	64.9	
		67.3	
		122.4	
	14-Apr-11	82.0	
		77.1	
		112.6	
	20-Apr-11	99.2	
78.4			
		90.6	

Station	Monitoring Date	Monitoring Result ( $\mu\text{g}/\text{m}^3$ )	Action/Limit Levels ( $\mu\text{g}/\text{m}^3$ )
ASR 8	26-Apr-11	148.1	337/500
		113.9	
		82.0	
	29-Apr-11	149.4	
		128.6	
		128.6	
	04-Apr-11	86.9	
		98.4	
		89.5	
	08-Apr-11	46.0	
		60.1	
		84.4	
	14-Apr-11	129.1	
		126.6	
		102.3	
	20-Apr-11	164.9	
101.0			
117.6			
26-Apr-11	190.5		
	84.4		
	95.9		
29-Apr-11	147.0		
	126.6		
	148.3		
ASR 9	04-Apr-11	107.1	329/500
		144.6	
		90.3	
	08-Apr-11	42.6	
		58.1	
		98.1	
	14-Apr-11	120.0	
		216.8	
		117.5	
	20-Apr-11	206.5	
		132.9	
		118.7	
	26-Apr-11	277.5	
		207.8	
		160.0	
	29-Apr-11	143.3	
180.7			

Station	Monitoring Date	Monitoring Result ( $\mu\text{g}/\text{m}^3$ )	Action/Limit Levels ( $\mu\text{g}/\text{m}^3$ )
		140.7	

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*

**Bold** indicates the occurrence of exceedance of **Limit Level**

**Table 4-1 Air Quality Monitoring Results**

4.1.3 No project related air quality exceedance was recorded in the reporting month.

## 4.2 Noise

### Air Borne Noise Monitoring

4.2.1 The air borne noise monitoring schedule of the reporting period is given in Appendix H. Results of measured noise level, in terms of  $L_{\text{eq}}(30\text{min})$ , during the construction are shown in Table 4-2. All measurements including  $L_{10}$  and  $L_{90}$  are recorded and presented to the nearest 0.1 dB(A) in this report. Detailed results including weather conditions and graphical presentation are presented in Appendix I.

Station	Monitoring Date	$L_{\text{eq}}(30\text{ min})$ dB(A)	Limit Levels dB(A)
NSR 1	04-Apr-11	64.2	70
	14-Apr-11	62.6	
	20-Apr-11	64.2	
	26-Apr-11	64.4	
NSR 3	04-Apr-11	67.3	75
	14-Apr-11	68.4	
	20-Apr-11	60.9	
	26-Apr-11	62.6	
NSR 6	04-Apr-11	63.7	75
	14-Apr-11	66.2	
	20-Apr-11	58.2	
	26-Apr-11	63.3	
NSR 8	04-Apr-11	65.5	75
	14-Apr-11	63.7	
	20-Apr-11	68.8	

Station	Monitoring Date	L <sub>eq</sub> (30 min) dB(A)	Limit Levels dB(A)
NSR 9	26-Apr-11	65.1	
	04-Apr-11	74.1	
	14-Apr-11	68.3	
	20-Apr-11	68.8	
	26-Apr-11	73.4	

**Table 4-2 Air Borne Noise Monitoring Results**

4.2.2 No project related air borne noise exceedance was recorded in the reporting month.

## Ground Borne Noise Monitoring

4.2.3 The ground borne noise monitoring schedule of the reporting period is given in Appendix H. Results of measured noise level, in terms of L<sub>eq</sub> (30min), during the monitoring period are shown in Table 4-3. All measurements including L<sub>10</sub> and L<sub>90</sub> are recorded and presented to the nearest 0.1 dB(A) in this report. Detailed results including weather conditions and graphical presentation are presented in Appendix I.

Station	Monitoring Date	TBM Location Chainage (m)	L <sub>eq</sub> (30 min) dB(A)	Limit Levels dB(A)
NSR 6	04-Apr-11	3121	43.9	65
	14-Apr-11	2991	46.5	

**Table 4-3 Ground Borne Noise Monitoring Results**

4.2.4 No project related ground borne noise exceedance was recorded in the reporting month.

## 4.3 Water Quality Monitoring

4.3.1 The water quality monitoring schedule of the reporting period is given in Appendix H. Summaries of exceedances for water quality monitoring are provided in Table 4-4 to Table 4-8.

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Two records on 8 and 18 April 2011	One record on 6 April 2011
Total	2	1

**Table 4-4 Summary of Exceedances for I-1**

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Nil	Nil
Total	Nil	Nil

**Table 4-5 Summary of Exceedances for I-2**

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Nil	Nil
Total	Nil	Nil

**Table 4-6 Summary of Exceedances for I-3**

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Three records on 8, 11 and 13 April 2011	Nil
Total	3	Nil

**Table 4-7 Summary of Exceedances for O-1(FT)**

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Nil	Nil
Total	Nil	Nil

**Table 4-8 Summary of Exceedances for O-1(ET)**

4.3.2 Results of measured water quality parameters during the reporting month are shown in Table 4-9. Detailed results including weather conditions and graphical presentations are enclosed in Appendix I.

## River Water Quality Monitoring

4.3.3 Three non-project related exceedances were recorded for the river water quality monitoring within the reporting month.



## Exceedances of Suspended Solids Level

### Action Level at I-1 on 8 April 2011

- 4.3.4 One exceedance of SS action level was recorded at I-1 on 8 April 2011. The measured SS level (9.45 mg/L) was above the baseline action level, but lower than the SS level of the control station (I-1-C) (10.00 mg/L). General site cleaning, rebar fixing at cascade bay 3, formwork preparing, removal of masonry wall, pipe roof corning drilling and geotechnical instrumentation monitoring were undertaken during the measurement. No direct disturbance was observed from the site. Thus, the exceedance was considered to be contributed by high SS level of the upstream location and natural variation. Therefore, no action was required.

### Action Level at I-1 on 18 April 2011

- 4.3.5 One exceedance of SS action level was recorded at I-1 on 18 April 2011. The measured SS level (2.70 mg/L) was below the baseline action level, but higher than 120% of SS level of the control station (I-1-C) (2.10 mg/L). General site cleaning, formwork at Cascade Bay 3 and 4, construction of H-pile platform, pipe roof drilling and geotechnical instrumentation monitoring were undertaken during the measurement. No direct disturbance was observed from the site. Thus, the exceedance was considered to be contributed by natural variation and no action was required.

### Limit Level at I-1 on 6 April 2011

- 4.3.6 One exceedance of SS limit level was recorded at I-1 on 6 April 2011. The measured SS level (10.95 mg/L) was above the baseline limit level, but lower than 120% of SS level of the control station (I-1-C) (10.60 mg/L). General site cleaning, rebar fixing at cascade bay 1, dismantling of formwork at vehicle access, removal of hoarding and masonry wall and geotechnical instrumentation monitoring were undertaken during the measurement. No direct disturbance was observed from the site. Thus, the exceedance was considered to be contributed by high SS level at upstream location and natural variation. Therefore, no action was required.

## Marine Water Quality Monitoring

- 4.3.7 Three exceedances were recorded for the marine water quality monitoring within the reporting month.

## Exceedances of Suspended Solids Level

### Action Level at O-1(FT) on 8, 11 and 13 April 2011

- 4.3.8 Three exceedances of SS action levels were recorded at O-1(FT) on 8, 11 and 13 April 2011. The measured SS levels (depth-averaged) at O-1(FT) (5.35, 5.27 and 3.90 mg/L, respectively) were below the baseline action/limit level but were higher than 120% of the control station's SS level (O-1-C(FT)) (4.20, 4.27 and 3.03 mg/L, respectively) at the same tide of the same day. The construction activities conducted includes laying non-woven geo-textile and backfilling grade 200 rockfill behind installed seawall blocks on 8 April 2011, installation of temporary concrete blocks and placing levelling stone on 11 April 2011 and installation of bagged concrete for seawall formation on 13 April 2011.

During monitoring, silt curtain was deployed along the Portion E boundary line and extended from seawater level to seabed and floating type silt curtain was also employed at the inner side. Since there was no other marine works during monitoring, the exceedances were considered to be contributed by natural variation and no further action was required.

Station	Date	Temperature	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-1	01-Apr-11	23.90	6.90	3.42 / 3.34	8.06	3.89	9.75 / 12.47	4.30	8.85 / 10.17
	04-Apr-11	19.50	7.53		8.05	5.10		4.45	
	06-Apr-11	22.70	7.13		8.11	9.42		<b>10.95</b>	
	08-Apr-11	21.90	6.97		8.11	5.16		9.45	
	11-Apr-11	28.50	6.76		8.02	7.59		8.20	
	13-Apr-11	23.70	7.27		8.18	4.59		4.50	
	15-Apr-11	24.35	7.10		8.12	4.47		4.20	
	18-Apr-11	26.00	7.23		8.06	4.78		2.70	
	20-Apr-11	24.05	7.17		7.96	3.70		2.25	
	26-Apr-11	27.00	7.18		8.10	3.49		<2.00	
	28-Apr-11	28.10	6.94		8.07	2.61		<2.00	
	30-Apr-11	24.25	7.16		8.07	2.42		2.10	

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-1-C	01-Apr-11	23.90	7.10	- / -	8.06	3.93	- / -	4.35	- / -
	04-Apr-11	19.50	7.43		8.06	5.50		4.60	
	06-Apr-11	22.60	7.25		8.10	9.54		10.60	
	08-Apr-11	21.90	7.08		8.10	5.09		10.00	
	11-Apr-11	28.60	6.73		8.03	7.77		7.75	
	13-Apr-11	23.70	7.33		8.18	4.68		4.80	
	15-Apr-11	24.40	7.25		8.12	4.63		5.20	
	18-Apr-11	26.10	7.19		8.06	4.92		2.10	
	20-Apr-11	24.00	7.03		7.95	3.79		<2.00	
	26-Apr-11	26.90	7.11		8.11	3.55		<2.00	
	28-Apr-11	28.00	6.99		8.07	2.48		<2.00	
	30-Apr-11	24.30	7.35		8.08	2.51		<2.00	

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-2	01-Apr-11	22.55	6.68	3.66 / 3.63	8.70	1.29	6.63 / 6.99	<2.00	7.68 / 8.34
	04-Apr-11	19.70	7.58		8.89	1.59		<2.00	
	06-Apr-11	22.00	7.56		8.91	1.52		<2.00	
	08-Apr-11	21.85	7.37		8.01	1.91		<2.00	
	11-Apr-11	28.05	7.08		8.06	1.82		<2.00	
	13-Apr-11	23.40	7.46		8.40	1.27		<2.00	
	15-Apr-11	25.10	7.14		8.01	1.09		<2.00	
	18-Apr-11	26.10	7.25		8.11	2.14		<2.00	
	20-Apr-11	24.20	7.24		8.00	1.60		<2.00	
	26-Apr-11	26.70	7.10		7.99	1.69		<2.00	
	28-Apr-11	28.15	7.26		8.01	1.87		<2.00	
	30-Apr-11	24.05	7.33		8.06	1.97		3.20	

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-2-C	01-Apr-11	23.00	6.78	- / -	8.72	1.29	- / -	<2.00	- / -
	04-Apr-11	19.80	7.71		8.88	1.56		<2.00	
	06-Apr-11	21.85	7.83		8.90	1.50		<2.00	
	08-Apr-11	22.00	7.37		8.02	1.95		<2.00	
	11-Apr-11	28.10	7.00		8.05	1.93		<2.00	
	13-Apr-11	23.50	7.57		8.40	1.69		<2.00	
	15-Apr-11	25.00	7.06		8.02	1.14		<2.00	
	18-Apr-11	26.20	7.15		8.10	2.20		2.50	
	20-Apr-11	24.20	7.21		7.99	1.68		<2.00	
	26-Apr-11	26.60	7.19		7.99	1.70		<2.00	
	28-Apr-11	28.30	7.19		8.02	1.91		2.05	
	30-Apr-11	24.20	7.43		8.07	1.99		6.15	

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-3	01-Apr-11	23.30	7.34	3.65 / 3.51	9.51	1.53	3.99 / 4.18	<2.00	6.13 / 7.23
	04-Apr-11	20.55	7.67		9.37	1.86		<2.00	
	06-Apr-11	22.45	7.38		9.12	1.95		<2.00	
	08-Apr-11	22.10	7.40		9.77	1.96		<2.00	
	11-Apr-11	28.15	6.90		9.70	1.90		<2.00	
	13-Apr-11	23.30	7.60		9.35	1.76		<2.00	
	15-Apr-11	25.00	7.59		9.08	1.14		<2.00	
	18-Apr-11	26.40	7.09		9.50	1.92		<2.00	
	20-Apr-11	24.30	7.10		9.72	1.46		<2.00	
	26-Apr-11	26.00	7.20		9.91	1.17		<2.00	
	28-Apr-11	27.90	7.17		9.90	2.21		<2.00	
	30-Apr-11	24.65	7.11		8.97	1.91		<2.00	

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-3-C	01-Apr-11	23.10	7.41	- / -	9.50	1.50	- / -	<2.00	- / -
	04-Apr-11	20.50	7.91		9.37	1.83		<2.00	
	06-Apr-11	22.30	7.35		9.10	1.92		<2.00	
	08-Apr-11	22.10	7.48		9.75	1.97		<2.00	
	11-Apr-11	28.20	6.83		9.71	1.92		<2.00	
	13-Apr-11	23.30	7.49		9.36	1.69		<2.00	
	15-Apr-11	25.10	7.49		9.07	1.20		<2.00	
	18-Apr-11	26.50	7.08		9.50	1.98		<2.00	
	20-Apr-11	24.30	7.04		9.73	1.45		<2.00	
	26-Apr-11	26.00	7.22		9.90	1.13		<2.00	
	28-Apr-11	27.75	7.21		9.91	2.29		<2.00	
	30-Apr-11	24.70	7.20		8.90	1.96		<2.00	

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.



Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)
O-1(FT)	01-Apr-11	Surface		7.39	6.84 / 6.81	8.31	3.58	10.35 / 13.15	5.47	14.10 / 18.08
		Middle	22.15	7.27						
		Bottom		7.33						
	04-Apr-11	Surface		7.68	6.84 / 6.81	8.41	1.13		2.55	
		Middle	19.60	7.38						
		Bottom		7.39						
	06-Apr-11	Surface		7.80	6.84 / 6.81	8.43	2.34		4.97	
		Middle	20.52	7.79						
		Bottom		7.93						
	08-Apr-11	Surface		7.18	6.84 / 6.81	8.39	1.81		5.35	
		Middle	22.63	7.40						
		Bottom		7.36						
	11-Apr-11	Surface		7.38	6.84 / 6.81	8.58	2.24		5.27	
		Middle	26.10	7.21						
		Bottom		7.46						
	13-Apr-11	Surface		7.61	6.84 / 6.81	8.59	1.13		3.90	
		Middle	22.62	7.51						
		Bottom		7.58						

Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)
O-1(FT)	15-Apr-11	Surface		7.54				10.35 / 13.15	2.37	14.10 / 18.08
		Middle	27.05	7.44	6.84 / 6.81	8.61	1.25			
		Bottom		7.51	6.99 / 6.96					
	18-Apr-11	Surface		7.18	6.84 / 6.81			5.38		
		Middle	25.38	7.22	6.84 / 6.81	8.57	3.63			
		Bottom		7.06	6.99 / 6.96					
	20-Apr-11	Surface		7.05	6.84 / 6.81			4.32		
		Middle	24.30	7.06	6.84 / 6.81	8.37	3.51			
		Bottom		7.16	6.99 / 6.96					
	26-Apr-11	Surface		7.40	6.84 / 6.81			2.57		
		Middle	27.40	7.31	6.84 / 6.81	8.37	3.35			
		Bottom		7.22	6.99 / 6.96					
	28-Apr-11	Surface		7.27	6.84 / 6.81			8.10		
		Middle	27.87	7.10	6.84 / 6.81	8.49	2.17			
		Bottom		7.20	6.99 / 6.96					
	30-Apr-11	Surface		7.06	6.84 / 6.81			4.07		
		Middle	24.03	7.24	6.84 / 6.81	8.38	2.11			
		Bottom		7.24	6.99 / 6.96					

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)
O-1-C(FT)	01-Apr-11	Surface		7.32	- / -			- / -		- / -
		Middle	22.30	7.26	- / -	8.31	3.64		6.10	
		Bottom		7.36	- / -					
	04-Apr-11	Surface		7.71	- / -					
		Middle	19.77	7.51	- / -	8.41	1.15		3.12	
		Bottom		7.45	- / -					
	06-Apr-11	Surface		7.67	- / -					
		Middle	20.55	7.62	- / -	8.43	2.42		4.40	
		Bottom		7.84	- / -					
	08-Apr-11	Surface		7.57	- / -					
		Middle	22.73	7.36	- / -	8.39	1.82		4.20	
		Bottom		7.46	- / -					
	11-Apr-11	Surface		7.36	- / -					
		Middle	26.07	7.26	- / -	8.59	2.25		4.27	
		Bottom		7.22	- / -					
	13-Apr-11	Surface		7.51	- / -					
		Middle	22.57	7.76	- / -	8.59	1.15		3.03	
		Bottom		7.65	- / -					

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.

**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)	
O-1-C(FT)	15-Apr-11	Surface		7.60	- / -			- / -		- / -	
		Middle	26.98	7.31	- / -	8.60	1.24		2.52		
		Bottom		7.51	- / -						
	18-Apr-11	Surface			7.05	- / -					
		Middle	25.40		7.21	- / -	8.57	3.63		5.02	
		Bottom			7.05	- / -					
	20-Apr-11	Surface			7.16	- / -					
		Middle	24.27		7.04	- / -	8.37	4.72		7.90	
		Bottom			7.09	- / -					
	26-Apr-11	Surface			7.28	- / -					
		Middle	27.43		7.18	- / -	8.38	3.94		2.42	
		Bottom			7.26	- / -					
	28-Apr-11	Surface			7.27	- / -					
		Middle	27.80		7.19	- / -	8.49	2.20		9.22	
		Bottom			7.07	- / -					
	30-Apr-11	Surface			7.21	- / -					
		Middle	24.03		7.30	- / -	8.38	2.07		3.98	
		Bottom			7.25	- / -					

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.

**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)
O-1(ET)	01-Apr-11	Surface		7.37	7.02 / 6.94	8.29	3.01	11.87/13.44	5.38	13.25/14.39
		Middle	23.18	7.22						
		Bottom		7.33						
	04-Apr-11	Surface		7.68	7.02 / 6.94	8.41	1.65		4.62	
		Middle	19.55	7.54						
		Bottom		7.72						
	06-Apr-11	Surface		7.84	7.02 / 6.94	8.45	1.42		2.62	
		Middle	20.75	7.99						
		Bottom		7.71						
	08-Apr-11	Surface		7.45	7.02 / 6.94	8.39	2.08		2.45	
		Middle	22.52	7.48						
		Bottom		7.40						
	11-Apr-11	Surface		7.51	7.02 / 6.94	8.59	2.12		3.87	
		Middle	26.53	7.56						
		Bottom		7.58						
	13-Apr-11	Surface		7.67	7.02 / 6.94	8.58	1.48		4.73	
		Middle	22.73	7.63						
		Bottom		7.75						

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.

**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)
O-1(ET)	15-Apr-11	Surface		7.45	7.02 / 6.94	8.60	1.53	11.87/13.44	3.70	13.25/14.39
		Middle	26.88	7.57						
		Bottom		7.29						
	18-Apr-11	Surface		7.15	7.02 / 6.94	8.54	3.62		4.02	
		Middle	25.18	7.12						
		Bottom		7.29						
	20-Apr-11	Surface		7.46	7.02 / 6.94	8.37	2.14		3.25	
		Middle	24.55	7.09						
		Bottom		7.14						
	26-Apr-11	Surface		7.23	7.02 / 6.94	8.37	2.13		2.48	
		Middle	27.07	7.31						
		Bottom		7.20						
	28-Apr-11	Surface		7.23	7.02 / 6.94	8.47	2.22		3.00	
		Middle	27.58	7.22						
		Bottom		7.40						
	30-Apr-11	Surface		7.18	7.02 / 6.94	8.40	2.15		3.72	
		Middle	23.70	7.13						
		Bottom		7.27						

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.

**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)
O-1-C(ET)	01-Apr-11	Surface		7.43	- / -			- / -		- / -
		Middle	23.67	7.27	- / -	8.29	3.24		4.68	
		Bottom		7.26	- / -					
	04-Apr-11	Surface		7.59	- / -					
		Middle	19.43	7.56	- / -	8.42	1.61		6.60	
		Bottom		7.54	- / -					
	06-Apr-11	Surface		7.49	- / -					
		Middle	20.72	7.66	- / -	8.44	1.38		2.55	
		Bottom		7.54	- / -					
	08-Apr-11	Surface		7.38	- / -					
		Middle	22.50	7.50	- / -	8.40	2.09		3.03	
		Bottom		7.53	- / -					
	11-Apr-11	Surface		7.42	- / -					
		Middle	26.53	7.51	- / -	8.58	2.25		3.65	
		Bottom		7.64	- / -					
	13-Apr-11	Surface		7.84	- / -					
		Middle	22.85	7.61	- / -	8.57	1.55		4.05	
		Bottom		7.69	- / -					

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.

**Bold** indicates the occurrence of exceedance of **Limit level**.

Station	Date	Depth	Temperature (°C) (depth-averaged)	DO (mg/L)	Action / Limit Level for DO (mg/L)	pH (depth-averaged)	Turbidity (NTU) (depth-averaged)	Action / Limit Level for Turbidity (NTU)	SS (mg/L) (depth-averaged)	Action / Limit Level for SS (mg/L)
O-1-C(ET)	15-Apr-11	Surface		7.42	- / -			- / -		- / -
		Middle	26.87	7.52	- / -	8.61	1.53		3.92	
		Bottom		7.36	- / -					
	18-Apr-11	Surface		7.21	- / -					
		Middle	25.27	7.25	- / -	8.54	3.66		4.15	
		Bottom		7.19	- / -					
	20-Apr-11	Surface		7.25	- / -					
		Middle	24.57	7.12	- / -	8.37	2.36		3.57	
		Bottom		7.10	- / -					
	26-Apr-11	Surface		7.13	- / -					
		Middle	27.05	7.17	- / -	8.37	2.51		2.38	
		Bottom		7.25	- / -					
	28-Apr-11	Surface		7.30	- / -					
		Middle	27.57	7.22	- / -	8.47	2.23		2.73	
		Bottom		7.29	- / -					
	30-Apr-11	Surface		7.29	- / -					
		Middle	23.78	7.31	- / -	8.40	2.24		3.62	
		Bottom		7.20	- / -					

**Note:** *Italic* indicates the occurrence of exceedance of *Action level*.  
**Bold** indicates the occurrence of exceedance of **Limit level**.

**Table 4-9 Water Quality Monitoring Results**



## 4.4 Summary of Project-Related Exceedances

4.4.1 Table 4-10 summarises the project-related exceedance results recorded in April 2011. Note that exceedances that are considered not related to the construction activities are not included in this table.

Environmental Monitoring	Total No. of Measurement	Action Level Exceedance	% of Action Level Exceedance	Limit Level Exceedance	% of Limit Level Exceedance
Air Quality	72	0	0	0	0
Air Borne Noise	20	0	0	0	0
Ground Borne Noise	2	0	0	0	0
Water	120	0	0	0	0

Note: Exceedances that are considered not related to the construction activities are not included in this table.

**Table 4-10 Summary of Project-Related Exceedances**

## 5 WASTE MANAGEMENT

5.1.1 The status of waste management is summarised in Table 5-1.

Status of waste management	Quantity
Inert C&D Material Disposed of to Public Fill at Tuen Mun (m <sup>3</sup> )	3,105.4
Inert C&D Material Reused in this Contracts (m <sup>3</sup> )	181.0
Inert C&D Material Reused in other Contracts* (m <sup>3</sup> )	17,946.7
Metals Generated (kg)	Nil
Paper / Cardboard Packaging (kg)	Nil
Plastics (kg)	Nil
Chemical Waste (kg)	4,341.4
General Waste Disposed of to NENT Landfill (m <sup>3</sup> )	34.8

\* Other Contracts include DC/2007/08, YL/2009/01, HY/2007/10, HY/2008/09, Wo Shang Wai, DC/2007/17, CV/2009/14, Tailor Recycle Aggregate, XRL 823A and 823B, XRL 825 and TW7.

**Table 5-1 Waste Generated in April 2011**

## 6 NON-COMPLIANCE AND DEFICIENCY

### 6.1 Site Audit by ET

6.1.1 ET has carried out two site inspections in the reporting month. All observations together with the appropriate recommended mitigation measures where necessary were recorded in the audit checklists that were passed to the Contractor. Major environmental deficiencies observed during site inspection/audits and recommendation, which were made by the ET, are summarised in Table 6-1 below. No non-compliance was observed.

Inspection Date	Observation	Recommendation	Status
8 April 2011	1. Unused empty drums at man access shaft were found at Intake I-2.	1. The Contractor was reminded to remove on-site unused empty drums and disposal in proper manner.	1. Unused empty drums at man access shaft were found removed and disposal in proper manner on 9 April 2011. (Closed)
21 April 2011	1. Temporary slope was not covered by tarpaulin sheet properly at Intake I-3.	1. The Contractor was reminded to cover temporary slope by tarpaulin sheet properly.	1. Temporary slope was found covered by tarpaulin sheet properly on 21 April 2011. (Closed)

**Table 6-1 Site Inspection by ET**

## 7 COMPLAINT

- 7.1.1 A complaint hotline at **9850 3241** of the Contractor has been established for the Project.
- 7.1.2 No environmental complaint was received during the reporting month. Details of the past complaint investigation and observations can be referred to Appendix K.
- 7.1.3 Cumulative statistics of environmental complaints are shown in Table 7-1.

Complaints Received in the Reporting Month	Cumulative Number of Complaints
0	21

**Table 7-1 Cumulative Statistics of Environmental Complaints**

## 8 SUMMARY OF NOTIFICATION OF SUMMONS, SUCCESSFUL PROSECUTIONS AND CORRECTIVE ACTIONS

- 8.1.1 No summons and successful prosecution was received during the reporting month.
- 8.1.2 Cumulative statistics of notification of summons, successful prosecutions and convictions are shown in Table 8-1.

Notification of Summons		Successful Prosecution and conviction	
April 2011	Cumulative	April 2011	Cumulative
0	0	0	0

**Table 8-1 Cumulative Statistics of Notification of Summons and Successful Prosecutions and Convictions**

## 9 FUTURE KEY ISSUE

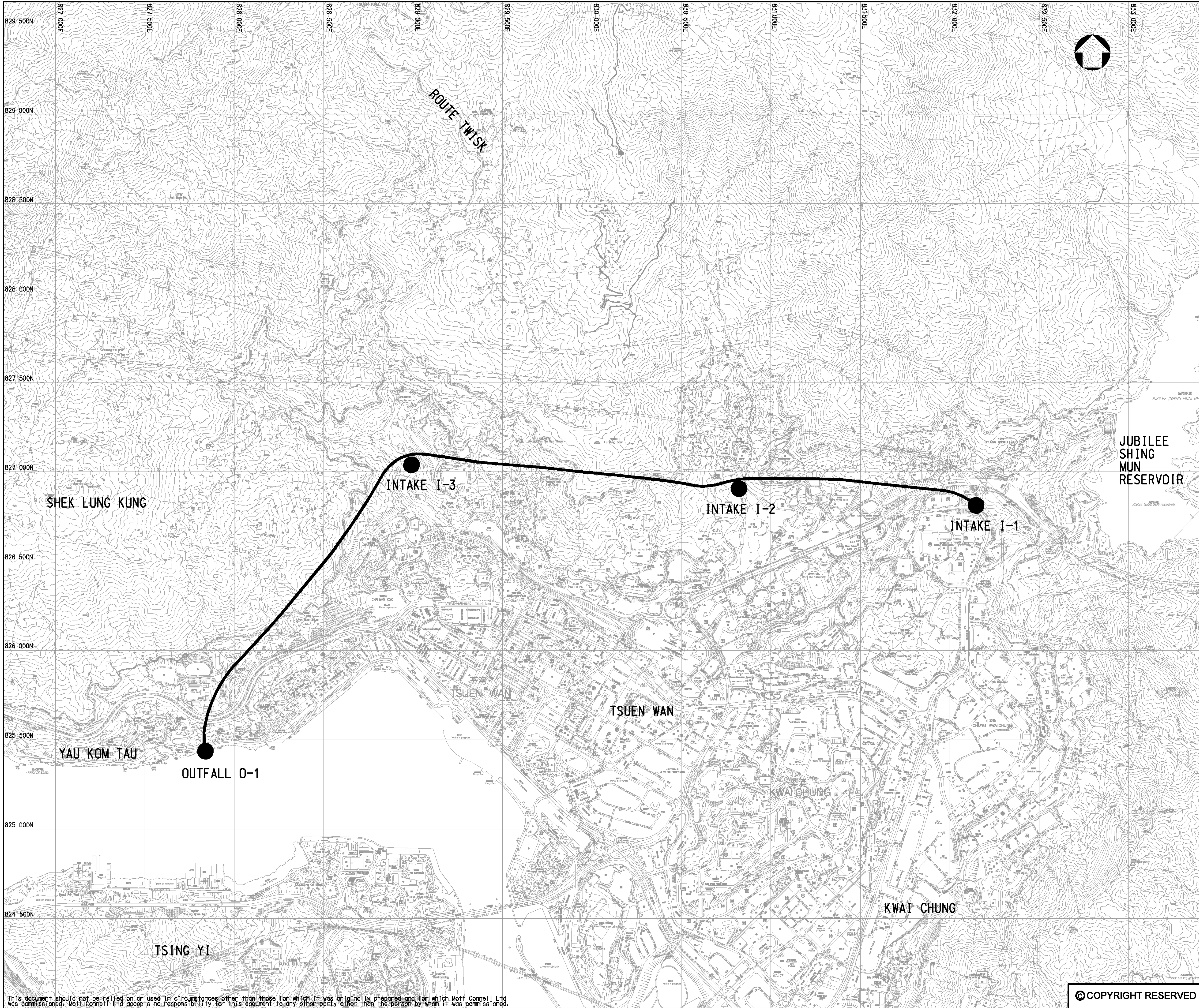
9.1.1 The forecast of construction works for the upcoming three months are:

- Site Cleaning and tidying at Outfall, I-1, I-2 and I-3;
- TBM drilling of the tunnel and mucking out of tunnel spoil at Outfall;
- Drilling, excavation and rock splitting at spiral ramp at Outfall;
- Removal of existing retaining wall and hanging support for existing utilities at fast lane of CPR at Outfall;
- Excavation and soil nailing for box culvert construction at fast lane of CPR east bound at Outfall;
- Removal of existing sea wall and armour rocks for basin scheme at Portion E;
- Placing levelling stone and bagged concrete to formation of sea wall at Portion E;
- Installation of precast seawall blocks and panels for construction of outfall apron at Portion E;
- Drilling and excavation of vortex shaft at I-3;
- Construction of PB wall structure skin wall and coping beam and backfilling at I-3;
- Construction of approach channel at I-3;
- Construction of boulder traps at I-3;
- Drilling, excavation and rock splitting of man access shaft and vortex drop shaft at I-2;
- Pipe jacking at Portion G at I-2;
- Pre-bored H-pile construction for skin wall at Portion G at I-2;
- Construction of approach channel structure at I-2;
- Construction of 750 step channel and catchpit at Portion G at I-2;
- Cascade and channel modification concrete structure works at I-1;
- Construction of horizontal pipe pile (pipe roofing) for TBM break-through at I-1; and
- Construction of vehicular access at I-1.

## Appendix A

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### Site Map and Works Area



**Key Plan:**

**Notes:**

1. CO-ORDINATES REFER TO HONG KONG METRIC GRID (1980).
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (P.D.).
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

**Key to symbols**

**LEGENDS :**

- TUNNEL ALIGNMENT
- INTAKE/OUTFALL STRUCTURES

B1	MAR 05	EL	FOR EMA&A MANUAL	<i>M</i>	<i>De</i>
Rev	Date	Drawn	Description	Ch'kd	App'd

**Client**

The Government of the Hong Kong  
Special Administrative Region  
Drainage Services Department

**Consulting Engineers**

**Mott Connell Ltd.**

in Association with  
MVA Hong Kong Ltd EDAW Earth Asia Ltd Environmental Resources  
WL/Delft Hydraulics Ltd Chesterton Petty Ltd Management

**Project**

Drainage Improvement in  
Tsuen Wan and Kwai Chung -  
Tsuen Wan Drainage Tunnel -  
Investigation

**Title**

TUNNEL ALIGNMENT  
AND SURROUNDING AREA

Designed	CF	<i>cf</i>	Eng.Chk.	MT	<i>M</i>
Drawn	HL	HL	Approved	TMC	<i>De</i>
Dwg.Chk.	KN	<i>KN</i>	Scale		
Project	204417				Status
CAD file	J:\204417\DRAWING\FIGURE EMA&A MANUAL\FIGURE1.1.dgn				
Drawing No.	FIGURE 1.1				Rev 01

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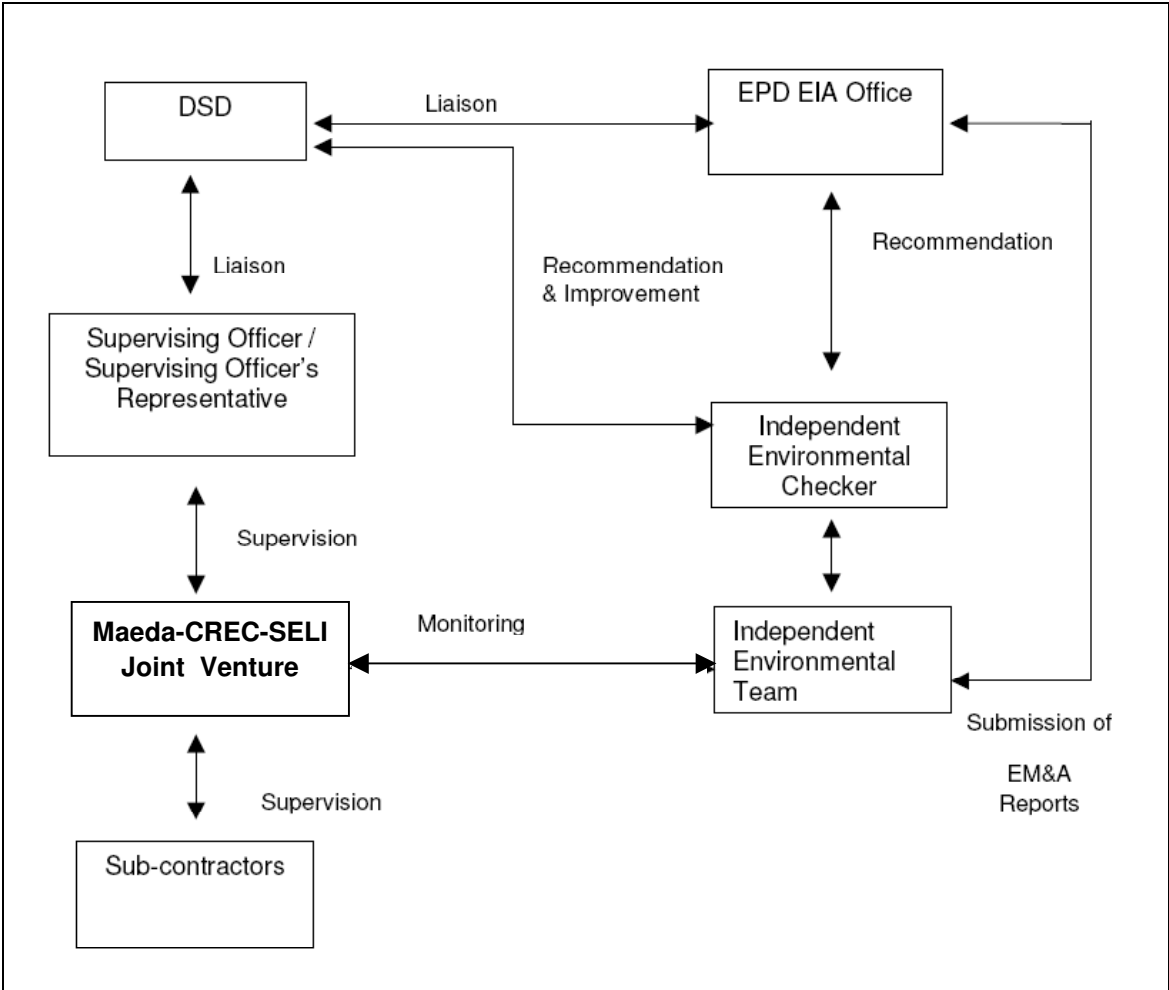
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## Appendix B

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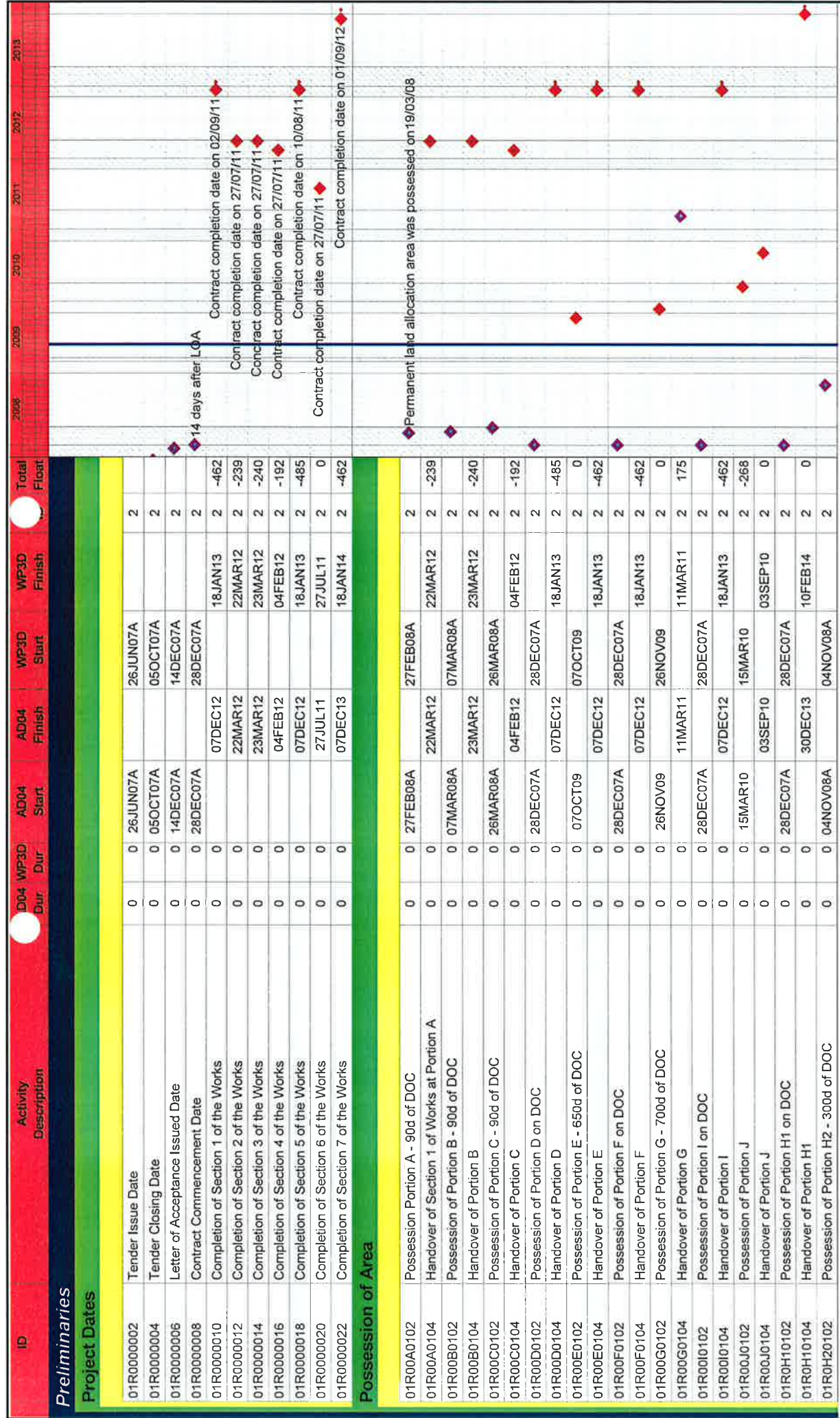
### Organization Chart



## Appendix C

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# Construction Programme



ID	Activity Description	D04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Total Float
01R0000002	Tender Issue Date	0	0	26JUN07A		26JUN07A		2
01R0000004	Tender Closing Date	0	0	05OCT07A		05OCT07A		2
01R0000006	Letter of Acceptance Issued Date	0	0	14DEC07A		14DEC07A		2
01R0000008	Contract Commencement Date	0	0	28DEC07A		28DEC07A		2
01R0000010	Completion of Section 1 of the Works	0	0	07DEC12	18JAN13		18JAN13	-462
01R0000012	Completion of Section 2 of the Works	0	0	22MAR12	22MAR12		22MAR12	-239
01R0000014	Completion of Section 3 of the Works	0	0	23MAR12	23MAR12		23MAR12	-240
01R0000016	Completion of Section 4 of the Works	0	0	04FEB12	04FEB12		04FEB12	-192
01R0000018	Completion of Section 5 of the Works	0	0	07DEC12	18JAN13		18JAN13	-485
01R0000020	Completion of Section 6 of the Works	0	0	27JUL11	27JUL11		27JUL11	0
01R0000022	Completion of Section 7 of the Works	0	0	07DEC13	18JAN14		18JAN14	-462
<b>Possession of Area</b>								
01R00A0102	Possession Portion A - 90d of DOC	0	0	27FEB08A		27FEB08A		2
01R00A0104	Handover of Section 1 of Works at Portion A	0	0	22MAR12	22MAR12		22MAR12	-239
01R00B0102	Possession of Portion B - 90d of DOC	0	0	07MAR08A		07MAR08A		2
01R00B0104	Handover of Portion B	0	0	23MAR12	23MAR12		23MAR12	-240
01R00C0102	Possession of Portion C - 90d of DOC	0	0	26MAR08A		26MAR08A		2
01R00C0104	Handover of Portion C	0	0	04FEB12	04FEB12		04FEB12	-192
01R00D0102	Possession of Portion D on DOC	0	0	28DEC07A		28DEC07A		2
01R00D0104	Handover of Portion D	0	0	07DEC12	18JAN13		18JAN13	-485
01R00E0102	Possession of Portion E - 650d of DOC	0	0	07OCT09		07OCT09		2
01R00E0104	Handover of Portion E	0	0	07DEC12	18JAN13		18JAN13	-462
01R00F0102	Possession of Portion F on DOC	0	0	28DEC07A		28DEC07A		2
01R00F0104	Handover of Portion F	0	0	07DEC12	18JAN13		18JAN13	-462
01R00G0102	Possession of Portion G - 700d of DOC	0	0	26NOV09		26NOV09		2
01R00G0104	Handover of Portion G	0	0	11MAR11	11MAR11		11MAR11	175
01R00I0102	Possession of Portion I on DOC	0	0	28DEC07A		28DEC07A		2
01R00I0104	Handover of Portion I	0	0	07DEC12	18JAN13		18JAN13	-462
01R00J0102	Possession of Portion J	0	0	15MAR10		15MAR10		2
01R00J0104	Handover of Portion J	0	0	03SEP10	03SEP10		03SEP10	-268
01R0H10102	Possession of Portion H1 on DOC	0	0	28DEC07A		28DEC07A		2
01R0H10104	Handover of Portion H1	0	0	30DEC13	10FEB14		10FEB14	0
01R0H20102	Possession of Portion H2 - 300d of DOC	0	0	04NOV08A		04NOV08A		2

Date	Revision	Checked	Approved
22JUN09	Works Program Revision "WP02"		
10AUG09	Works Program Revision "WP3D"		
04SEP09	WP3D-TBM Halt Speed at WSD Tunnel#3		
07OCT09	WP3E		
22OCT09	WP04		

Maeda-CREC-SELI JV  
**CONTRACT NO. DC/2007/12**  
**Design and Construction of**  
**Tsuen Wan Drainage Tunnel**  
 Addendum to Works Programme "WP04"

AD04

29JUN07  
 30DEC13  
 28MAY09  
 22OCT09 10:37

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Sheet 1 of 58



ID	Activity Description	D04		WP3D		AD04		WP3D		AD04		Total Float
		Dur	Dur	Start	Finish	Start	Finish	Start	Finish	Start	Finish	
01R0001417	Install furnitures/internet & move in	2	2	14JUL08A	17JUL08A	14JUL08A	17JUL08A	14JUL08A	17JUL08A	14JUL08A	17JUL08A	1
<b>Works Programme &amp; Monthly Report as per SCC 27</b>												
01R0000502	Prepare/Submit draft Works Programme	7	7	14DEC07A	21DEC07A	14DEC07A	21DEC07A	14DEC07A	21DEC07A	14DEC07A	21DEC07A	2
01R0000504	SO's review/comment on draft Works Programme	14	14	22DEC07A	23JAN08A	22DEC07A	23JAN08A	22DEC07A	23JAN08A	22DEC07A	23JAN08A	2
01R0000505	Prepare/Submit draft Works Programme Rev. 1	28	28	24JAN08A	15FEB08A	24JAN08A	15FEB08A	24JAN08A	15FEB08A	24JAN08A	15FEB08A	2
01R0000506	Prepare/Submit 1st 3-Month Rolling Programme	14	14	14DEC07A	03JAN08A	14DEC07A	03JAN08A	14DEC07A	03JAN08A	14DEC07A	03JAN08A	2
01R0000507	SO's approval on draft Works Programme	14	14	16FEB08A	28MAR08A	16FEB08A	28MAR08A	16FEB08A	28MAR08A	16FEB08A	28MAR08A	2
01R0000508	Submit Revised Works Programme	14	14	28AUG08A	30SEP08A	28AUG08A	30SEP08A	28AUG08A	30SEP08A	28AUG08A	30SEP08A	2
01R0000510	SO's Approval of Revised Works Programme	14	14	02OCT08A	28FEB09A	02OCT08A	28FEB09A	02OCT08A	28FEB09A	02OCT08A	28FEB09A	2
01R0000512	Monthly Update for all Programme	1,779	1,779	18JAN08A	31DEC12	18JAN08A	31DEC12	18JAN08A	18JAN13	18JAN08A	18JAN13	2
01R0000514	Contractor's Monthly Progress Report	1,775	1,775	22JAN08A	31DEC12	22JAN08A	31DEC12	22JAN08A	18JAN13	22JAN08A	18JAN13	2
<b>Safety Plan as per SCC 35</b>												
01R0000602	Submit draft Safety Plan	14	14	14DEC07A	29DEC07A	14DEC07A	29DEC07A	14DEC07A	29DEC07A	14DEC07A	29DEC07A	2
01R0000604	Hold an ad hoc meeting with RE on Safety Plan	7	7	31DEC07A	09JAN08A	31DEC07A	09JAN08A	31DEC07A	09JAN08A	31DEC07A	09JAN08A	2
01R0000606	Submit 6 copies of the Safety Plan	35	35	14DEC07A	26FEB08A	14DEC07A	26FEB08A	14DEC07A	26FEB08A	14DEC07A	26FEB08A	2
01R0000608	Submit updated safety organiza. chart monthly	1,747	1,747	20MAR08A	31DEC12	20MAR08A	31DEC12	20MAR08A	18JAN13	20MAR08A	18JAN13	2
17R0000602	Fulfill all relevant safety obligation	1,830	1,830	28DEC07A	31DEC12	28DEC07A	31DEC12	28DEC07A	18JAN13	28DEC07A	18JAN13	2
<b>Contractor's All Insurances</b>												
01R0000704	Submit documents for all insurances are effected	21	21	14DEC07A	02SEP08A	14DEC07A	02SEP08A	14DEC07A	02SEP08A	14DEC07A	02SEP08A	2
<b>Quality System as per ER 9.3</b>												
01R0000802	Appoint a Quality Manager	14	14	28DEC07A	02JAN08A	28DEC07A	02JAN08A	28DEC07A	02JAN08A	28DEC07A	02JAN08A	2
01R0000804	Submit proposed Quality System for SO's consent	28	28	14DEC07A	22JAN08A	14DEC07A	22JAN08A	14DEC07A	22JAN08A	14DEC07A	22JAN08A	2
01R0000806	Submit QSSP for approval of the SO	28	28	28DEC07A	14MAR08A	28DEC07A	14MAR08A	28DEC07A	14MAR08A	28DEC07A	14MAR08A	2
01R0000808	Maintain & update Quality System	1,802	1,802	25JAN08A	31DEC12	25JAN08A	31DEC12	25JAN08A	18JAN13	25JAN08A	18JAN13	2
<b>Environment</b>												
01R0000902	Nominate Environmental Officer	14	14	14DEC07A	21DEC07A	14DEC07A	21DEC07A	14DEC07A	21DEC07A	14DEC07A	21DEC07A	2
01R0000903	Establish a billing account for disposal	21	21	14DEC07A	02JAN08A	14DEC07A	02JAN08A	14DEC07A	02JAN08A	14DEC07A	02JAN08A	2
01R0000904	Submit draft EMP	21	21	14DEC07A	02JAN08A	14DEC07A	02JAN08A	14DEC07A	02JAN08A	14DEC07A	02JAN08A	2
01R0000906	Revise draft EMP within 7 days of SO's notice	14	14	04JAN08A	21FEB08A	04JAN08A	21FEB08A	04JAN08A	21FEB08A	04JAN08A	21FEB08A	2
01R0000908	Submit final version of EMP	45	45	14DEC07A	21FEB08A	14DEC07A	21FEB08A	14DEC07A	21FEB08A	14DEC07A	21FEB08A	2
01R0000910	Review/update/submit EMP monthly	1,769	1,769	28JAN08A	31DEC12	28JAN08A	31DEC12	28JAN08A	18JAN13	28JAN08A	18JAN13	2
01R0000912	Employ IET	21	21	14DEC07A	02JAN08A	14DEC07A	02JAN08A	14DEC07A	02JAN08A	14DEC07A	02JAN08A	2
01R0000914	Submit Baseline Monitoring Plan	21	21	28DEC07A	18JAN08A	28DEC07A	18JAN08A	28DEC07A	18JAN08A	28DEC07A	18JAN08A	2
01R0000915	Seek for EPD's Agreement on WQML & schedule	21	21	18JAN08A	31JAN08A	18JAN08A	31JAN08A	18JAN08A	31JAN08A	18JAN08A	31JAN08A	2
01R0000916	Carry out baseline monitoring	37	37	11FEB08A	20MAR08A	11FEB08A	20MAR08A	11FEB08A	20MAR08A	11FEB08A	20MAR08A	2
01R0000918	Prepare/submit reports for baseline monitoring	20	20	21MAR08A	28MAR08A	21MAR08A	28MAR08A	21MAR08A	28MAR08A	21MAR08A	28MAR08A	2
01R0000920	Impact monitoring & reporting	1,705	1,705	01APR08A	31DEC12	01APR08A	31DEC12	01APR08A	18JAN13	01APR08A	18JAN13	2







ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
VO028-04	Preparation works for new T.T. area	20	20	18AUG08A	07SEP08A	18AUG08A	07SEP08A	2	
01R0001502	Appoint Landscape Specialist Contractor	14	14	14DEC07A	14JAN08A	14DEC07A	14JAN08A	2	
01R0001504	SO's Approval of Landscape Contractor	7	7	15JAN08A	28FEB08A	15JAN08A	28FEB08A	2	
01R0001506	Nominate competent person to oversee tree works	45	45	14DEC07A	29JAN08A	14DEC07A	29JAN08A	2	
01R0001510	Obtain Tree Removal Permit by Others	90	90	28DEC07A	06MAR08A	28DEC07A	06MAR08A	2	
01R0001512	Remove / Transplant Trees start	0	0	08SEP08A	08SEP08A	08SEP08A	08SEP08A	2	
<b>Survey</b>									
01R0001602	Appoint Surveyors	14	14	28DEC07A	10JAN08A	28DEC07A	10JAN08A	2	
01R0001604	SO's Approval of Surveyor	7	7	11JAN08A	16APR08A	11JAN08A	16APR08A	2	
01R0001608	Initial Survey	28	28	18JAN08A	10MAR08A	18JAN08A	10MAR08A	1	
01R0001610	Maintain & carry out survey works	1,378	1,378	23FEB08A	07DEC12	23FEB08A	18JAN13	2	0
<b>Smart Card System as per ER B.30</b>									
01R0001802	Submit Smart Card Sys for SO's Approval	7	7	28DEC07A	15JAN08A	28DEC07A	15JAN08A	2	
01R0001804	Install & start Operating Smart-Card System	60	60	28DEC07A	23FEB08A	28DEC07A	23FEB08A	2	
01R0001806	Operate & Maintain Smart-Card System	1,771	1,771	25FEB08A	30NOV13	25FEB08A	11JAN14	2	0
<b>Procurement of Sub-contractor</b>									
01R0001904	Spoil Disposal	60	60	28AUG08A	27MAR09A	28AUG08A	27MAR09A	2	
01R0001906	Earthwork for Outfall O-1	60	60	14DEC07A	05JUN08A	14DEC07A	05JUN08A	2	
01R0001910	Re-bar Supply	90	90	14DEC07A	30MAY08A	14DEC07A	30MAY08A	2	
01R0001912	Soil Nailing	60	60	28DEC07A	02APR08A	28DEC07A	02APR08A	2	
01R0001914	H-piling Works	90	90	14DEC07A	09MAY08A	14DEC07A	09MAY08A	2	
01R0001916	Fabrication of Pre-cast Lining	80	80	02JUN08A	05JAN09A	02JUN08A	05JAN09A	2	
01R0001920	Drainage/Road Works for Access Road at I-3	60	60	08AUG08A	03NOV08A	08AUG08A	03NOV08A	2	
01R0001922	Temp. steel decking over Shing Mun Nullah at I-1	90	90	14DEC07A	25APR08A	14DEC07A	25APR08A	2	
01R0001924	Design/Install Communication System	344	344	28JUN08A	26JUN09	28JUN08A	26JUN09	2	356
01R0001925	Design/install Flow Monitoring Devices	78	78	14JUL08A	01AUG08A	14JUL08A	01AUG08A	2	
01R0001936	Procurement & delivery of Communication System	180	180	06DEC09	03JUN10	06DEC09	03JUN10	2	356
01R0001938	Procurement/delivery of Flow Measurement Devices	120	120	11OCT09	07FEB10	11OCT09	07FEB10	2	501
01R0018A02	Supply TBM/Main Tunnel Construction	7	7	14DEC07A	21DEC07A	14DEC07A	21DEC07A	2	
01R0018A04	Security	17	17	17DEC07A	02JAN08A	17DEC07A	02JAN08A	2	
01R0018A06	Progress Photo/Vedio	25	25	29DEC07A	22JAN08A	29DEC07A	22JAN08A	2	
01R0018A08	Webpage/Physical Model/3D Animation	48	48	14DEC07A	14FEB08A	14DEC07A	14FEB08A	2	
01R0018A10	Hoarding/Fencing Erection	60	60	04JAN08A	03MAR08A	04JAN08A	03MAR08A	2	
01R0018A12	Erection of Contractor's Office	67	67	28DEC07A	03MAR08A	28DEC07A	03MAR08A	2	
01R0018A14	Remote Control CCTV	60	60	04JAN08A	03MAR08A	04JAN08A	03MAR08A	2	
01R0018A16	Concrete Supply	45	45	14DEC07A	11MAR08A	14DEC07A	11MAR08A	2	
01R0018A18	Geotechnical Instrumentation	60	60	15JAN08A	14MAR08A	15JAN08A	14MAR08A	2	
01R0018A20	Drilling/Grouting for Geotechnical Instrumental.	60	60	16JAN08A	15MAR08A	16JAN08A	15MAR08A	2	

ID	Activity Description	D04		WP3D		AD04		WP3D		Total Float
		Dur	Dur	Start	Finish	Start	Finish	Start	Finish	
01R0018A22	Site Clearance	60	60	26JAN08A	25MAR08A	26JAN08A	25MAR08A	26JAN08A	25MAR08A	2
01R0018A24	Erection of SOR's Office	95	95	02JAN08A	05APR08A	02JAN08A	05APR08A	02JAN08A	05APR08A	2
01R0018A26	Carry out Grout Trial at Fault F1	90	90	02APR08A	30JUN08A	02APR08A	30JUN08A	02APR08A	30JUN08A	2
01R0018A28	Design/Fabricate Segmental Lining Mould	90	90	23APR08A	21JUL08A	23APR08A	21JUL08A	23APR08A	21JUL08A	2
01R0018A30	Construction of Skin Walls	90	90	21JUL08A	03JAN09A	21JUL08A	03JAN09A	21JUL08A	03JAN09A	2
01R0018A32	Design/Fabricate/Supply/Install Conveyor Belt	90	90	14JUL08A	05JAN09A	14JUL08A	05JAN09A	14JUL08A	05JAN09A	2
01R0018A34	Supply of Locomotive	90	90	14JUL08A	10OCT08A	14JUL08A	10OCT08A	14JUL08A	10OCT08A	2
01R0018A36	Excavation Works at I-1	60	60	28AUG08A	21JAN09A	28AUG08A	21JAN09A	28AUG08A	21JAN09A	2
01R0018A38	Construction of Steel Platform at O-1	50	50	28AUG08A	14MAR09A	28AUG08A	14MAR09A	28AUG08A	14MAR09A	2
01R0018A40	Construction of Steel Platform at I-2	50	50	28AUG08A	27DEC08A	28AUG08A	27DEC08A	28AUG08A	27DEC08A	2
01R0018A42	Pre-excavation Grouting for Shaft Excavation	60	60	28AUG08A	11MAR09A	28AUG08A	11MAR09A	28AUG08A	11MAR09A	2
01R0018A46	Excavation/Construction of TBM Launching Chamber	70	70	28AUG08A	18DEC08A	28AUG08A	18DEC08A	28AUG08A	18DEC08A	2
01R0018A48	Construction of Subgrade Structure at I-1	333	333	28AUG08A	26JUL09	28AUG08A	26JUL09	28AUG08A	26JUL09	2
01R0018A50	Shaft Excavation by RCD at I-2	90	90	28AUG08A	26NOV08A	28AUG08A	26NOV08A	28AUG08A	26NOV08A	2
01R0018A52	Excavation/Construction of Shafts/Adits/Chambers	90	90	28AUG08A	26MAR09A	28AUG08A	26MAR09A	28AUG08A	26MAR09A	2
01R0018A54	Construction of Hopper at O-1	90	90	28AUG08A	31JAN09A	28AUG08A	31JAN09A	28AUG08A	31JAN09A	2
01R0018A56	Suttering of Spiral Ramp	233	233	28AUG08A	26JUL09	28AUG08A	26JUL09	28AUG08A	26JUL09	2
01R0018A58	Open Cut Excavation & Construction at I-3	90	90	28AUG08A	02MAY09A	28AUG08A	02MAY09A	28AUG08A	02MAY09A	2
01R0018A60	Lining Formworks for Underground Structures	233	233	28AUG08A	05AUG09	28AUG08A	05AUG09	28AUG08A	05AUG09	2
01R0018A61	Tunnel Data Management System (TDMS)	90	90	28AUG08A	03APR09A	28AUG08A	03APR09A	28AUG08A	03APR09A	2
01R0018A62	Supply of Rail Track	90	90	28AUG08A	26MAR09A	28AUG08A	26MAR09A	28AUG08A	26MAR09A	2
01R0018A64	Supply of Aggregate	120	120	28FEB09A	28JUL09	28FEB09A	28JUL09	28FEB09A	28JUL09	2
01R0018A68	Construct Box Culvert/Cascade/Spiral Ramp at O-1	200	200	28FEB09A	16SEP09	28FEB09A	16SEP09	28FEB09A	16SEP09	2
01R0018A70	Metal Works	200	200	28FEB09A	16OCT09	28FEB09A	16OCT09	28FEB09A	16OCT09	2
01R0018A72	Pipe Jacking Works at Lo Wai	250	250	28FEB09A	16OCT09	28FEB09A	16OCT09	28FEB09A	16OCT09	2
01R0018A74	Finishing Works	250	250	28FEB09A	05DEC09	28FEB09A	05DEC09	28FEB09A	05DEC09	2
<b>Others</b>										
01R0001928	Submit Contractor's Management Team	0	0		10JAN08A		10JAN08A		10JAN08A	2
01R0001930	Submit Photographer for Monthly Progress Photo	0	0	28JAN08A		28JAN08A		28JAN08A		2
01R0001932	Install Project Signboards at Portions A,B,C & D	30	30	28FEB09A	29MAY09	28FEB09A	29MAY09	28FEB09A	29MAY09	2
01R0001934	Presentation of TDMS to SOR/ Employer; ER 4.4.6	6	6	27MAR09A	06MAY09A	27MAR09A	06MAY09A	27MAR09A	06MAY09A	2
01R0001940	Prepare/submit Operation & Maintenance Manual	90	90	11NOV11	08FEB12	23DEC11	21MAR12	21MAR12	21MAR12	2
01R0001942	Prepare/submit As-built Drawings	90	90	08DEC12	07MAR13	19JAN13	18APR13	18APR13	18APR13	2
01R0001944	Produce 2 documentary video for tunnel	30	30	08DEC12	05JAN13	19JAN13	17FEB13	17FEB13	17FEB13	2
<b>Construction Risk Assessment (CRA) as per ER 7</b>										
<b>PCRA for Works at Portion A (I-1)</b>										
01R000PCRA2	Prepare/submit PCRA for works at I-1	21	21	07APR08A	20AUG08A	07APR08A	20AUG08A	07APR08A	20AUG08A	2
01R000PCRA4	DC review & certify PCRA for works at I-1	60	60	22MAY08A	13OCT08A	22MAY08A	13OCT08A	22MAY08A	13OCT08A	2
01R000PCRA6	SOR review & accept PCRA at works at I-1	60	60	12MAY08A	25SEP08A	12MAY08A	25SEP08A	12MAY08A	25SEP08A	2
01R000PCRA8	GEO review/agree PCRA	28	28	31OCT08A	09DEC08A	31OCT08A	09DEC08A	31OCT08A	09DEC08A	2
<b>PCRA for Works at Portion B (I-2)</b>										
01R000PCRB2	Prepare/submit PCRA for works at I-2	21	21	14APR08A	20AUG08A	14APR08A	20AUG08A	14APR08A	20AUG08A	2

ID	Activity Description	AD04		AD04		AD04		WP3D Start	WP3D Finish	Cal ID	Total Float
		Dur	WP3D Dur	Start	Finish	Start	Finish				
01R00PCRB4	DC review & certify PCRA for works at I-2	60	60	22MAY08A	13OCT08A	22MAY08A	13OCT08A	2			
01R00PCRB6	SOR review & accept PCRA at works at I-2	60	60	22MAY08A	25SEP08A	22MAY08A	25SEP08A	2			
01R00PCRB8	GEO review/agree PCRA	28	28	31OCT08A	09DEC08A	31OCT08A	09DEC08A	2			
<b>PCRA for Works at Portion C (I-3)</b>											
01R00PCRC2	Prepare/submit PCRA for works at I-3	21	21	01APR08A	20AUG08A	01APR08A	20AUG08A	2			
01R00PCRC4	DC review & certify PCRA for works at I-3	60	60	21MAY08A	13OCT08A	21MAY08A	13OCT08A	2			
01R00PCRC6	SOR review & accept PCRA at works at I-3	60	60	21MAY08A	25SEP08A	21MAY08A	25SEP08A	2			
01R00PCRC8	GEO review/agree PCRA	28	28	31OCT08A	09DEC08A	31OCT08A	09DEC08A	2			
<b>PCRA for Works at Portion D/E (O-1)</b>											
01R00PCRD2	Prepare/submit PCRA for works at O-1	21	21	01APR08A	20AUG08A	01APR08A	20AUG08A	2			
01R00PCRD4	DC review & certify PCRA for works at O-1	60	60	21MAY08A	13OCT08A	21MAY08A	13OCT08A	2			
01R00PCRD6	SOR review & accept PCRA at works at O-1	60	60	12MAY08A	25SEP08A	12MAY08A	25SEP08A	2			
01R00PCRD8	GEO review/agree PCRA	28	28	31OCT08A	09DEC08A	31OCT08A	09DEC08A	2			
<b>PCRA for Works at Portion F/J (Main Tunnel)</b>											
01R00PCRF2	Prepare/submit PCRA for main tunnel works	21	21	09JUN08A	23APR09A	09JUN08A	23APR09A	2			
01R00PCRF4	DC review & certify PCRA for main tunnel works	60	60	14JUL08A	08JUN09	14JUL08A	08JUN09	2			
01R00PCRF6	SOR review & accept PCRA for main tunnel works	60	60	16JUL08A	16JUN09	16JUL08A	16JUN09	2			
01R00PCRF8	GEO review/agree PCRA	28	28	28FEB09A	09JUN09	28FEB09A	09JUN09	2			
<b>DCRA for Works at Portion A (I-1)</b>											
01R00DCRA2	Prepare/submit DCRA for works at I-1	14	14	02OCT08A	27OCT08A	02OCT08A	27OCT08A	2			
01R00DCRA4	DC review & certify DCRA for works at I-1	21	21	28OCT08A	17FEB09A	28OCT08A	17FEB09A	2			
01R00DCRA6	SOR review & accept DCRA at works at I-1	49	49	05NOV08A	26MAR09A	05NOV08A	26MAR09A	2			
01R00DCRA8	GEO review/agree DCRA	28	28	28FEB09A	27MAR09A	28FEB09A	27MAR09A	2			
<b>DCRA for Works at Portion B (I-2)</b>											
01R00DCRB2	Prepare/submit DCRA for works at I-2	14	14	14OCT08A	02JUN09	14OCT08A	02JUN09	2			
01R00DCRB4	DC review & certify DCRA for works at I-2	21	21	05DEC08A	09JUN09	05DEC08A	09JUN09	2			
01R00DCRB6	SOR review & accept DCRA at works at I-2	49	49	10DEC08A	16JUN09	10DEC08A	16JUN09	2			
01R00DCRB8	GEO review/agree DCRA	28	28	10JUN09	07JUL09	10JUN09	07JUL09	2			
<b>DCRA for Works at Portion C (I-3)</b>											
01R00DCRC2	Prepare/submit DCRA for works at I-3	14	14	14OCT08A	03JUN09	14OCT08A	03JUN09	2			
01R00DCRC4	DC review & certify DCRA for works at I-3	21	21	31OCT08A	10JUN09	31OCT08A	10JUN09	2			
01R00DCRC6	SOR review & accept DCRA at works at I-3	49	49	07NOV08A	17JUN09	07NOV08A	17JUN09	2			
01R00DCRC8	GEO review/agree DCRA	28	28	11JUN09	08JUL09	11JUN09	08JUL09	2			
<b>DCRA for Works at Portion D/E (O-1)</b>											
01R00DCRD2	Prepare/submit DCRA for works at O-1	14	14	03NOV08A	03JUN09	03NOV08A	03JUN09	2			
01R00DCRD4	DC review & certify DCRA for works at O-1	21	21	15NOV08A	10JUN09	15NOV08A	10JUN09	2			
01R00DCRD6	SOR review & accept DCRA at works at O-1	49	49	15NOV08A	17JUN09	15NOV08A	17JUN09	2			
01R00DCRD8	GEO review/agree DCRA	28	28	11JUN09	08JUL09	11JUN09	08JUL09	2			
<b>DCRA for Works at Portion F/J (Main Tunnel)</b>											
01R00DCRF2	Prepare/submit DCRA for main tunnel works	21	21	14MAR09A	23JUN09	14MAR09A	23JUN09	2			
01R00DCRF4	DC review & certify DCRA for main tunnel works	21	21	24JUN09	14JUL09	24JUN09	14JUL09	2			
01R00DCRF6	SOR review & accept DCRA for main tunnel works	49	49	24JUN09	11AUG09	24JUN09	11AUG09	2			
01R00DCRF8	GEO review/agree DCRA	28	28	15JUL09	11AUG09	15JUL09	11AUG09	2			



ID	Activity Description	AD04 WP3D		AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
		Dur	Dur						
01R0002531	1R 31: On complete all wks for 6 mth frm CMP	0	0		07JUN13		19JUL13	2	206
01R0002532	1R 32: On complete all wks for 9 mth frm CMP	0	0		06SEP13		18OCT13	2	115
01R0002533	1R 33: On issuance of maintenance certificate	0	0		30DEC13		10FEB14	2	0
<b>Schedule of Milestones for Cost Centre No. 16R</b>									
16R7003001	16R 1: On completion of landscape wks; Portion A	0	0		01MAR12		01MAR12	2	669
16R7003002	16R 2: On completion of landscape wks; Portion B	0	0		16MAR12		16MAR12	2	654
16R7003003	16R 3: On completion of landscape wks; Portion C	0	0		28JAN12		28JAN12	2	702
16R7003004	16R 4: On completion of landscape wks; Portion D	0	0		30NOV12		11JAN13	2	395
16R7003005	16R 5: On completion of establish wks; Portion A	0	0		01MAR13		01MAR13	2	304
16R7003006	16R 6: On completion of establish wks; Portion B	0	0		16MAR13		16MAR13	2	289
16R7003007	16R 7: On completion of establish wks; Portion C	0	0		27JAN13		27JAN13	2	337
16R7003008	16R 8: On completion of establish wks; Portion D	0	0		30NOV13		11JAN14	2	30
<b>Schedule of Milestones for Cost Centre No. 17R</b>									
17R0003101	17R 1: On complet of all wks for 3 mth frm DOC	0	0		27MAR08A		27MAR08A	2	
17R0003102	17R 2: On complet of all wks for 6 mth frm DOC	0	0		27JUN08A		27JUN08A	2	
17R0003103	17R 3: On complet of all wks for 9 mth frm DOC	0	0		26SEP08A		26SEP08A	2	
17R0003104	17R 4: On complet of all wks for 12 mth frm DOC	0	0		27DEC08A		27DEC08A	2	
17R0003105	17R 5: On complet of all wks for 15 mth frm DOC	0	0		27MAR09A		27MAR09A	2	
17R0003106	17R 6: On complet of all wks for 18 mth frm DOC	0	0		27JUN09		15JUL09	2	1,647
17R0003107	17R 7: On complet of all wks for 21 mth frm DOC	0	0		26SEP09		14OCT09	2	1,556
17R0003108	17R 8: On complet of all wks for 24 mth frm DOC	0	0		26DEC09		13JAN10	2	1,465
17R0003109	17R 9: On complet of all wks for 27 mth frm DOC	0	0		28MAR10		15APR10	2	1,373
17R0003110	17R 10: On complet of all wks for 30 mth frm DOC	0	0		27JUN10		15JUL10	2	1,282
17R0003111	17R 11: On complet all wks for 33 mth frm DOC	0	0		26SEP10		14OCT10	2	1,191
17R0003112	17R 12: On complet all wks for 36 mth frm DOC	0	0		26DEC10		13JAN11	2	1,100
17R0003113	17R 13: On complet all wks for 39 mth frm DOC	0	0		28MAR11		15APR11	2	1,008
17R0003114	17R 14: On complet all wks for 42 mth frm DOC	0	0		27JUN11		15JUL11	2	917
17R0003115	17R 15: On complet all wks for 45 mth frm DOC	0	0		26SEP11		14OCT11	2	826
17R0003116	17R 16: On complet all wks for 48 mth frm DOC	0	0		26DEC11		13JAN12	2	735
17R0003117	17R 17: On complet of all wks for 3 mth frm CMP	0	0		08MAR13		19APR13	2	297
17R0003118	17R 18: On complet of all wks for 6 mth frm CMP	0	0		07JUN13		19JUL13	2	206
17R0003119	17R 19: On complet of all wks for 9 mth frm CMP	0	0		07SEP13		19OCT13	2	114
17R0003120	17R 20: On issuance of maintenance certificate	0	0		30DEC13		10FEB14	2	0
<b>Design/Design Check for Permanent Works</b>									
<b>Project -wide Packages</b>									
<b>Project Design Plan (PDP)</b>									
02L10D0102	Employ Independent Designer	7	7	14DEC07A	20DEC07A	14DEC07A	20DEC07A	2	
02L10D0104	Prepare & submit Project Design Plan (PDP)	28	28	14DEC07A	26FEB08A	14DEC07A	26FEB08A	2	
02L10D0106	SO's review & comment on PDP	28	28	27FEB08A	18MAR08A	27FEB08A	18MAR08A	2	
02L10D0108	Provide further information of (PDP)	28	28	19MAR08A	21AUG08A	19MAR08A	21AUG08A	2	
per ER 5.4.1, within 28 days of LOA									

ID	Activity Description	004		AD04		WP3D		AD04		WP3D		Total Float
		Dur	Dur	Start	Finish	Start	Finish	Start	Finish			
02L10D0110	SO approves PDP	14	14	14MAY08A	04SEP08A	14MAY08A	04SEP08A	2				2
02L10D0112	Employ Independent Design Checker	14	14	28DEC07A	01FEB08A	28DEC07A	01FEB08A	2				2
02L10D0114	Approval of Design Checker by the SO	28	28	02FEB08A	28FEB08A	02FEB08A	28FEB08A	2				2
<b>Design for Communication System</b>												
02L1FE0102	Design preparation for the AIP submission	15	15	27JUN09	11JUL09	27JUN09	11JUL09	2				356
02L1FE0103	Design (AIP) submission for the DC's approval	1	1	13JUL09	13JUL09	13JUL09	13JUL09	1				288
02L1FE0104	Design (AIP) certification by the Design Checker	28	28	14JUL09	10AUG09	14JUL09	10AUG09	2				356
02L1FE0106	Design (AIP) submission for the SO's approval	1	1	13JUL09	13JUL09	13JUL09	13JUL09	1				294
02L1FE0108	Design (AIP) review by the SO	60	60	21JUL09	18SEP09	21JUL09	18SEP09	2				356
02L1FE0110	AIP submission for rel. authorities' approval	1	1	13JUL09	13JUL09	13JUL09	13JUL09	1				321
02L1FE0112	Design (AIP) review by the rel. authorities	28	28	21JUL09	17AUG09	21JUL09	17AUG09	2				387
02L1FE0114	Obtain rel. authorities's approval for AIP	1	1	18AUG09	18AUG09	18AUG09	18AUG09	1				315
02L1FE0116	Obtain SO's consent for design (AIP)	0	0		19SEP09		19SEP09	2				356
02L1FE0118	Design preparation for the DDA submission	30	30	28AUG09	26SEP09	28AUG09	26SEP09	2				356
02L1FE0119	Design (DDA) submission for the DC's approval	1	1	28SEP09	28SEP09	28SEP09	28SEP09	1				288
02L1FE0120	Design (DDA) certification by the Design Checker	28	28	29SEP09	26OCT09	29SEP09	26OCT09	2				356
02L1FE0122	Design (DDA) submission for the SO's approval	1	1	28SEP09	28SEP09	28SEP09	28SEP09	1				293
02L1FE0124	Design (DDA) review by the SO	60	60	06OCT09	04DEC09	06OCT09	04DEC09	2				356
02L1FE0126	DDA submission for rel. authorities' approval	1	1	28SEP09	28SEP09	28SEP09	28SEP09	1				319
02L1FE0128	Design (DDA) review by the rel. authorities	28	28	06OCT09	02NOV09	06OCT09	02NOV09	2				388
02L1FE0130	Obtain rel. authorities's approval for DDA	1	1	03NOV09	03NOV09	03NOV09	03NOV09	1				316
02L1FE0132	Obtain SO's consent for design (DDA)	0	0		05DEC09		05DEC09	2				356
<b>Design for Flow Measurement System</b>												
02L1FE0202	Design preparation for the AIP submission	0	0		11MAY09A		11MAY09A	2				
02L1FE0203	Design (AIP) submission for the DC's approval	1	1	29MAY09	29MAY09	29MAY09	29MAY09	1				410
02L1FE0204	Design (AIP) certification by the Design Checker	28	28	30MAY09	26JUN09	30MAY09	26JUN09	2				502
02L1FE0206	Design (AIP) submission for the SO's approval	1	1	12MAY09A	12MAY09A	12MAY09A	12MAY09A	1				
02L1FE0208	Design (AIP) review by the SO	60	60	13MAY09A	24JUL09	13MAY09A	24JUL09	2				502
02L1FE0210	AIP submission for rel. authorities' approval	1	1	29MAY09	29MAY09	29MAY09	29MAY09	1				432
02L1FE0212	Design (AIP) review by the rel. authorities	28	28	06JUN09	03JUL09	06JUN09	03JUL09	2				522
02L1FE0214	Obtain rel. authorities's approval for AIP	1	1	04JUL09	04JUL09	04JUL09	04JUL09	1				427
02L1FE0216	Obtain SO's consent for design (AIP)	0	0		25JUL09		25JUL09	2				502
02L1FE0218	Design preparation for the DDA submission	30	30	03JUL09	01AUG09	03JUL09	01AUG09	2				502
02L1FE0219	Design (DDA) submission for the DC's approval	1	1	03AUG09	03AUG09	03AUG09	03AUG09	1				410
02L1FE0220	Design (DDA) certification by the Design Checker	28	28	04AUG09	31AUG09	04AUG09	31AUG09	2				501
02L1FE0222	Design (DDA) submission for the SO's approval	1	1	03AUG09	03AUG09	03AUG09	03AUG09	1				416
02L1FE0224	Design (DDA) review by the SO	60	60	11AUG09	09OCT09	11AUG09	09OCT09	2				501
02L1FE0226	DDA submission for rel. authorities' approval	1	1	03AUG09	03AUG09	03AUG09	03AUG09	1				440
02L1FE0228	Design (DDA) review by the rel. authorities	28	28	11AUG09	07SEP09	11AUG09	07SEP09	2				533
02L1FE0230	Obtain rel. authorities's approval for DDA	1	1	08SEP09	08SEP09	08SEP09	08SEP09	1				431
02L1FE0232	Obtain design (DDA) approval from the SO	0	0		10OCT09		10OCT09	2				501

ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
<b>Design Packages for Works in Portion A</b>									
<b>Temp. Steel Decking Design Over Shing Mun Nullah</b>									
02L1AA0102	Design preparation by the Designer	14	14	22FEB08A	15MAY08A	22FEB08A	15MAY08A	2	
02L1AA0104	Design certification by the Design Checker	14	14	16MAY08A	26MAY08A	16MAY08A	26MAY08A	2	
02L1AA0106	Design submission for the SO's approval	1	1	26MAY08A	26MAY08A	26MAY08A	26MAY08A	1	
02L1AA0108	Design review by the SO	21	21	27MAY08A	30JUN08A	27MAY08A	30JUN08A	2	
02L1AA0110	Obtain design approval from the SO	0	0		30JUN08A		30JUN08A	2	
<b>ELS Design for Spiral Ramp/Cascade/Box Culvert</b>									
02L1AA0202	Design preparation for the DDA submission	158	158	02MAY08A	16FEB09A	02MAY08A	16FEB09A	2	
02L1AA0203	Design submission for the DC's approval	2	2	10JUL08A	17FEB09A	10JUL08A	17FEB09A	1	
02L1AA0204	Design (DDA) certification by the Design Checker	30	30	11JUL08A	17FEB09A	11JUL08A	17FEB09A	2	
02L1AA0206	Design (DDA) submission for the SO's approval	2	2	12AUG08A	17FEB09A	12AUG08A	17FEB09A	1	
02L1AA0208	Design (DDA) review by the SO	68	68	13AUG08A	14MAR09A	13AUG08A	14MAR09A	2	
02L1AA0216	SO submit design (DDA) for approval of GEO	1	1	03FEB09A	03MAR09A	03FEB09A	03MAR09A	1	
02L1AA0218	Design (DDA) review/approval by the GEO	28	28	04MAR09A	31MAY09	04MAR09A	31MAY09	2	0
02L1AA0238	Obtain SO's consent for design (DDA)	0	0		24MAR09A		24MAR09A	2	
<b>Temp. Platform Design for H-Piling</b>									
02L1AA0302	Design preparation by the Designer	15	15	04JAN10*	18JAN10	04JAN10*	18JAN10	2	330
02L1AA0303	Design submission for the DC's approval	1	1	19JAN10	19JAN10	19JAN10	19JAN10	1	269
02L1AA0304	Design certification by the Design Checker	28	28	20JAN10	16FEB10	20JAN10	16FEB10	2	330
02L1AA0306	Design submission for the SO's approval	1	1	19JAN10	19JAN10	19JAN10	19JAN10	1	269
02L1AA0308	Design review by the SO	42	42	20JAN10	02MAR10	20JAN10	02MAR10	2	330
02L1AA0310	Obtain design approval from the SO	0	0		02MAR10		02MAR10	2	330
<b>Cascade &amp; Box Culver Design for Portion A</b>									
02L1AA0402	Design preparation for the AIP submission	30	30	02JUN08A	28FEB09A	02JUN08A	28FEB09A	2	
02L1AA0403	Design (AIP) submission for the DC's approval	3	3	12JUL08A	02MAR09A	12JUL08A	02MAR09A	1	
02L1AA0404	Design (AIP) certification by the Design Checker	243	243	14JUL08A	18MAR09A	14JUL08A	18MAR09A	2	
02L1AA0406	Design (AIP) submission for the SO's approval	2	2	15JUL08A	19MAR09A	15JUL08A	19MAR09A	1	
02L1AA0408	Design (AIP) review by the SO	66	66	16JUL08A	20MAR09A	16JUL08A	20MAR09A	2	
02L1AA0410	AIP submission for rel. authorities' approval	1	1	14JUL08A	19AUG08A	14JUL08A	19AUG08A	1	
02L1AA0412	Design (AIP) review by the rel. authorities	28	28	15JUL08A	12NOV08A	15JUL08A	12NOV08A	2	
02L1AA0414	Obtain rel. authorities's approval for AIP	1	1	03NOV08A	12NOV08A	03NOV08A	12NOV08A	1	
02L1AA0420	Obtain SO's consent for design (AIP)	0	0		20MAR09A		20MAR09A	2	
02L1AA0422	Design preparation for the DDA submission	30	30	21MAR09A	12JUN09	21MAR09A	12JUN09	2	124
02L1AA0423	Design (DDA) submission for the DC's approval	1	1	13JUN09	13JUN09	13JUN09	13JUN09	1	105
02L1AA0424	Design (DDA) certification by the Design Checker	28	28	14JUN09	11JUL09	14JUN09	11JUL09	2	126
02L1AA0426	Design (DDA) submission for the SO's approval	1	1	13JUN09	13JUN09	13JUN09	13JUN09	1	103
02L1AA0428	Design (DDA) review by the SO	66	66	14JUN09	18AUG09	14JUN09	18AUG09	2	124
02L1AA0430	DDA submission for rel. authorities' approval	1	1	20JUN09	20JUN09	20JUN09	20JUN09	1	128
02L1AA0432	Design (DDA) review by the rel. authorities	28	28	21JUN09	18JUL09	21JUN09	18JUL09	2	155
02L1AA0434	Obtain rel. authorities's approval for DDA	1	1	20JUL09	20JUL09	20JUL09	20JUL09	1	129
02L1AA0440	Obtain SO's consent for design (DDA)	0	0		19AUG09		19AUG09	2	124

7 days after ICE certification

1st ICE on 17/09/09 2hd ICE cert on 02/12/08

Temp. Steel Decking Design Over Shing Mun Nullah

Cascade & Box Culver Design for Portion A

ID	Activity Description	D04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Total Float
<b>Impact Assessment on WSD Wo Yip Hop V. S. P. H.</b>								
02L1AA0502	Design preparation for the DDA submission	30	30	02MAY08A	26FEB09A	02MAY08A	26FEB09A	2
02L1AA0503	Design (DDA) submission for the DC's approval	1	1	26JUN08A	27FEB09A	26JUN08A	27FEB09A	1
02L1AA0504	Design (DDA) certification by the Design Checker	60	60	27JUN08A	11MAR09A	27JUN08A	11MAR09A	2
02L1AA0505	Design (DDA) submission for the SO's approval	2	2	14JUL08A	24MAR09A	14JUL08A	24MAR09A	1
02L1AA0506	Design (DDA) review by the SO	66	66	15JUL08A	31MAR09A	15JUL08A	31MAR09A	2
02L1AA0510	DDA submission for rel. authorities' approval	2	2	10JUL08A	14MAR09A	10JUL08A	14MAR09A	1
02L1AA0512	Design (DDA) review by the rel. authorities	28	28	14JUL08A	31MAY09	14JUL08A	31MAY09	2
02L1AA0514	Obtain rel. authorities' approval for DDA	1	1	01JUN09	01JUN09	01JUN09	01JUN09	1
02L1AA0520	Obtain SO's consent for design (DDA)	0	0	31MAR09A	31MAR09A	31MAR09A	31MAR09A	2
<b>Temporary Platform for Pipe Piling</b>								
02L1AA0602	Design preparation by the Designer	11	11	21JUL08A	23AUG08A	21JUL08A	23AUG08A	2
02L1AA0603	Design submission for the DC's approval	1	1	01AUG08A	25AUG08A	01AUG08A	25AUG08A	1
02L1AA0604	Design certification by the Design Checker	21	21	02AUG08A	26SEP08A	02AUG08A	26SEP08A	2
02L1AA0605	Design submission for the SO's approval	1	1	08AUG08A	27SEP08A	08AUG08A	27SEP08A	1
02L1AA0608	Design review by the SO	28	28	09AUG08A	17OCT08A	09AUG08A	17OCT08A	2
02L1AA0610	Obtain design approval from the SO	0	0	17OCT08A	17OCT08A	17OCT08A	17OCT08A	2
<b>Temporary Works Design for Retrieval of TBM</b>								
02L1AA0702	Design preparation by the Designer	30	30	28FEB09A	22JUN09	28FEB09A	22JUN09	2
02L1AA0703	Design submission for the DC's approval	1	1	23JUN09	23JUN09	23JUN09	23JUN09	1
02L1AA0704	Design certification by the Design Checker	28	28	24JUN09	21JUL09	24JUN09	21JUL09	2
02L1AA0706	Design submission for the SO's approval	1	1	23JUN09	23JUN09	23JUN09	23JUN09	1
02L1AA0708	Design review by the SO	42	42	24JUN09	04AUG09	24JUN09	04AUG09	2
02L1AA0710	Obtain design approval from the SO	0	0	04AUG09	04AUG09	04AUG09	04AUG09	2
<b>Temporary Drainage Management Plan for Portion A</b>								
02L1AA0802	TDMP preparation by the Designer	208	208	18AUG08A	23MAY09A	18AUG08A	23MAY09A	2
02L1AA0804	TDMP submission for the DC's approval	2	2	24SEP08A	25MAY09A	24SEP08A	25MAY09A	1
02L1AA0806	TDMP certification by the Design Checker	28	28	24OCT08A	03JUN09	24OCT08A	03JUN09	2
02L1AA0808	TDMP submission for the SO's approval	2	2	05NOV08A	04JUN09	05NOV08A	04JUN09	1
02L1AA0810	TDMP review by the SO	90	90	05NOV08A	16JUL09	05NOV08A	16JUL09	2
02L1AA0812	TDMP submission for DSD's approval	1	1	04JUN09	04JUN09	04JUN09	04JUN09	1
02L1AA0814	TDMP review by the DSD	90	90	05JUN09	02SEP09	05JUN09	02SEP09	2
02L1AA0816	Obtain DSD's approval for DDA	1	1	03SEP09	03SEP09	03SEP09	03SEP09	1
02L1AA0818	Obtain SO's consent for TDMP	0	0	03SEP09	03SEP09	03SEP09	03SEP09	2
<b>Geotechnical Instrumentation Stg 1 for GL Works</b>								
3DL1AAG102	Design preparation by the Designer	14	14	22FEB08A	28APR08A	22FEB08A	28APR08A	2
3DL1AAG104	Design certification by the Design Checker	7	7	29APR08A	16JUN08A	29APR08A	16JUN08A	2
3DL1AAG106	Design submission for the SO's approval	1	1	10MAY08A	10MAY08A	10MAY08A	10MAY08A	1
3DL1AAG108	Design review by the SO	14	14	12MAY08A	28AUG08A	12MAY08A	28AUG08A	2
3DL1AAG110	Obtain design approval from the SO	0	0	28AUG08A	28AUG08A	28AUG08A	28AUG08A	2
3DL1AAG112	Install Geotechnical Instruments	6	6	26MAY08A	26MAY08A	26MAY08A	26MAY08A	1
3DL1AAG114	Baseline Monitoring	14	14	27MAY08A	31MAY08A	27MAY08A	31MAY08A	2

1st ICE cert on 02/12/08



ID	Activity Description	AD04		WP3D		Cal ID	Total Float
		Dur	WP3D Dur	Start	Finish		
<b>Geotechnical Instrumentation Stg 2 for Deep Exc.</b>							
3DL1AAG202	Design preparation by the Designer	14	14	01DEC08A	24FEB09A	2	
3DL1AAG204	Design certification by the Design Checker	7	7	15DEC08A	25FEB09A	2	
3DL1AAG206	Design submission for the SO's approval	1	1	07JAN09A	25FEB09A	1	
3DL1AAG208	Design review by the SO	28	28	08JAN09A	24MAR09A	2	
3DL1AAG210	Obtain design approval from the SO	0	0	24MAR09A	24MAR09A	2	
3DL1AAG212	Install Geotechnical Instruments	28	28	09FEB09A	04JUN09	1	0
3DL1AAG214	Baseline Monitoring	6	6	18FEB09A	25MAR09A	2	
3DL1AAG216	Monitor/report Geotechnical Instrumentation	1,643	1,643	02JUN08A	04FEB13	2	0
<b>Design Packages for Works in Portion B</b>							
<b>Piling Platform to Construct H-pile Wall</b>							
02L1BB0202	Design preparation by the Designer	15	15	24MAR08A	09MAY08A	2	
02L1BB0204	Design certification by the Design Checker	14	14	10MAY08A	08AUG08A	2	
02L1BB0206	Design submission for the SO's approval	1	1	21MAY08A	08AUG08A	1	
02L1BB0208	Design review by the SO	21	21	22MAY08A	25SEP08A	2	
02L1BB0210	Obtain design approval from the SO	0	0	25SEP08A	25SEP08A	2	
<b>Temp. Platform to Construct Drop Shafts</b>							
02L1BB0302	Design preparation by the Designer	22	22	04AUG08A	11DEC08A	2	
02L1BB0303	Design submission for the DC's approval	2	2	11DEC08A	12FEB09A	1	
02L1BB0304	Design certification by the Design Checker	14	14	12DEC08A	25FEB09A	2	
02L1BB0306	Design submission for the SO's approval	2	2	12DEC08A	25FEB09A	1	
02L1BB0308	Design review by the SO	21	21	13DEC08A	11MAR09A	2	
02L1BB0310	Obtain design approval from the SO	0	0	11MAR09A	11MAR09A	2	
<b>Temporary Drainage Management Plan</b>							
02L1BB0402	TDMP preparation by the Designer	313	313	05MAY08A	21MAR09A	2	
02L1BB0403	TDMP submission for the DC's approval	2	2	05AUG08A	23MAR09A	1	
02L1BB0404	TDMP certification by the Design Checker	213	213	06AUG08A	13APR09A	2	
02L1BB0406	TDMP submission for the SO's approval	2	2	24SEP08A	14APR09A	1	
02L1BB0408	TDMP review by the SO	90	90	25SEP08A	03JUN09	2	-210
02L1BB0410	TDMP submission for DSD's approval	1	1	23SEP08A	23SEP08A	1	
02L1BB0412	TDMP review by the DSD	90	90	24SEP08A	04JUN09	2	-211
02L1BB0414	Obtain DSD's approval for DDA	1	1	05JUN09	05JUN09	1	-168
02L1BB0416	Obtain SO's consent for TDMP	0	0	05JUN09	05JUN09	2	-211
<b>Temp. Support Design for MAA/MAS/DS/DC</b>							
02L1BB0502	Design preparation for the AIP submission	272	272	02JUN08A	19MAR09A	2	
02L1BB0503	Design (AIP) submission for the DC's approval	2	2	11JUL08A	20MAR09A	1	
02L1BB0504	Design (AIP) certification by the Design Checker	60	60	12JUL08A	04APR09A	2	
02L1BB0506	Design (AIP) submission for the SO's approval	2	2	24JUL08A	06APR09A	1	
02L1BB0508	Design (AIP) review by the SO	66	66	25JUL08A	11MAY09A	2	
02L1BB0510	AIP submission for rel. authorities' approval	1	1	12JUL08A	12JUL08A	1	
02L1BB0512	Design (AIP) review by the rel. authorities	28	28	14JUL08A	10NOV08A	2	
02L1BB0514	Obtain rel. authorities' approval for AIP	1	1	11NOV08A	11NOV08A	1	
02L1BB0516	SO submit design (AIP) for approval of GEO	1	1	29MAY09	29MAY09	1	0

















ID	Activity Description	ADD4 Dur	WP3D Dur	ADD4 Start	ADD4 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
02L1DD0404	Design certification by the Design Checker	150	150	17APR08A	14NOV08A	17APR08A	14NOV08A	2	
02L1DD0406	Design submission for the SO's approval	2	2	25APR08A	14NOV08A	25APR08A	14NOV08A	1	
02L1DD0408	Design review by the SO	90	90	26APR08A	04DEC08A	26APR08A	04DEC08A	2	
02L1DD0412	Obtain design approval from the SO	0	0		04DEC08A		04DEC08A	2	
<b>Site Formation Design; +40mPD to +24mPD</b>									
02L1DD0502	Design preparation by the Designer	120	120	14APR08A	09MAY09A	14APR08A	09MAY09A	2	
02L1DD0504	Design certification by the Design Checker	145	145	05MAY08A	15MAY09A	05MAY08A	15MAY09A	2	
02L1DD0506	Design submission for the SO's approval	2	2	10MAY08A	16MAY09A	10MAY08A	16MAY09A	1	
02L1DD0508	Design review by the SO	90	90	12MAY08A	03JUN09	12MAY08A	03JUN09	2	-201
02L1DD0512	Obtain design approval from the SO	0	0		03JUN09		03JUN09	2	-201
<b>Site Formation Design; +24mPD to 14mPD</b>									
02L1DD0602	Design preparation by the Designer	60	60	28AUG08A	23APR09A	28AUG08A	23APR09A	2	
02L1DD0603	Design submission for the DC's approval	2	2	16JAN09A	24APR09A	16JAN09A	24APR09A	1	
02L1DD0604	Design certification by the Design Checker	28	28	19JAN09A	15MAY09A	19JAN09A	15MAY09A	2	
02L1DD0606	Design submission for the SO's approval	2	2	02FEB09A	15MAY09A	02FEB09A	15MAY09A	1	
02L1DD0608	Design review by the SO	63	63	03FEB09A	18JUN09	03FEB09A	18JUN09	2	-213
02L1DD0610	Design review by GEO	28	28	28MAY09	24JUN09	28MAY09	24JUN09	2	0
02L1DD0612	Obtain design approval from the SO	0	0		18JUN09		18JUN09	2	-213
<b>TBM Launching Chamber Design</b>									
02L1DD0702	Design (AIP) preparation by the Designer	381	381	21APR08A	11MAY09A	21APR08A	11MAY09A	2	
02L1DD0703	Design (AIP) submission for the DC's approval	3	3	28JUL08A	12MAY09A	28JUL08A	12MAY09A	1	
02L1DD0704	Design (AIP) certification by the Design Checker	37	37	21AUG08A	13MAY09A	21AUG08A	13MAY09A	2	
02L1DD0706	Design (AIP) submission for the SO's approval	3	3	28JUL08A	13MAY09A	28JUL08A	13MAY09A	1	
02L1DD0708	Design (AIP) review by the SO	280	280	29JUL08A	19MAY09A	29JUL08A	19MAY09A	2	
02L1DD0710	AIP submission for rel. authorities' approval	1	1	28AUG08A	28AUG08A	28AUG08A	28AUG08A	1	
02L1DD0712	Design (AIP) review by the rel. authorities	28	28	28FEB09A	27MAR09A	28FEB09A	27MAR09A	2	
02L1DD0714	Obtain rel. authorities' approval for AIP	0	0		19MAY09A		19MAY09A	1	
02L1DD0716	SO submit Design (AIP) for approval of GEO	1	1	28FEB09A	28FEB09A	28FEB09A	28FEB09A	1	
02L1DD0718	Design (AIP) review/approval by the GEO	28	28	01MAR09A	28MAY09	01MAR09A	28MAY09	2	-176
02L1DD0720	Obtain SO's consent for design (AIP)	0	0		19MAY09A		19MAY09A	2	
02L1DD0722	Design preparation for the DDA submission	30	30	07MAR09A	05JUN09	07MAR09A	05JUN09	2	-183
02L1DD0723	Design (DDA) submission for the DC's approval	1	1	06JUN09	06JUN09	06JUN09	06JUN09	1	-142
02L1DD0724	Design (DDA) certification by the Design Checker	28	28	07JUN09	04JUL09	07JUN09	04JUL09	2	-180
02L1DD0726	Design (DDA) submission for the SO's approval	1	1	06JUN09	06JUN09	06JUN09	06JUN09	1	-144
02L1DD0728	Design (DDA) review by the SO	66	66	07JUN09	11AUG09	07JUN09	11AUG09	2	-183
02L1DD0730	DDA submission for rel. authorities' approval	1	1	13JUN09	13JUN09	13JUN09	13JUN09	1	0
02L1DD0732	Design (DDA) review by the rel. authorities	28	28	14JUN09	11JUL09	14JUN09	11JUL09	2	1
02L1DD0734	Obtain rel. authorities' approval for DDA	1	1	13JUL09	13JUL09	13JUL09	13JUL09	1	0
02L1DD0736	SO submit design (DDA) for approval of GEO	1	1	13JUL09	13JUL09	13JUL09	13JUL09	1	0
02L1DD0738	Design (DDA) review/approval by the GEO	28	28	14JUL09	10AUG09	14JUL09	10AUG09	2	0
02L1DD0740	Obtain SO's consent for design (DDA)	0	0		12AUG09		12AUG09	2	-183
<b>Hopper Design</b>									
02L1DD0802	Design preparation by the Designer	119	119	28FEB09A	26JUN09	28FEB09A	26JUN09	2	-212



ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
<b>Temporary Drainage Management Plan</b>									
02L1DD1302	TDMP preparation by the Designer	225	225	05MAY08A	27MAR09A	05MAY08A	27MAR09A	2	
02L1DD1303	TDMP submission for the DC's approval	2	2	08AUG08A	29MAY09	08AUG08A	29MAY09	1	10
02L1DD1304	TDMP certification by the Design Checker	28	28	09AUG08A	06JUN09	09AUG08A	06JUN09	2	12
02L1DD1306	TDMP submission for the SO's approval	2	2	08AUG08A	08JUN09	08AUG08A	08JUN09	1	16
02L1DD1308	TDMP review by the SO	90	90	08AUG08A	04JUL09	08AUG08A	04JUL09	2	12
02L1DD1310	TDMP submission for DSD's approval	1	1	17NOV08A	17NOV08A	17NOV08A	17NOV08A	1	
02L1DD1312	TDMP review by the DSD	90	90	18NOV08A	16JUL09	18NOV08A	16JUL09	2	0
02L1DD1314	Obtain DSD's approval for DDA	1	1	17JUL09	17JUL09	17JUL09	17JUL09	1	0
02L1DD1316	Obtain SO's consent for TDMP	0	0		17JUL09		17JUL09	2	0
<b>Geotechnical Instrumentation Stg 1 for GL Works</b>									
3DL1DDG102	Design preparation by the Designer	14	14	22FEB08A	24APR08A	22FEB08A	24APR08A	2	
3DL1DDG104	Design certification by the Design Checker	7	7	25APR08A	16JUN08A	25APR08A	16JUN08A	2	
3DL1DDG106	Design submission for the SO's approval	1	1	25APR08A	16JUN08A	25APR08A	16JUN08A	1	
3DL1DDG108	Design review by the SO	14	14	26APR08A	14JUL08A	26APR08A	14JUL08A	2	
3DL1DDG110	Obtain design approval from the SO	0	0		14JUL08A		14JUL08A	2	
3DL1DDG112	Install Geotechnical Instruments	10	10	04JUN08A	05JUL08A	04JUN08A	05JUL08A	1	
3DL1DDG114	Initial reading	14	14	18JUN08A	09JUL08A	18JUN08A	09JUL08A	2	
<b>Geotechnical Instrumentation Stg 2 for Deep Exc.</b>									
3DL1DDG202	Design preparation by the Designer	14	14	28MAY09*	10JUN09	28MAY09*	10JUN09	2	195
3DL1DDG204	Design certification by the Design Checker	14	14	11JUN09	24JUN09	11JUN09	24JUN09	2	195
3DL1DDG206	Design submission for the SO's approval	1	1	11JUN09	11JUN09	11JUN09	11JUN09	1	163
3DL1DDG208	Design review by the SO	28	28	12JUN09	09JUL09	12JUN09	09JUL09	2	195
3DL1DDG210	Obtain design approval from the SO	0	0		09JUL09		09JUL09	2	195
3DL1DDG212	Install Geotechnical Instruments	18	18	10JUL09	30JUL09	10JUL09	30JUL09	1	161
3DL1DDG214	Baseline Monitoring	14	14	31JUL09	13AUG09	31JUL09	13AUG09	2	195
3DL1DDG216	Monitor/report Geotechnical Instrumentation	1,605	1,605	10JUL08A	31DEC12	10JUL08A	31DEC12	2	0
<b>Design Packages for Works in Portion F</b>									
<b>Main Tunnel Design</b>									
02L1FF0102	Design preparation for the AIP submission	414	414	08FEB08A	27MAR09A	08FEB08A	27MAR09A	2	
02L1FF0103	Design (AIP) submission for the DC's approval	2	2	02MAY08A	27MAR09A	02MAY08A	27MAR09A	1	
02L1FF0104	Design (AIP) certification by the Design Checker	28	28	03MAY08A	27MAR09A	03MAY08A	27MAR09A	2	
02L1FF0106	Design (AIP) submission for the SO's approval	1	1	10JUL08A	27MAR09A	10JUL08A	27MAR09A	1	
02L1FF0108	Design (AIP) review by the SO	66	66	11JUL08A	03JUN09	11JUL08A	03JUN09	2	-176
02L1FF0110	AIP submission for rel. authorities' approval	1	1	08JUL08A	08JUL08A	08JUL08A	08JUL08A	1	
02L1FF0112	Design (AIP) review by the rel. authorities	28	28	09JUL08A	05MAR09A	09JUL08A	05MAR09A	2	
02L1FF0114	Obtain rel. authorities' approval for AIP	1	1	06MAR09A	06MAR09A	06MAR09A	06MAR09A	1	
02L1FF0116	SO submit design (AIP) for approval of GEO	1	1	29MAY09	29MAY09	29MAY09	29MAY09	1	0
02L1FF0118	Design (AIP) review/approval by the GEO	28	28	30MAY09	26JUN09	30MAY09	26JUN09	2	0
02L1FF0120	Obtain SO's consent for design (AIP)	0	0		04JUN09		04JUN09	2	-176
02L1FF0122	Design preparation for the DDA submission	30	30	04NOV08A	11JUN09	04NOV08A	11JUN09	2	-176
02L1FF0123	Design (DDA) submission for the DC's approval	1	1	12JUN09	12JUN09	12JUN09	12JUN09	1	-138
02L1FF0124	Design (DDA) certification by the Design Checker	28	28	13JUN09	10JUL09	13JUN09	10JUL09	2	-176

ID	Activity Description	D04		AD04		WP3D		Total Float
		Dur	Dur	Start	Finish	Start	Finish	
02L1FF0126	Design (DDA) submission for the SO's approval	1	1	12JUN09	12JUN09	12JUN09	12JUN09	1
02L1FF0128	Design (DDA) review by the SO	56	56	16JUN09	10AUG09	16JUN09	10AUG09	2
02L1FF0130	DDA submission for rel. authorities' approval	1	1	19JUN09	19JUN09	19JUN09	19JUN09	1
02L1FF0132	Design (DDA) review by the rel. authorities	28	28	20JUN09	17JUL09	20JUN09	17JUL09	2
02L1FF0134	Obtain rel. authorities's approval for DDA	1	1	18JUL09	18JUL09	18JUL09	18JUL09	1
02L1FF0136	SO submit design (DDA) for approval of GEO	1	1	13JUL09	13JUL09	13JUL09	13JUL09	1
02L1FF0138	Design (DDA) review/approval by the GEO	28	28	14JUL09	10AUG09	14JUL09	10AUG09	2
02L1FF0140	Obtain SO's consent for design (DDA)	0	0		11AUG09		11AUG09	2
<b>Impact Assessment on WSD Yau Kam Tau WTW</b>								
02L1FF0202	Design preparation for the DDA submission	60	60	29APR08A	30JUN08A	29APR08A	30JUN08A	2
02L1FF0203	Design (DDA) submission for the DC's approval	1	1	03JUL08A	03JUL08A	03JUL08A	03JUL08A	1
02L1FF0204	Design (DDA) certification by the Design Checker	260	260	04JUL08A	18MAR09A	04JUL08A	18MAR09A	2
02L1FF0206	Design (DDA) submission for the SO's approval	1	1	15JUL08A	18MAR09A	15JUL08A	18MAR09A	1
02L1FF0208	Design (DDA) review by the SO	66	66	16JUL08A	31MAR09A	16JUL08A	31MAR09A	2
02L1FF0210	DDA submission for rel. authorities' approval	1	1	10JUL08A	02APR09A	10JUL08A	02APR09A	1
02L1FF0212	Design (DDA) review by the rel. authorities	28	28	11JUL08A	10JUN09	11JUL08A	10JUN09	2
02L1FF0214	Obtain rel. authorities's approval for DDA	1	1	11JUN09	11JUN09	11JUN09	11JUN09	1
02L1FF0220	Obtain SO's consent for design (DDA)	0	0		31MAR09A		31MAR09A	2
<b>Impact Assessment on WSD Tai Lam Chung WT No. 3</b>								
02L1FF0302	Design preparation for the DDA submission	32	32	14APR08A	27JUN08A	14APR08A	27JUN08A	2
02L1FF0303	Design submission for the DC's approval	1	1	27JUN08A	27JUN08A	27JUN08A	27JUN08A	1
02L1FF0304	Design (DDA) certification by the Design Checker	285	285	28JUN08A	08JUN09	28JUN08A	08JUN09	2
02L1FF0306	Design (DDA) submission for the SO's approval	1	1	15JUL08A	15JUL08A	15JUL08A	15JUL08A	1
02L1FF0308	Design (DDA) review by the SO	66	66	16JUL08A	13JUL09	16JUL08A	13JUL09	2
02L1FF0310	DDA submission for rel. authorities' approval	1	1	10JUL08A	10JUL08A	10JUL08A	10JUL08A	1
02L1FF0312	Design (DDA) review by the rel. authorities	28	28	11JUL08A	15JUN09	11JUL08A	15JUN09	2
02L1FF0314	Obtain rel. authorities's approval for DDA	1	1	16JUN09	16JUN09	16JUN09	16JUN09	1
02L1FF0316	SO submit design (DDA) for approval of GEO	1	1	16JUN09	16JUN09	16JUN09	16JUN09	1
02L1FF0318	Design (DDA) review/approval by the GEO	28	28	17JUN09	14JUL09	17JUN09	14JUL09	2
02L1FF0320	Obtain SO's consent for design (DDA)	0	0		14JUL09		14JUL09	2
<b>Impact Assessment on KCRC West Rail Tunnel</b>								
02L1FF0402	Design preparation for the DDA submission	30	30	28APR08A	26JUN08A	28APR08A	26JUN08A	2
02L1FF0403	Design submission for the DC's approval	1	1	26JUN08A	26JUN08A	26JUN08A	26JUN08A	1
02L1FF0404	Design (DDA) certification by the Design Checker	90	90	27JUN08A	02APR09A	27JUN08A	02APR09A	2
02L1FF0406	Design (DDA) submission for the SO's approval	2	2	15JUL08A	03APR09A	15JUL08A	03APR09A	1
02L1FF0408	Design (DDA) review by the SO	267	267	16JUL08A	08JUN09	16JUL08A	08JUN09	2
02L1FF0410	DDA submission for rel. authorities' approval	1	1	14JUL08A	14JUL08A	14JUL08A	14JUL08A	1
02L1FF0412	Design (DDA) review by the rel. authorities	28	28	15JUL08A	11MAR09A	15JUL08A	11MAR09A	2
02L1FF0414	Obtain rel. authorities's approval for DDA	1	1	12MAR09A	11MAR09A	12MAR09A	11MAR09A	1
02L1FF0416	SO submit design (DDA) for approval of GEO	1	1	29MAY09	29MAY09	29MAY09	29MAY09	1
02L1FF0418	Design (DDA) review/approval by the GEO	28	28	30MAY09	26JUN09	30MAY09	26JUN09	2
02L1FF0420	Obtain SO's consent for design (DDA)	0	0		27JUN09		27JUN09	2

ID	Activity Description	AD04		AD04		AD04		WP3D Dur	WP3D Start	WP3D Finish	Cal ID	Total Float
		Dur	Dur	Start	Finish	Start	Finish					
<b>Impact Assessment on WSD Tsuen Wan Reservoir G.</b>												
02L1FF0502	Design preparation for the DDA submission	30	30	05MAY08A	02JUL08A	05MAY08A	02JUL08A					
02L1FF0503	Design submission for the DC's approval	1	1	03JUL08A	03JUL08A	03JUL08A	03JUL08A					
02L1FF0504	Design (DDA) certification by the Design Checker	260	260	04JUL08A	01APR09A	04JUL08A	01APR09A					
02L1FF0506	Design (DDA) submission for the SO's approval	2	2	15JUL08A	01APR09A	15JUL08A	01APR09A					
02L1FF0508	Design (DDA) review by the SO	60	60	16JUL08A	16JUN09	16JUL08A	16JUN09					
02L1FF0510	DDA submission for rel. authorities' approval	1	1	10JUL08A	10JUL08A	10JUL08A	10JUL08A					
02L1FF0512	Design (DDA) review by the rel. authorities	28	28	11JUL08A	10JUN09	11JUL08A	10JUN09					
02L1FF0514	Obtain rel. authorities's approval for DDA	1	1	11JUN09	11JUN09	11JUN09	11JUN09					
02L1FF0520	Obtain SO's consent for design (DDA)	0	0		17JUN09		17JUN09					
<b>Grout Trial at Fault Zone F1</b>												
02L1FF0602	MS preparation for the DDA submission	12	12	02MAY08A	20MAY08A	02MAY08A	20MAY08A					
02L1FF0606	Ms (DDA) submission for the SO's approval	1	1	21MAY08A	21MAY08A	21MAY08A	21MAY08A					
02L1FF0608	MS (DDA) review by the SO	24	24	22MAY08A	17JUL08A	22MAY08A	17JUL08A					
02L1FF0620	Obtain SO's consent for MS (DDA)	0	0		17JUL08A		17JUL08A					
<b>Geotechnical Instrumentation</b>												
3DL1FFG102	Design preparation by the Designer	60	60	28AUG08A	23JAN09A	28AUG08A	23JAN09A					
3DL1FFG104	Design certification by the Design Checker	14	14	24JAN09A	10JUN09	24JAN09A	10JUN09					-195
3DL1FFG106	Design submission for the SO's approval	2	2	24JAN09A	26MAR09A	24JAN09A	26MAR09A					
3DL1FFG108	Design review by the SO	56	56	24JAN09A	20JUN09	24JAN09A	20JUN09					-160
3DL1FFG110	DDA submission for rel. authorities' approval	1	1	14MAR09A	14MAR09A	14MAR09A	14MAR09A					
3DL1FFG112	Design (DDA) review by the rel. authorities	56	56	15MAR09A	23JUL09	15MAR09A	23JUL09					-195
3DL1FFG114	Obtain rel. authorities's approval for DDA	1	1	24JUL09	24JUL09	24JUL09	24JUL09					-156
3DL1FFG116	Obtain design approval from the SO	0	0		24JUL09		24JUL09					-194
3DL1FFG118	Install geotechnical instrumentations	90	90	25JUL09	10NOV09	25JUL09	10NOV09					-156
3DL1FFG120	Baseline Monitoring	14	14	11NOV09	24NOV09	11NOV09	24NOV09					-188
3DL1FT0208	Maintain/monitor geotechnical instrumentation	1,200	1,200	25NOV09	08MAR13	25NOV09	08MAR13					-188
<b>Design Packages for Works in Portion G</b>												
<b>Drainage Impact Assessment</b>												
02L1GG0105	Quotation and award consultant	24	24	22JUN09*	20JUL09	22JUN09*	20JUL09					182
02L1GG0115	Prepare preliminary DIA report	36	36	21JUL09	31AUG09	21JUL09	31AUG09					182
02L1GG0125	Prepare final DIA report	12	12	01SEP09	14SEP09	01SEP09	14SEP09					182
02L1GG0135	Submission of DIA report to SOR/DSD	1	1	15SEP09	15SEP09	15SEP09	15SEP09					186
02L1GG0145	SOR/DSD review/comment DIA report	28	28	22SEP09	19OCT09	22SEP09	19OCT09					227
02L1GG0155	Revise DIA incorporating comments	12	12	20OCT09	03NOV09	20OCT09	03NOV09					182
02L1GG0165	SOR/DSD review/approve DIA report	21	21	04NOV09	24NOV09	04NOV09	24NOV09					227
02L1GG0175	Obtain consent from SOR and DSD	0	0		24NOV09		24NOV09					227
<b>Temp. Platform Design for H-Piling at Portion G</b>												
02L1GG0202	Design preparation for the DDA submission	30	30	21JUL09	19AUG09	21JUL09	19AUG09					261
02L1GG0203	Design (DDA) submission for the DC's approval	1	1	20AUG09	20AUG09	20AUG09	20AUG09					211
02L1GG0204	Design (DDA) certification by the Design Checker	28	28	21AUG09	17SEP09	21AUG09	17SEP09					263
02L1GG0206	Design (DDA) submission for the SO's approval	1	1	20AUG09	20AUG09	20AUG09	20AUG09					210
02L1GG0208	Design (DDA) review by the SO	58	58	21AUG09	17OCT09	21AUG09	17OCT09					261

to be endorsed by All Reservoir Panel Engineer

ID	Activity Description	D04		WP3D		AD04		WP3D		Total Float	
		Dur	Dur	Start	Finish	Start	Finish	Start	Finish		
02L1GG0210	DDA submission for rel. authorities' approval	1	1	27AUG09	27AUG09	27AUG09	27AUG09	27AUG09	27AUG09	1	228
02L1GG0212	Design (DDA) review by the rel. authorities	28	28	28AUG09	24SEP09	28AUG09	24SEP09	28AUG09	24SEP09	2	284
02L1GG0214	Obtain rel. authorities' approval for DDA	1	1	25SEP09	25SEP09	25SEP09	25SEP09	25SEP09	25SEP09	1	226
02L1GG0228	Obtain design (DDA) approval from the SO	0	0		18OCT09		18OCT09		18OCT09	2	261
<b>ELS Design for Pipe Jacking at Portion G</b>											
02L1GG0302	Design preparation for the DDA submission	15	15	20AUG09	03SEP09	20AUG09	03SEP09	20AUG09	03SEP09	2	284
02L1GG0303	Design (DDA) submission for the DC's approval	1	1	04SEP09	04SEP09	04SEP09	04SEP09	04SEP09	04SEP09	1	229
02L1GG0304	Design (DDA) certification by the Design Checker	28	28	05SEP09	02OCT09	05SEP09	02OCT09	05SEP09	02OCT09	2	286
02L1GG0306	Design (DDA) submission for the SO's approval	1	1	04SEP09	04SEP09	04SEP09	04SEP09	04SEP09	04SEP09	1	228
02L1GG0308	Design (DDA) review by the SO	58	58	05SEP09	01NOV09	05SEP09	01NOV09	05SEP09	01NOV09	2	284
02L1GG0310	DDA submission for rel. authorities' approval	1	1	11SEP09	11SEP09	11SEP09	11SEP09	11SEP09	11SEP09	1	246
02L1GG0314	Design (DDA) review by the rel. authorities	28	28	12SEP09	09OCT09	12SEP09	09OCT09	12SEP09	09OCT09	2	307
02L1GG0316	Obtain rel. authorities' approval for DDA	1	1	10OCT09	10OCT09	10OCT09	10OCT09	10OCT09	10OCT09	1	248
02L1GG0318	Obtain design (DDA) approval from the SO	0	0		02NOV09		02NOV09		02NOV09	2	284
<b>Schedule of Milestones for Cost Centre No. 2L</b>											
02L10D1002	2L 1; On submission of PDP to the SO	0	0		10JAN08A		10JAN08A		10JAN08A	2	
02L10D1004	2L 2; On acceptance of PDP by the SO	0	0		04SEP08A		04SEP08A		04SEP08A	2	
02L10D1006	2L 3; On submission of AIP to the SO; Portion A	0	0		12MAY09A		12MAY09A		12MAY09A	2	
02L10D1008	2L 4; On acceptance of AIP by the SO; Portion A	0	0		25JUL09		25JUL09		25JUL09	2	1,619
02L10D1010	2L 5; On submission of DDA to the SO; Portion A	0	0		28SEP09		28SEP09		28SEP09	2	1,554
02L10D1012	2L 6; On acceptance of DDA by the SO; Portion A	0	0		10OCT09		10OCT09		10OCT09	2	1,542
02L10D1014	2L 7; On submission of AIP to the SO; Portion B	0	0		07JUL09		07JUL09		07JUL09	2	1,637
02L10D1016	2L 8; On acceptance of AIP by the SO; Portion B	0	0		12AUG09		12AUG09		12AUG09	2	1,601
02L10D1018	2L 9; On submission of DDA to the SO; Portion B	0	0		28SEP09		28SEP09		28SEP09	2	1,554
02L10D1020	2L 10; On acceptance of DDA by the SO; Portion B	0	0		26OCT09		26OCT09		26OCT09	2	1,526
02L10D1022	2L 11; On submission of AIP to the SO; Portion C	0	0		25JUL09		25JUL09		25JUL09	2	1,619
02L10D1024	2L 12; On acceptance of AIP by the SO; Portion C	0	0		10AUG09		10AUG09		10AUG09	2	1,603
02L10D1026	2L 13; On submission of DDA to the SO; Portion C	0	0		28SEP09		28SEP09		28SEP09	2	1,554
02L10D1028	2L 14; On acceptance of DDA by the SO; Portion C	0	0		23OCT09		23OCT09		23OCT09	2	1,529
02L10D1030	2L 15; On acceptance of AIP by the SO; Portion D	0	0		25JUL09		25JUL09		25JUL09	2	1,619
02L10D1032	2L 16; On acceptance of DDA by the SO; Portion D	0	0		10OCT09		10OCT09		10OCT09	2	1,542
02L10D1034	2L 17; On submission of AIP to the SO; Portion F	0	0		13JUL09		13JUL09		13JUL09	2	1,631
02L10D1036	2L 18; On acceptance of AIP by the SO; Portion F	0	0		19SEP09		19SEP09		19SEP09	2	1,563
02L10D1038	2L 19; On submission of DDA to the SO; Portion F	0	0		28SEP09		28SEP09		28SEP09	2	1,554
02L10D1040	2L 20; On acceptance of DDA by the SO; Portion F	0	0		05DEC09		05DEC09		05DEC09	2	1,486
02L10D1042	2L 21; On acceptance of AIP by the SO; Portion G	0	0		27MAY09		27MAY09		27MAY09	2	1,678
02L10D1044	2L 22; On acceptance of DDA by the SO; Portion G	0	0		24NOV09		24NOV09		24NOV09	2	1,497
02L10D1046	2L 23; On completion of all works under this CC	0	0		24NOV09		24NOV09		24NOV09	2	1,497

ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
<b>Construction of Main Tunnel</b>									
<b>Trial Grout at Fault Zone F1</b>									
3AL1FT0002	Hyd issue XP	0	0		23JUL08A		23JUL08A	2	
3AL1FT0004	Advance notice to Hyd/Road advice	6	6	24JUL08A	30JUL08A	24JUL08A	30JUL08A	1	
3AL1FT0006	Trial pit excavation	4	4	31JUL08A	04AUG08A	31JUL08A	04AUG08A	1	
3AL1FT0010	Scaffolding, mobilize & set up	7	7	05AUG08A	13AUG08A	05AUG08A	13AUG08A	1	
3AL1FT0012	Drill & test for 2m Arrangement Test	45	45	14AUG08A	15NOV08A	14AUG08A	15NOV08A	1	
3AL1FT0014	Backfill drilled holes, demobilization & Tidy up	6	6	17NOV08A	22NOV08A	17NOV08A	22NOV08A	1	
3AL1FT0016	Drill & test for single hole arrangement test	17	17	11AUG08A	04SEP08A	11AUG08A	04SEP08A	1	
3AL1FT0018	Backfill drilled hole, demobilization & tidy up	1	1	05SEP08A	05SEP08A	05SEP08A	05SEP08A	1	
<b>TBM Manufacture/Testing/Delivery</b>									
<b>Manufacture of TBM &amp; Back-ups</b>									
3AL1FT0302	TBM & Excavation Sys Procurement	30	30	14DEC07A	12JAN08A	14DEC07A	12JAN08A	2	
3AL1FT0304	TBM design & manufacturing	252	252	21DEC07A	28SEP08A	21DEC07A	28SEP08A	2	
3AL1FT0306	TBM workshop tests	7	7	04OCT08A	08OCT08A	04OCT08A	08OCT08A	2	
3AL1FT0308	TBM dismounting & packing	21	21	09OCT08A	24DEC08A	09OCT08A	24DEC08A	2	
<b>Delivery of TBM</b>									
3AL1FT0105	TBM shipment to Hong Kong	30	30	06JUL09*	04AUG09	06JUL09*	04AUG09	2	-161
3AL1FT0110	TBM arriving Portion I	3	3	05AUG09	07AUG09	05AUG09	07AUG09	1	-130
3AL1FT0115	Destuffing Containers/Cleaning & lubrication	24	24	08AUG09	04SEP09	08AUG09	04SEP09	1	-130
<b>TBM Pre-assembly/Test &amp; Comms. at Portion I</b>									
3AL1FT0205	Cutterhead	7	7	05SEP09	12SEP09	05SEP09	12SEP09	1	-130
3AL1FT0210	Bearing	6	6	05SEP09	11SEP09	05SEP09	11SEP09	1	-129
3AL1FT0215	Backup # 1	6	6	12SEP09	18SEP09	12SEP09	18SEP09	1	-122
3AL1FT0220	Backup # 2	5	5	14SEP09	18SEP09	14SEP09	18SEP09	1	-121
3AL1FT0225	Backup # 3	5	5	19SEP09	24SEP09	19SEP09	24SEP09	1	-122
3AL1FT0230	Backup # 4	5	5	19SEP09	24SEP09	19SEP09	24SEP09	1	-121
3AL1FT0240	Backup # 5	5	5	25SEP09	30SEP09	25SEP09	30SEP09	1	-122
3AL1FT0245	Backup # 6	5	5	25SEP09	30SEP09	25SEP09	30SEP09	1	-121
3AL1FT0250	Backup # 7	5	5	02OCT09	08OCT09	02OCT09	08OCT09	1	-80
3AL1FT0255	Backup # 8	5	5	02OCT09	08OCT09	02OCT09	08OCT09	1	-77
3AL1FT0260	Backup # 9	5	5	09OCT09	14OCT09	09OCT09	14OCT09	1	-79
3AL1FT0365	Backup # 10	5	5	09OCT09	14OCT09	09OCT09	14OCT09	1	-76
3AL1FT0370	Backup # 11	5	5	15OCT09	20OCT09	15OCT09	20OCT09	1	-78
3AL1FT0375	Backup # 12	5	5	15OCT09	20OCT09	15OCT09	20OCT09	1	-75
<b>TBM Transport from Portion I to Outfall</b>									
3AL1FT0405	Cutterhead	1	1	02JAN10	02JAN10	02JAN10	02JAN10	1	-219
3AL1FT0415	Shield # 1	1	1	04JAN10	04JAN10	04JAN10	04JAN10	1	-210
3AL1FT0425	Shield # 2	1	1	05JAN10	05JAN10	05JAN10	05JAN10	1	-210
3AL1FT0435	Bearing	1	1	06JAN10	06JAN10	06JAN10	06JAN10	1	-210
3AL1FT0445	Erector	1	1	07JAN10	07JAN10	07JAN10	07JAN10	1	-210



grouting at F1ER.B27 27.73(5), within 6 months of DOC

**Construction of Main Tunnel**

**Trial Grout at Fault Zone F1**

**TBM Manufacture/Testing/Delivery**

**Manufacture of TBM & Back-ups**

**Delivery of TBM**

**TBM Pre-assembly/Test & Comms. at Portion I**

**TBM Transport from Portion I to Outfall**

ID	Activity Description	D04 Dur	WP3D Dur	AD04		Total Float
				Start	Finish	
3AL1FT0455	Conveyor	1	1	08JAN10	08JAN10	1
3AL1FT0465	Backup # 1	1	1	09JAN10	09JAN10	1
3AL1FT0475	Backup # 2	1	1	11JAN10	11JAN10	1
3AL1FT0485	Backup # 3	1	1	12JAN10	12JAN10	1
3AL1FT0495	Backup # 4	1	1	13JAN10	13JAN10	1
3AL1FT0505	Backup # 5	1	1	29JAN10	29JAN10	1
3AL1FT0515	Backup # 6	1	1	30JAN10	30JAN10	1
3AL1FT0525	Backup # 7	1	1	27MAR10	27MAR10	1
3AL1FT0535	Backup # 8	1	1	31MAR10	31MAR10	1
3AL1FT0545	Backup # 9	1	1	08APR10	08APR10	1
3AL1FT0555	Backup # 10	1	1	12APR10	12APR10	1
3AL1FT0565	Backup # 11	1	1	15APR10	15APR10	1
3AL1FT0575	Backup # 12	1	1	19APR10	19APR10	1
<b>Manufacture Pre-cast Lining/Delivery</b>						
<b>Segmental Lining Mould</b>						
3AL1FTSM02	Procure sub-contract for segmental mould	0	0	21JUL08A	21JUL08A	2
3AL1FTSM04	Prepare shop drwgs for segmental mould	60	60	02FEB09A	02FEB09A	2
3AL1FTSM06	Fabrication of segmental mould	90	90	06MAR09A	06MAR09A	2
3AL1FTSM08	Inspection in Korea	7	7	18MAY09A	18MAY09A	2
3AL1FTSM10	Painting & packing	7	7	21MAY09A	21MAY09A	2
3AL1FTSM12	Delivery of segmental moulds to HKG	7	7	28MAY09	03JUN09	2
<b>Pre-cast Segmental Lining</b>						
3AL1FT0404	Prepare/submit QA/QC System	30	30	12JAN09A	04MAR09A	2
3AL1FT0410	SO approve QA/QC system	28	28	05MAR09A	06JUN09	1
3AL1FT0412	Approval of Tunnel Lining Design	0	0	11AUG09	11AUG09	2
3AL1FT0416	Manufacture of segments	330	330	12AUG09	20SEP10	1
3AL1FT0418	Delivery of Segments	400	400	02JAN10	12MAY11	1
3AL1FTSL02	Procure sub-contract for segment lining	0	0	05JAN09A	05JAN09A	1
<b>Geotech Instrumentation at WSD Tunnel Using PPE</b>						
<b>Method Statement to Install G.I. Works</b>						
3AL1FTMS02	Prepare method statement	69	69	12MAR09A	26MAR09A	1
3AL1FTMS04	Method statement endorsement by ICE & APRE	30	30	29MAY09A	03JUL09	1
3AL1FTMS08	Method statement endorsement by LD	18	18	04JUL09	24JUL09	1
3AL1FTMS12	Method statement endorsement by SOR	12	12	25JUL09	07AUG09	1
3AL1FTMS14	Method statement endorsement by WSD	24	24	08AUG09	04SEP09	1
3AL1FTMS24	Application for electrical power	45	45	22DEC09*	18FEB10	1
<b>At Ting Kau Air Valve House</b>						
3AL1WT3B02	Arrange WSD to open the valve house	1	1	19MAR10	19MAR10	1
3AL1WT3B12	Set up exhaust fans & arrange temp. electricity	3	3	20MAR10	23MAR10	1
3AL1WT3B22	Arrange 2 mrs. set of water pumps	2	2	24MAR10	25MAR10	1
3AL1WT3B32	Remove the air vent pipe (DN250)	2	2	26MAR10	27MAR10	1
3AL1WT3B42	Remove connection flange (DN900)	1	1	29MAR10	29MAR10	1



to lower down the water level following water tunnel shut down







ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
6AR1FT0906	6aR 3; On completion of grouting at F6b	0	0		27MAY10		27MAY10	2	1,313
6AR1FT0908	6aR 4; On completion of grouting at F6a	0	0		15JUN10		15JUN10	2	1,294
6AR1FT0910	6aR 5; On completion of grouting at WSD T. 3	0	0		17JUL10		17JUL10	2	1,262
6AR1FT0912	6aR 6; On completion of 20% grout by lth at P6	0	0		17JUL10		17JUL10	2	1,262
6AR1FT0914	6aR 7; On completion of 40% grout by lth at P6	0	0		23JUL10		23JUL10	2	1,256
6AR1FT0916	6aR 8; On completion of 60% grout by lth at P6	0	0		29JUL10		29JUL10	2	1,250
6AR1FT0918	6aR 9; On completion of 80% grout by lth at P6	0	0		17JUL10		17JUL10	2	1,262
6AR1FT0920	6aR 10; On completion of grouting works at P6	0	0		20JUL10		20JUL10	2	1,259
6AR1FT0922	6aR 11; On completion of grouting wks at P5	0	0		06AUG10		06AUG10	2	1,242
6AR1FT0924	6aR 12; On completion of grouting wks at P4	0	0		04SEP10		04SEP10	2	1,213
6AR1FT0926	6aR 13; On completion of grouting wks at P3	0	0		07OCT10		07OCT10	2	1,180
6AR1FT0928	6aR 14; On completion of grouting wks at WSD's	0	0		06NOV10		06NOV10	2	1,150
6AR1FT0930	6aR 15; On completion of grouting wks at F5	0	0		13NOV10		13NOV10	2	1,143
6AR1FT0932	6aR 16; On completion of grouting wks at F4	0	0		26NOV10		26NOV10	2	1,130
6AR1FT0934	6aR 17; On completion of grouting wks at F3	0	0		22DEC10		22DEC10	2	1,104
6AR1FT0936	6aR 18; On completion of grouting wks at F2	0	0		21FEB11		21FEB11	2	1,043
6AR1FT0938	6aR 19; On completion of grouting wks at P2	0	0		31MAR11		31MAR11	2	1,005
6AR1FT0940	6aR 20; On completion of grouting wks at P1	0	0		27APR11		27APR11	2	978
6AR1FT0942	6aR 21; On completion of 10% grout by lth at F1	0	0		21MAY11		21MAY11	2	954
6AR1FT0944	6aR 22; On completion of 20% grout by lth at F1	0	0		23MAY11		23MAY11	2	952
6AR1FT0946	6aR 23; On completion of 30% grout by lth at F1	0	0		24MAY11		24MAY11	2	951
6AR1FT0948	6aR 24; On completion of 40% grout by lth at F1	0	0		25MAY11		25MAY11	2	950
6AR1FT0950	6aR 25; On completion of 50% grout by lth at F1	0	0		26MAY11		26MAY11	2	949
6AR1FT0952	6aR 26; On completion of 60% grout by lth at F1	0	0		27MAY11		27MAY11	2	948
6AR1FT0954	6aR 27; On completion of 70% grout by lth at F1	0	0		28MAY11		28MAY11	2	947
6AR1FT0956	6aR 28; On completion of 80% grout by lth at F1	0	0		30MAY11		30MAY11	2	945
6AR1FT0958	6aR 29; On completion of 90% grout by lth at F1	0	0		31MAY11		31MAY11	2	944
6AR1FT0960	6aR 30; On completion of grouting works at F1	0	0		01JUN11		01JUN11	2	943
6AR1FT0970	6aR 31; On completion of all works under this CC	0	0		18JUN11		18JUN11	2	926
<b>Schedule of Milestones for Cost Centre No. 3aL</b>									
3AL1FT1002	3aL 1; On providing evidence of procuring TBM	0	0		19JAN08A		19JAN08A	2	
3AL1FT1004	3aL 2; On providing evidence of TBM Factory Test	0	0		08OCT08A		08OCT08A	2	
3AL1FT1006	3aL 3; On delivery of all parts of TBM to the SI	0	0		07AUG09		07AUG09	2	1,606
3AL1FT1008	3aL 4; On completion of site comm. & test. of TB	0	0		07MAY10		07MAY10	2	1,333
3AL1FT1010	3aL 5; On completion of 5% perm. tunnel lining	0	0		18MAY10		18MAY10	2	1,322
3AL1FT1012	3aL 6; On completion of 10% perm. tunnel lining	0	0		09JUN10		09JUN10	2	1,300
3AL1FT1014	3aL 7; On completion of 15% perm. tunnel lining	0	0		02JUL10		02JUL10	2	1,277
3AL1FT1016	3aL 8; On completion of 20% perm. tunnel lining	0	0		28JUL10		28JUL10	2	1,251
3AL1FT1018	3aL 9; On completion of 25% perm. tunnel lining	0	0		13AUG10		13AUG10	2	1,235
3AL1FT1020	3aL 10; On completion of 30% perm. tunnel lining	0	0		02SEP10		02SEP10	2	1,215
3AL1FT1022	3aL 11; On completion of 35% perm. tunnel lining	0	0		22SEP10		22SEP10	2	1,195
3AL1FT1024	3aL 12; On completion of 40% perm. tunnel lining	0	0		22OCT10		22OCT10	2	1,165

CH 2865-2970 - Tsuen Wan West Service Reservoir G

under this Cost Centre



ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
01R1A1116	Erect SOR's secondary site office	6	6	28AUG08A	03SEP08A	28AUG08A	03SEP08A	1	
01R1A1118	Footing for temp. bridge span over Shing M. Nul.	26	26	10JUN08A	16JUL08A	10JUN08A	16JUL08A	1	
01R1A1120	Decking for temp. bridge span over Shing M. Nul.	13	13	17JUL08A	01AUG08A	17JUL08A	01AUG08A	1	
01R1A1122	Install remote control CCTV as per ER 4.4-10	12	12	04SEP08A	18SEP08A	04SEP08A	18SEP08A	1	
16R1A1101	Tree Identification & Report	14	14	14MAR08A	01APR08A	14MAR08A	01APR08A	2	
16R7A1102	1st tree pruning for small 3 nos. trees	1	1	03JUN08A	03JUN08A	03JUN08A	03JUN08A	1	
16R7A1104	2nd tree pruning for small 3 nos. trees	1	1	04JUL08A	04JUL08A	04JUL08A	04JUL08A	1	
16R7A1106	Final pruning & uplifting of 3 nos. small trees	2	2	08SEP08A	09SEP08A	08SEP08A	09SEP08A	1	
16R7A1108	Confirm location for trees to be transplanted	51	51	02APR08A	27AUG08A	02APR08A	27AUG08A	1	
16R7A1114	One stg transplant for big 4 nos. big trees	9	9	11FEB09A	19FEB09A	11FEB09A	19FEB09A	1	
<b>Permanent Soil Nailing Works</b>									
11R2A1302	Erect working platform & mobilization	8	8	17MAY08A	24MAY08A	17MAY08A	24MAY08A	1	
11R2A1304	Install test nails & proof loading test; 2 nos.	8	8	24JUN08A	08JUL08A	24JUN08A	08JUL08A	1	
11R2A1306	Soil nailing for A to C rows; 69 nos.	16	16	02JUL08A	14JUL08A	02JUL08A	14JUL08A	1	
11R2A1308	Soil nailing for D to F rows; 71 nos.	29	29	15JUL08A	05SEP08A	15JUL08A	05SEP08A	1	
11R2A1310	Constrcut soil nail heads; 140 nos.	22	22	19JUL08A	06SEP08A	19JUL08A	06SEP08A	1	
11R2A1312	Demobilization	3	3	08SEP08A	10SEP08A	08SEP08A	10SEP08A	1	
<b>Construction of Spiral Ramp &amp; Cascade</b>									
<b>Additional GI Woks to Finalize Design</b>									
AGIA-02	Drill for 5 nos. additional GI works	21	21	09SEP08A	04OCT08A	09SEP08A	04OCT08A	1	
<b>Temp. Pipe-pile cofferdam</b>									
04L1A11202	Erect piling platform	43	43	22OCT08A	24DEC08A	22OCT08A	24DEC08A	1	
04L1A11203	Mobilization & set up piling rig	3	3	30OCT08A	01NOV08A	30OCT08A	01NOV08A	1	
04L1A11204	Install 273 mm dia. temp. pipe piles; 144 nos.	43	43	08NOV08A	05JAN09A	08NOV08A	05JAN09A	1	
04L1A11226	Demobilize all plant and materials	6	6	06JAN09A	13JAN09A	06JAN09A	13JAN09A	1	
<b>Excavate +104.0 to +100.5mPD; Row 7</b>									
04L1A11402	Mobilization	1	1	23FEB09A	23FEB09A	23FEB09A	23FEB09A	1	
04L1A11404	Bulk excavation; soil (155m3)	4	4	24FEB09A	27FEB09A	24FEB09A	27FEB09A	1	
04L1A11406	Install test tie-back & proof load test	4	4	28FEB09A	04MAR09A	28FEB09A	04MAR09A	1	
04L1A11408	Install tie backs/walling & shortcrete	4	4	03MAR09A	06MAR09A	03MAR09A	06MAR09A	1	
<b>Excavate +100.5 to +99.0mPD; Rows 1 &amp; 8</b>									
04L1A11410	Bulk excavation; soil (219m3)	2	2	07MAR09A	09MAR09A	07MAR09A	09MAR09A	1	
04L1A11412	Install tie backs/walling & shortcrete	6	6	10MAR09A	16MAR09A	10MAR09A	16MAR09A	1	
<b>Excavate +99.0 to +96.5mPD; Rows 2, 9 &amp; 18</b>									
04L1A11414	Bulk excavation; soil (710m3)	3	3	17MAR09A	19MAR09A	17MAR09A	19MAR09A	1	
04L1A11416	Install test tie-back & proof load test	4	4	26MAR09A	01APR09A	26MAR09A	01APR09A	1	
04L1A11418	Install tie backs/walling & shortcrete	6	6	23MAR09A	28MAR09A	23MAR09A	28MAR09A	1	
<b>Excavate +96.5 to +95.0mPD; Rows 3, 10 &amp; 19</b>									
04L1A11420	Bulk excavation; soil (721m3)	3	3	30MAR09A	04APR09A	30MAR09A	04APR09A	1	
04L1A11422	Install tie backs/walling & shortcrete	4	4	02APR09A	20APR09A	02APR09A	20APR09A	1	









ID	Activity Description	AD04		WP3D		AD04	AD04		WP3D	Cal ID	Total Float
		Dur	Dur	Start	Finish		Start	Finish			
07R1A11918	7R 9; On completion of spiral access ramp	0	0	24AUG10	24AUG10	WP3D	24AUG10	24AUG10	2	2	1,224
07R1A11920	7R 10; On completion of all works under this CC	0	0	22MAR12	22MAR12	WP3D	22MAR12	22MAR12	2	2	648
<b>Schedule of Milestones for Cost Centre No. 11R</b>											
11R2A11R02	11R 1; On completion of soil nailing works	0	0	06SEP08A	06SEP08A		06SEP08A	06SEP08A	2	2	
11R2A11R04	11R 2; On completion of piling at platform	0	0	26NOV10	26NOV10		26NOV10	26NOV10	2	2	1,130
11R2A11R06	11R 3; On completion of piling at branch access	0	0	02JAN12	02JAN12		02JAN12	02JAN12	2	2	728
11R2A11R08	11R 4; On completion of all works under this CC	0	0	03DEC10	03DEC10		03DEC10	03DEC10	2	2	1,123
<b>Construction of Intake I-2</b>											
<b>Preliminary Works</b>											
<b>Additional GI Works to Finalize Design</b>											
AGIB-02	Erect platform/mobilization & set up GI rig	3	3	12SEP08A	16SEP08A		12SEP08A	12SEP08A	1	1	
AGIB-04	Drill 3 nos. GI holes for Intake Structures	22	22	17SEP08A	03NOV08A		17SEP08A	03NOV08A	1	1	
AGIB-06	Drill 1 hole for Intersection with Main Tunnel	12	12	11NOV08A	24NOV08A		11NOV08A	24NOV08A	1	1	
<b>Diversion of CLP Overhead Cable</b>											
01R1BU0102	Temporary diversion of CLP overhead cable	30	30	02SEP08A	17OCT08A		02SEP08A	17OCT08A	2	2	
<b>Diversion of 100mm Watermain</b>											
01R1BU0202	Temporary Diversion of 100mm dia. Watermain	64*	64*	03OCT08A	05DEC08A		03OCT08A	03OCT08A	2	2	
01R1BU0204	Issue VO35 for temp. diversion	1	1	03OCT08A	03OCT08A		03OCT08A	03OCT08A	1	1	
01R1BU0206	Preparation works	26	26	04OCT08A	04NOV08A		04OCT08A	04OCT08A	1	1	
01R1BU0208	Install steel support	3	3	05NOV08A	07NOV08A		05NOV08A	07NOV08A	1	1	
01R1BU0210	Lay new watermain	2	2	08NOV08A	18NOV08A		08NOV08A	18NOV08A	1	1	
01R1BU0212	Obtain ICE certificate for temp. support	0	0	19NOV08A	19NOV08A		19NOV08A	19NOV08A	1	1	
01R1BU0214	Pressure test	2	2	20NOV08A	21NOV08A		20NOV08A	21NOV08A	1	1	
01R1BU0216	Sterilise new pipe & take water sample	3	3	22NOV08A	25NOV08A		22NOV08A	25NOV08A	1	1	
01R1BU0218	Watermain connection by WSD	10	10	26NOV08A	05DEC08A		26NOV08A	05DEC08A	2	2	
<b>VO #11; Transparent Hoarding at I-2</b>											
VO011-02	Receive VO11 for transparent hoarding	0	0	14JUL08A	14JUL08A		14JUL08A	14JUL08A	1	1	
VO011-04	Procure/prepare/install transparent hoarding	51	51	15JUL08A	13SEP08A		15JUL08A	13SEP08A	1	1	
<b>VO#32; Replace Hoarding by Chain Link Fence</b>											
VO032-I202	Receive VO-32 for replacing hoarding by CLF	0	0	16SEP08A	16SEP08A		16SEP08A	16SEP08A	1	1	
VO032-I204	Procure/prepare/install transparent hoarding	51	51	17SEP08A	17SEP08A		17SEP08A	17SEP08A	1	1	
<b>Stream Diversion/Approach Channel/H-Pile Wall</b>											
01R1BU2102	Possession of Portion B -90d of DOC	0	0	26MAR08A	26MAR08A		26MAR08A	26MAR08A	2	2	
01R1BU2104	Obtain TTA (ingress & egress) approval	0	0	19APR08A	19APR08A		19APR08A	19APR08A	2	2	
01R1BU2108	Site clearance	30	30	02MAY08A	05SEP08A		02MAY08A	05SEP08A	1	1	
01R1BU2112	Erect hoarding	30	30	05JUN08A	16MAR09A		05JUN08A	16MAR09A	1	1	
01R1BU2116	Install remote control CCTV as per ER 4.4.10	12	12	28FEB09A	13MAR09A		28FEB09A	13MAR09A	1	1	
16R7BI2002	Tree transplanting; 1 no.	72	72	10DEC08A	23APR09A		10DEC08A	23APR09A	1	1	
<b>Received VO22 for revised layout of pile wall</b>											
VO022-02	Received VO22 for revised layout of pile wall	0	0	10JUL08A	10JUL08A		10JUL08A	10JUL08A	1	1	

ID	Activity Description	D04		WP3D		AD04		WP3D		Total Float
		Dur	Dur	Start	Finish	Start	Finish	Start	Finish	
VO022-04	SOR confirmed to demolish exit: ret. wall	38	38	11JUL08A	21AUG08A	11JUL08A	21AUG08A	11JUL08A	21AUG08A	1
VO022-06	Demolish existing retaining wall	1	1	13SEP08A	13SEP08A	13SEP08A	13SEP08A	13SEP08A	13SEP08A	1
VO022-16	Reinstate piling platform	2	2	16SEP08A	17SEP08A	16SEP08A	17SEP08A	16SEP08A	17SEP08A	1
<b>Phase 1; Construct 550 dia. H-pile Wall</b>										
12R3BI2202	Form temp. access ramp along west side of stream	44	44	10JUN08A	31JUL08A	10JUN08A	31JUL08A	10JUN08A	31JUL08A	1
12R3BI2204	Additional SI & engineering works	26	26	25AUG08A	24SEP08A	25AUG08A	24SEP08A	25AUG08A	24SEP08A	1
12R3BI2206	Mobilize piling rig & set up	5	5	25SEP08A	30SEP08A	25SEP08A	30SEP08A	25SEP08A	30SEP08A	1
12R3BI2208	Construct piles 1 to 18	13	13	02OCT08A	17OCT08A	02OCT08A	17OCT08A	02OCT08A	17OCT08A	1
12R3BI2210	Piling works stopped by the SOR	8	8	18OCT08A	27OCT08A	18OCT08A	27OCT08A	18OCT08A	27OCT08A	1
12R3BI2212	Construct piles 19-58	28	28	28OCT08A	26NOV08A	28OCT08A	26NOV08A	28OCT08A	26NOV08A	1
12R3BI2214	SOR's instruction to delete pile 59	0	0		02DEC08A		02DEC08A		02DEC08A	1
12R3BI2216	Demobilize piling rig	4	4	03DEC08A	06DEC08A	03DEC08A	06DEC08A	03DEC08A	06DEC08A	1
12R3BI2218	Construct skin wall/capping beam/u-channel	70*	70*	25JUN09	15SEP09	25JUN09	15SEP09	25JUN09	15SEP09	1
12R3BI2220	Excavate for skin wall: 4 bays	18	18	25JUN09	16JUL09	25JUN09	16JUL09	25JUN09	16JUL09	1
12R3BI2222	Construct for skin wall: 4 bays	24	24	17JUL09	13AUG09	17JUL09	13AUG09	17JUL09	13AUG09	1
12R3BI2224	Construct capping beam: 4 bays	16	16	14AUG09	01SEP09	14AUG09	01SEP09	14AUG09	01SEP09	1
12R3BI2226	Construct drainage: 4 bays	12	12	02SEP09	15SEP09	02SEP09	15SEP09	02SEP09	15SEP09	1
<b>Phase 1; Construct Dry Weather Flow Channel</b>										
08R1BI2202	Excavate for new low flow channel	6	6	27MAR09A	03APR09A	27MAR09A	03APR09A	27MAR09A	03APR09A	1
08R1BI2204	Construct new low flow channel	6	6	11JUN09	17JUN09	11JUN09	17JUN09	11JUN09	17JUN09	1
08R3BI2208	Remove block wall/excavate for gantry footing	12	12	18JUN09	02JUL09	18JUN09	02JUL09	18JUN09	02JUL09	1
08R3BI2212	Construct PC bund wall to protect gantry footing	6	6	03JUL09	09JUL09	03JUL09	09JUL09	03JUL09	09JUL09	1
<b>Phase 2; Construct Approach Channel West</b>										
08R1BI2218	Construct temp. concrete block bund	12	12	02NOV09*	14NOV09	02NOV09*	14NOV09	02NOV09*	14NOV09	1
08R1BI2220	Excavate for western portion guide wall & slab	12	12	16NOV09	28NOV09	16NOV09	28NOV09	16NOV09	28NOV09	1
08R1BI2222	Construct western portion of guide wall & slab	50	50	30NOV09	29JAN10	30NOV09	29JAN10	30NOV09	29JAN10	1
08R1BI2224	Remove concrete block bund	6	6	30JAN10	05FEB10	30JAN10	05FEB10	30JAN10	05FEB10	1
<b>Phase 3; Construct Approach Channel North</b>										
08R1BI2226	Construct temp. concrete block bund	6	6	01NOV10*	06NOV10	01NOV10*	06NOV10	01NOV10*	06NOV10	1
08R1BI2228	Excavate for L-shaped retaining wall	12	12	08NOV10	20NOV10	08NOV10	20NOV10	08NOV10	20NOV10	1
08R1BI2230	Construct L-shaped retaining wall	18	18	22NOV10	11DEC10	22NOV10	11DEC10	22NOV10	11DEC10	1
08R1BI2232	Excavate eastern portion of guide wall & slab	12	12	13DEC10	28DEC10	13DEC10	28DEC10	13DEC10	28DEC10	1
08R1BI2234	Construction of boulder traps; 7nos.	24	24	29DEC10	26JAN11	29DEC10	26JAN11	29DEC10	26JAN11	1
08R1BI2236	Construct eastern portion of guide wall & slab	24	24	27JAN11	26FEB11	27JAN11	26FEB11	27JAN11	26FEB11	1
08R1BI2240	Remove temp. concrete block bund	6	6	28FEB11	05MAR11	28FEB11	05MAR11	28FEB11	05MAR11	1
<b>Phase 4 - Construct Remaining Appr. Channel</b>										
08R1BI2242	Remove gantry crane & steel deck	18	18	16DEC11	10JAN12	16DEC11	10JAN12	16DEC11	10JAN12	1
08R1BI2244	Excavation for remaining approach channel	12	12	11JAN12	27JAN12	11JAN12	27JAN12	11JAN12	27JAN12	1
08R1BI2246	Construct remaining approach channel	24	24	28JAN12	24FEB12	28JAN12	24FEB12	28JAN12	24FEB12	1
08R1BI2248	Close out last section of guide wall	12	12	25FEB12	09MAR12	25FEB12	09MAR12	25FEB12	09MAR12	1
08R1BI2250	Construct trash grill	12	12	25FEB12	09MAR12	25FEB12	09MAR12	25FEB12	09MAR12	1



ID	Activity Description	AD04		WP3D		Cal ID	Total Float
		Dur	Dur	Start	Finish		
<b>Excavate &amp; Construct Vortex/Drop Shaft</b>							
<b>Steel Deck &amp; Gantry Crane/Noise Enclosure</b>							
05L1B12300	Construct 8 nos. mini piles	24	24	20JAN09A	21FEB09A	20JAN09A	21FEB09A
05L1B12301	Erect timber platform for mini piling	4	4	23FEB09A	26FEB09A	23FEB09A	26FEB09A
05L1B12302	Construct 6 nos. mini piles	12	12	27FEB09A	12MAR09A	27FEB09A	12MAR09A
05L1B12303	Excavation for footing/pile caps	12	12	13MAR09A	26MAR09A	13MAR09A	26MAR09A
05L1B12304	Construction of footing/pile caps	12	12	27MAR09A	18APR09A	27MAR09A	18APR09A
05L1B12305	Install steel deck	25	25	04MAY09A	30JUL09	04MAY09A	-175
05L1B12316	Construct footing for gantry crane	12	12	25AUG09	07SEP09	25AUG09	-196
05L1B12318	Install gantry crane & noise enclosure	42	42	08SEP09	29OCT09	08SEP09	-196
<b>Ground Treatment Works for Vortex Shaft</b>							
05L1B12306	Setting up	2	2	10JUL09	11JUL09	10JUL09	-196
05L1B12308	Probing & curtain grouting around shaft	37	37	13JUL09	24AUG09	13JUL09	-196
<b>Excavation and Construction of Vortex Shaft</b>							
05L1B12320	Excavate shaft: +99mPD to +65mPD (30m)	118	118	30OCT09	23MAR10	30OCT09	-196
05L1B12321	Set up for lining construction	6	6	11NOV11	17NOV11	11NOV11	-196
05L1B12322	Construct permanent lining; 30m @ 4m/4days	30	30	11NOV11	15DEC11	11NOV11	-196
<b>Excavate &amp; Construct Air Vent Shaft</b>							
05L1B12418	Enlarge the platform for RCD operation	15	15	08DEC08A	27DEC08A	08DEC08A	1
05L1B12420	Mobilize & set up RCD for excavation	6	6	29DEC08A	06JAN09A	29DEC08A	1
05L1B12422	Bore shaft with RCD; 37.5m @ 1m/day	54	54	07JAN09A	13MAR09A	07JAN09A	1
05L1B12424	Demobilize RCD rig	5	5	14MAR09A	19MAR09A	14MAR09A	1
05L1B12426	Install permanent steel liner	3	3	20MAR09A	23MAR09A	20MAR09A	1
05L1B12427	Preparation works for casting concrete	1	1	21MAR09A	25APR09A	21MAR09A	1
05L1B12428	Damage found on installed steel liner	0	0	25APR09A	25APR09A	25APR09A	1
05L1B12429	Removal of steel liner	31	31	27APR09A	04JUN09	27APR09A	-196
05L1B12430	Remove RCD platform	17	17	05JUN09	24JUN09	05JUN09	-196
05L1B12432	Construct PC bund wall	12	12	25JUN09	09JUL09	25JUN09	-196
05L1B12434	Divert channel to West	0	0	09JUL09	09JUL09	09JUL09	-196
05L1B12436	Footing for gantry crane	12	12	02NOV09*	14NOV09	02NOV09*	-96
05L1B12438	Erection of gantry crane	36	36	16NOV09	29DEC09	16NOV09	-96
05L1B12440	Set up sliding system	6	6	30DEC09	06JAN10	30DEC09	-96
05L1B12446	Install steel casing	36	36	07JAN10	20FEB10	07JAN10	-96
05L1B12448	Survey checking & capping concrete	3	3	22FEB10	24FEB10	22FEB10	-96
05L1B12450	Preparation & concreting	3	3	25FEB10	27FEB10	25FEB10	-96
05L1B12452	Construct upstand wall	24	24	01MAR10*	27MAR10	01MAR10*	-96
<b>Excavate &amp; Construct Man Access Shaft</b>							
<b>Ground Treatment for Man Access Shaft</b>							
05L1B12502	Probing & curtain grouting around shaft	31	31	10JUL09	14AUG09	10JUL09	-50
<b>Gantry Crane &amp; Noise Enclosure at M. A. Shaft</b>							
05L1B12504	Excavate & construct 4 nos. gantry footings	12	12	15AUG09	28AUG09	15AUG09	-50

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following channel diversion to west

provision of TTA

provision of TTA

following consent from the SOR

including 1 wk concrete strength

ID	Activity Description	904 WP3D		AD04		WP3D		Total Float
		Dur	Start	Finish	Start	Finish	WP3D Start	
05L1B12505	Install gantry crane & noise enclosure	36	29AUG09	12OCT09	29AUG09	12OCT09	12OCT09	1 -50
<b>ELS and Excavation upto Rock Head Level at M.A.</b>								
05L1B12503	Install sheet piles	6	15AUG09	21AUG09	15AUG09	21AUG09	21AUG09	1 -44
05L1B12506	Excavation to rock head level	18	13OCT09	03NOV09	13OCT09	03NOV09	03NOV09	1 -50
<b>Excavation &amp; Construction of Man Access Shaft</b>								
05L1B12508	Excavation/muck out/temporary support	127	04NOV09	12APR10	04NOV09	12APR10	12APR10	1 -50
05L1B12522	Construct base	4	15MAR11	18MAR11	15MAR11	18MAR11	18MAR11	1 -50
05L1B12524	Set up for 37m shaft construction (wall only)	6	19MAR11	25MAR11	19MAR11	25MAR11	25MAR11	1 -50
05L1B12526	Construct wall/stair, 25 landings @ 3 days/land	75	26MAR11	28JUN11	26MAR11	28JUN11	28JUN11	1 -50
05L1B12528	Removal of gantry crane	12	29JUN11	13JUL11	29JUN11	13JUL11	13JUL11	1 -50
05L1B12530	Construct wall above ground level	8	14JUL11	22JUL11	14JUL11	22JUL11	22JUL11	1 -50
05L1B12532	Construct shaft roof	12	23JUL11	05AUG11	23JUL11	05AUG11	05AUG11	1 -50
<b>Excavate &amp; Construct Deaeration Chamber</b>								
05L1B12602	Probing/grout/excavate/muckout/temp.support	72	24MAR10	23JUN10	24MAR10	23JUN10	23JUN10	1 -196
05L1B12604	Drill/excavate/muckout/temp. support for bench	50	24JUN10	21AUG10	24JUN10	21AUG10	21AUG10	1 -196
05L1B12607	Drill/excavate/muckout/temp. support for bottom	50	23AUG10	22OCT10	23AUG10	22OCT10	22OCT10	1 -196
05L1B12608	Set up for lining construction	12	26AUG11	08SEP11	26AUG11	08SEP11	08SEP11	1 -196
05L1B12610	Construct base, 3 bays	9	09SEP11	20SEP11	09SEP11	20SEP11	20SEP11	1 -196
05L1B12612	Construct walls 2 lifts, 3 bays	24	2421SEP11	20OCT11	21SEP11	20OCT11	20OCT11	1 -196
05L1B12614	Const. crown/underpin. of air vent & drop shafts	18	21OCT11	10NOV11	21OCT11	10NOV11	10NOV11	1 -196
<b>Excavate &amp; Construct Main Adit Tunnel</b>								
38L1B12102	Probing/grout/temp. support/excavation/muck out	200	23OCT10	27JUN11	23OCT10	27JUN11	27JUN11	1 -196
38L1B12104	Construct permanent lining	50	28JUN11	25AUG11	28JUN11	25AUG11	25AUG11	1 -196
<b>Excavate &amp; Construct Man Access Adit</b>								
<b>Upper Horizontal Section</b>								
05L1B12806	Probing/gorut/excavate/muckout/temporary support	90	13APR10	30JUL10	13APR10	30JUL10	30JUL10	1 -50
05L1B12830	Set up for 23m upper adit construction	6	26JAN11	01FEB11	26JAN11	01FEB11	01FEB11	1 -50
05L1B12834	Construction of permanent lining	32	02FEB11	14MAR11	02FEB11	14MAR11	14MAR11	1 -50
<b>Vertical Section</b>								
05L1B12807	Probing & curtain grouting around shaft	24	31JUL10	27AUG10	31JUL10	27AUG10	27AUG10	1 -50
05L1B12808	Set up for 7.2m raise (shaft) excavation	2	28AUG10	30AUG10	28AUG10	30AUG10	30AUG10	1 -50
05L1B12810	Excavate/removal of rock/temporary support	24	31AUG10	28SEP10	31AUG10	28SEP10	28SEP10	1 -50
05L1B12822	Construct base of raise shaft	4	09DEC10	13DEC10	09DEC10	13DEC10	13DEC10	1 -50
05L1B12824	Set up for 9m raise stairway const. (wall only)	6	14DEC10	20DEC10	14DEC10	20DEC10	20DEC10	1 -50
05L1B12826	Construct wall & stair, 7 landings @4days/landin	28	21DEC10	25JAN11	21DEC10	25JAN11	25JAN11	1 -50
<b>Lower Horizontal Section</b>								
05L1B12812	Set up for 9.3m lower adit excavation	2	29SEP10	30SEP10	29SEP10	30SEP10	30SEP10	1 -50
05L1B12814	Excavate/removal of rock/temporary support	31	02OCT10	08NOV10	02OCT10	08NOV10	08NOV10	1 -50
05L1B12816	Set up for 7m lower adit construction	6	09NOV10	15NOV10	09NOV10	15NOV10	15NOV10	1 -50
05L1B12818	Construction of permanent lining for lower adit	20	16NOV10	08DEC10	16NOV10	08DEC10	08DEC10	1 -50

provision of TTA

after construction of man access adit

top heading  
 4m deep @ 0.2m/day = 72  
 4.5m deep @ 22\*4.5\*9=891m<sup>3</sup>, 17.8m<sup>3</sup>/day  
 4.5m deep @ 22\*4.5\*9=891m<sup>3</sup>, 17.8m<sup>3</sup>/day

including 5 days for setup of mould @ 56m @ 4m/11 days

26m, @ 4 m/9 day

@ 0.3m/day & night

@ 0.3m/day & night

ID	Activity Description	AD04		WP3D		Cal ID	Total Float	Year											
		Dur	Start	Dur	Finish			2008	2009	2010	2011	2012	2013						
<b>Junction Between Main Tunnel &amp; Adit Tunnel</b>																			
3BL1B12106	Temp. support & excavation breakthrough	48	26AUG11	48	24OCT11	1	-127												
3BL1B12108	Construct collar between MT & AT	48	25OCT11	48	19DEC11	1	-127												
<b>Remaining Works Prior to Handover</b>																			
08R1B12102	Finishing & reinstatement works; Portion B	36	04FEB12	36	16MAR12	1	-196												
08R1B12103	Pre-handover inspections and remedial works	30	18FEB12	30	23MAR12	1	-196												
08R1B12104	Contractor serve notice for Works completion	7	24MAR12	7	30MAR12	2	0												
08R1B12105	SO issues completion certificate	21	31MAR12	21	20APR12	2	0												
16R7B12102	Landscaping works at Portion B	72	16DEC11	72	16DEC11	1	-158												
16R7B12104	Establishment Works at Portion B	365	17MAR12	365	16MAR13	2	-196												
3DL1B12101	Install flow measurement devices at Intake I-2	12	07FEB12	12	20FEB12	1	-184												
3DL1B12105	Maintain & monitor flow monitoring	365	21FEB12	365	19FEB13	2	0												
<b>Schedule of Milestones for Cost Centre No. 3bL</b>																			
3BL1B12A02	3bL 1; On establishing tunnelling equipments	0	22OCT10	0	22OCT10	2	1,165												
3BL1B12A04	3bL 2; On completion of 12.5% perm. tunnel linin	0	18NOV10	0	18NOV10	2	1,138												
3BL1B12A06	3bL 3; On completion of 25% perm. tunnel lining	0	16DEC10	0	16DEC10	2	1,110												
3BL1B12A08	3bL 4; On completion of 37.5% perm. tunnel linin	0	15JAN11	0	15JAN11	2	1,080												
3BL1B12A10	3bL 5; On completion of 50% perm. tunnel lining	0	15FEB11	0	15FEB11	2	1,049												
3BL1B12A12	3bL 6; On completion of 62.5% perm. tunnel linin	0	15MAR11	0	15MAR11	2	1,021												
3BL1B12A14	3bL 7; On completion of 75% perm. tunnel lining	0	12APR11	0	12APR11	2	993												
3BL1B12A16	3bL 8; On completion of 87.5% perm. tunnel linin	0	09JUL11	0	09JUL11	2	905												
3BL1B12A18	3bL 9; On completion of perm. tunnel lining	0	25AUG11	0	25AUG11	2	858												
3BL1B12A20	3bL 10; On completion of all works under this CC	0	19DEC11	0	19DEC11	2	742												
<b>Schedule of Milestones for Cost Centre No. 5L</b>																			
05L1B12M02	5L 1; On completion of 25% of excavation	0	08DEC09	0	08DEC09	2	1,483												
05L1B12M04	5L 2; On completion of 50% of excavation	0	12APR10	0	12APR10	2	1,358												
05L1B12M06	5L 3; On completion of 75% of excavation	0	23JUN10	0	23JUN10	2	1,286												
05L1B12M08	5L 4; On completion of all excavation	0	22OCT10	0	22OCT10	2	1,165												
05L1B12M10	5L 5; On completion of drop shaft & vortex shaft	0	15DEC11	0	15DEC11	2	746												
05L1B12M12	5L 6; On completion of de-aeration chamber	0	10NOV11	0	10NOV11	2	781												
05L1B12M14	5L 7; On completion of air vent shaft	0	27MAR10	0	27MAR10	2	1,374												
05L1B12M16	5L 8; On completion of man access shaft	0	05AUG11	0	05AUG11	2	878												
05L1B12M18	5L 9; On completion of man access adit	0	14MAR11	0	14MAR11	2	1,022												
05L1B12M20	5L 10; On completion of all works under this CC	0	23MAR12	0	23MAR12	2	647												
<b>Schedule of Milestones for Cost Centre No. 8R</b>																			
08R1B12R02	8R 1; On completion of approach channel	0	09MAR12	0	09MAR12	2	661												
08R1B12R04	8R 2; On completion of trash grill	0	09MAR12	0	09MAR12	2	661												

◆ equipment for tunnelling at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ for Adit Tunnel at Intake I-2  
 ◆ under this Cost Centre

◆ below G.L. except for Adit at Intake I-2  
 ◆ below G.L. except for Adit at Intake I-2  
 ◆ below G.L. except for Adit at Intake I-2  
 ◆ below G.L. except for Adit Intake I-2  
 ◆ vortex shaft at Intake I-2  
 ◆ chamber at Intake I-2  
 ◆ shaft at Intake I-2  
 ◆ shaft at Intake I-2  
 ◆ adit at Intake I-2  
 ◆ under this Cost Centre

channel and associated decking at Intake I-2  
 ◆ at Intake I-2

ID	Activity Description	D04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Total Float
08R1B12R06	8R 3; On completion of all works under this CC	0	0	23MAR12	23MAR12			647
<b>Schedule of Milestones for Cost Centre No. 12R</b>								
12R3B12S02	12R 1; On completion of 50% pile retain. wall	0	0	06NOV08A	06NOV08A			2
12R3B12S04	12R 2; On completion of pile retain. wall	0	0	26NOV08A	26NOV08A			2
12R3B12S06	12R 3; On completion of boulder traps	0	0	26JAN11	26JAN11			2 1,069
12R3B12S08	12R 4; On completion of all works under this CC	0	0	23MAR12	23MAR12			2 647
<b>Construction of Intake I-3</b>								
<b>Preliminary Works</b>								
<b>Additional GI Works To Finalize Design</b>								
AGIC-02	Erect platform/mobilization & set up GI rig	3	3	03NOV08A	05NOV08A	03NOV08A	05NOV08A	1
AGIC-04	Drill 3 nos. GI holes for Intake Structures	12	12	06NOV08A	19NOV08A	06NOV08A	19NOV08A	1
<b>VO#32; Replace Hoarding by Chain Link Fence</b>								
VO032-I302	Received VO-32 for replacing hoarding by CLF	0	0	16SEP08A	16SEP08A		16SEP08A	1
VO032-I304	Procure/prepare/install transparent hoarding	80	80	17SEP08A	06MAR09A	17SEP08A	06MAR09A	1
<b>Tree Transplanting Works</b>								
01R1C13102	Possession of Portion C--90d of DOC	0	0	26MAR08A	26MAR08A			2
01R1C13104	Site clearance	40	40	22APR08A	20SEP08A	22APR08A	20SEP08A	1
01R1C13106	Hoarding at slope crest	48	48	03JUN08A	30JUL08A	03JUN08A	30JUL08A	1
01R1C13110	Set-up wheel washing facilities	6	6	30JUN08A	03JUL08A	30JUN08A	03JUL08A	1
01R1C13118	Install remote control CCTV as per ER 4.4.10	12	12	28OCT08A	10NOV08A	28OCT08A	10NOV08A	1
<b>Tree Transplanting Works</b>								
16R7C13202	Tree inspection & report	7	7	01APR08A	26APR08A	01APR08A	26APR08A	2
16R7C13204	Tree transplant for upper parts; 8 nos.	86*	86*	04JUN08A	13SEP08A	04JUN08A	13SEP08A	1
16R7C13206	1st stg tree pruning	2	2	04JUN08A	21JUN08A	04JUN08A	21JUN08A	1
16R7C13208	2nd stg tree pruning	2	2	04JUL08A	04JUL08A	04JUL08A	04JUL08A	1
16R7C13210	Final stg. tree pruning & tree uplifting	6	6	08SEP08A	13SEP08A	08SEP08A	13SEP08A	1
16R7C13212	Tree transplanting at Ch250-Ch200; 20 nos.	214*	214*	21JUN08A	09MAR09A	21JUN08A	09MAR09A	1
16R7C13214	1st stg tree pruning	3	3	21JUN08A	15JUL08A	21JUN08A	15JUL08A	1
16R7C13216	2nd stg tree pruning	3	3	15JUL08A	12SEP08A	15JUL08A	12SEP08A	1
16R7C13218	Final stg tree pruning & tree uplifting	8	8	28FEB09A	09MAR09A	28FEB09A	09MAR09A	1
16R7C13220	Tree transplanting at Ch100-Ch0	66*	66*	12NOV09	30JAN10	12NOV09	30JAN10	1 17
16R7C13222	1st stg tree pruning	4	4	12NOV09	16NOV09	12NOV09	16NOV09	1 17
16R7C13224	2nd stg tree pruning	4	4	15DEC09	18DEC09	15DEC09	18DEC09	1 17
16R7C13226	Final stg tree pruning & tree uplifting	10	10	20JAN10	30JAN10	20JAN10	30JAN10	1 17
<b>H-Pile Retaining Wall for Wall A</b>								
<b>Piling Works</b>								
13R4C13400	Mobilize & set up piling rig	6	6	11AUG08A	16AUG08A	11AUG08A	16AUG08A	1
13R4C13401	Drill 28 nos. grout (partially) 11 nos. piles	1	1	18AUG08A	28AUG08A	18AUG08A	28AUG08A	1
13R4C13402	Piling stopped due to accessive grout loss	1	1	29AUG08A	22OCT08A	29AUG08A	22OCT08A	1
13R4C13403	Piling resumed date	1	1	26NOV08A	26NOV08A	26NOV08A	26NOV08A	1



ID	Activity Description	D04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Total Float
09R1CI3620	Excavation of slope batter above access road	47	47	14SEP09	10NOV09	14SEP09	10NOV09	1
<b>Ch. 270 to Ch. 210</b>								
09R1CI3624	Excavation & soil nailing	54	54	25JUL09	29SEP09	29JUL09	29SEP09	1
09R1CI3626	Backfill (grade 200) & compaction	3	3	07OCT09	09OCT09	07OCT09	09OCT09	1
09R1CI3628	Temporary concrete paving & curing	10	10	10OCT09	21OCT09	10OCT09	21OCT09	1
<b>Ch. 210 to Ch. 130</b>								
09R1CI3630	Excavation as per conforming design	48	48	12DEC08A	11MAY09A	12DEC08A	11MAY09A	1
09R1CI3632	Temporary concrete paving & curing	12	12	13NOV09	26NOV09	13NOV09	26NOV09	1
VO-084-02	VO#084 revising the design received	0	0	12MAY09A		12MAY09A		1
VO-084-12	Works resumed as per VO #084	0	0	16MAY09A		16MAY09A		1
VO-084-22	Excavate slope profile as per VO#084	34	34	16MAY09A	25JUN09	16MAY09A	25JUN09	1
VO-084-26	Remove excavated material off site: 6000m3	18	18	22OCT09	12NOV09	22OCT09	12NOV09	1
VO-084-32	Soil nailing at Ch. 198 to 210	4	4	30SEP09	06OCT09	30SEP09	06OCT09	1
VO-084-42	Excavate to access road formation	18	18	26APR11	17MAY11	26APR11	17MAY11	1
<b>Ch. 130 to Ch. 0; up to +74.5mPD</b>								
09R1CI3634	Excavation & soil nailing	62	62	30OCT09	13JAN10	30OCT09	13JAN10	1
09R1CI3636	Temporary concrete paving & curing	15	15	14JAN10	30JAN10	14JAN10	30JAN10	1
<b>Ch. 130 to Ch. 0; below +74.5mPD</b>								
09R1CI3638	Excavate & soil nailing (+74.5 to 88.5mPD)	41	41	06AUG10	22SEP10	06AUG10	22SEP10	1
09R1CI3640	Excavate rock (88.5 to 63mPD); 3239m3 @ 80m3/day	40	40	24SEP10	11NOV10	24SEP10	11NOV10	1
09R1CI3642	Backfill (grade 200) & compaction	7	7	12NOV10	19NOV10	12NOV10	19NOV10	1
<b>Drainage &amp; Road Paving; Ch. 460 to Ch. 270</b>								
09R1CI3664	Construct drainage as per VO#090; 190m @ 5m/day	32	32	29JUN11	05AUG11	29JUN11	05AUG11	1
09R1CI3674	Road formation; 190m @ 12m/day	20	20	06AUG11	29AUG11	06AUG11	29AUG11	1
09R1CI3684	Lay sub-base and kerb; 190m @ 12m/day	16	16	30AUG11	17SEP11	30AUG11	17SEP11	1
09R1CI3694	Concrete paving; 190m @ 12m/day	16	16	19SEP11	08OCT11	19SEP11	08OCT11	1
VO-095-02	Green slope arrangement as per VO# 095	24	24	08JUL11	05AUG11	09JUL11	05AUG11	1
<b>Drainage &amp; Road Paving; Ch. 270 to Ch. 0</b>								
09R1CI3644	Construct drainage; 140m @ 4m/day	35	35	18MAY11	28JUN11	18MAY11	28JUN11	1
09R1CI3646	Backfill trench & road formation; 140m @ 12m/day	12	12	29JUN11	13JUL11	29JUN11	13JUL11	1
09R1CI3648	Lay sub-base and kerb; 140m @ 12m/day	12	12	14JUL11	27JUL11	14JUL11	27JUL11	1
09R1CI3654	Concrete paving; 140m @ 12m/day	12	12	28JUL11	10AUG11	28JUL11	10AUG11	1
<b>Drainage &amp; Road paving; Ch. 130 to Ch. 0</b>								
09R1CI3704	Construct drainage; 130m @ 4m/day	33	33	06AUG11	14SEP11	06AUG11	14SEP11	1
09R1CI3714	Backfill trench & road formation; 130m @ 12m/day	11	11	15SEP11	27SEP11	15SEP11	27SEP11	1
09R1CI3724	Lay sub-base & kerb; 130m @ 12m/day	11	11	28SEP11	12OCT11	28SEP11	12OCT11	1
09R1CI3734	Concrete paving; 130m @ 12m/day	11	11	13OCT11	25OCT11	13OCT11	25OCT11	1
<b>H-Pile Retaining Wall for Wall B</b>								
<b>Piling Works</b>								
13R4CI3701	Form piling platform for Wall B	12	12	01FEB10	17FEB10	01FEB10	17FEB10	1
13R4CI3702	Mobilize & set up piling rig	6	6	18FEB10	24FEB10	18FEB10	24FEB10	1
13R4CI3704	350mm dia. pre-bored H-piles, Wall B; 98 nos.	53	53	25FEB10	03MAY10	25FEB10	03MAY10	1



ID	Activity Description	AD04		WP3D		AD04	AD04	AD04	AD04	WP3D	WP3D	Cal	Total
		Dur	Dur	Start	Finish								
13R4CI3705	Demobilize piling rig	6	6	04MAY10	10MAY10	04MAY10	10MAY10	04MAY10	10MAY10	04MAY10	10MAY10	1	17
<b>Skin Wall</b>													
13R4CI3706	Excavate for skin wall: 48m <sup>3</sup>	18	18	11MAY10	01JUN10	11MAY10	01JUN10	11MAY10	01JUN10	11MAY10	01JUN10	1	17
13R4CI3708	Hack off piles; piles 1 to 98	24	24	26MAY10	23JUN10	26MAY10	23JUN10	26MAY10	23JUN10	26MAY10	23JUN10	1	17
13R4CI3710	Construct skin wall; 6 bays	24	24	09JUN10	08JUL10	09JUN10	08JUL10	09JUN10	08JUL10	09JUN10	08JUL10	1	17
13R4CI3712	Excavate for capping beams;	12	12	02JUL10	15JUL10	02JUL10	15JUL10	02JUL10	15JUL10	02JUL10	15JUL10	1	17
13R4CI3714	Construct for capping beams;	18	18	09JUL10	29JUL10	09JUL10	29JUL10	09JUL10	29JUL10	09JUL10	29JUL10	1	17
13R4CI3716	Construct U-channels	18	18	16JUL10	05AUG10	16JUL10	05AUG10	16JUL10	05AUG10	16JUL10	05AUG10	1	17
<b>Channel Modification Works (Dry Season)</b>													
<b>River Diversion for Underground Works</b>													
09R1CI3802	Form a temporary plant access to stream	60	60	12DEC08A	04FEB09A	12DEC08A	04FEB09A	12DEC08A	04FEB09A	12DEC08A	04FEB09A	1	
09R1CI3804	Break boulders	32	32	05FEB09A	24FEB09A	05FEB09A	24FEB09A	05FEB09A	24FEB09A	05FEB09A	24FEB09A	1	
09R1CI3806	Concrete bedding for bund wall (gabion)	11	11	25FEB09A	09MAR09A	25FEB09A	09MAR09A	25FEB09A	09MAR09A	25FEB09A	09MAR09A	1	
09R1CI3808	Construct bund wall (gabion)	22	22	10MAR09A	30APR09A	10MAR09A	30APR09A	10MAR09A	30APR09A	10MAR09A	30APR09A	1	
09R1CI3810	Divert channel to south west	0	0		30APR09A		30APR09A		30APR09A		30APR09A	1	
<b>Channel Modification Works</b>													
09R1CI3812	Breaking of large boulders	30	30	02NOV09*	05DEC09	02NOV09*	05DEC09	02NOV09*	05DEC09	02NOV09*	05DEC09	1	21
09R1CI3814	Excavation of the stream bed & make good	24	24	07DEC09	06JAN10	07DEC09	06JAN10	07DEC09	06JAN10	07DEC09	06JAN10	1	21
09R1CI3816	Laying of rock armour	24	24	07JAN10	03FEB10	07JAN10	03FEB10	07JAN10	03FEB10	07JAN10	03FEB10	1	21
09R1CI3818	Construct bund wall for approach channel const.	24	24	04FEB10	06MAR10	04FEB10	06MAR10	04FEB10	06MAR10	04FEB10	06MAR10	1	21
09R1CI3820	Divert channel to south west	0	0		06MAR10		06MAR10		06MAR10		06MAR10	1	21
<b>Excavation for AVS/VS/DC/MAS/MAA</b>													
<b>Open Excavation for Underground Structures</b>													
06L1CI3906	Mobilize drilling rig, backhoes	1	1	30OCT09	30OCT09	30OCT09	30OCT09	30OCT09	30OCT09	30OCT09	30OCT09	1	-160
06L1CI3908	Excavate/mucking out/temporary support	200	200	31OCT09	07JUL10	31OCT09	07JUL10	31OCT09	07JUL10	31OCT09	07JUL10	1	-160
<b>Excavation &amp; Construction of Main Adit</b>													
3CL1CI3102	Excavation/mucking out/temporary support	40	40	08JUL10	23AUG10	08JUL10	23AUG10	08JUL10	23AUG10	08JUL10	23AUG10	1	-134
3CL1CI3104	Construction of permanent lining	24	24	24AUG10	20SEP10	24AUG10	20SEP10	24AUG10	20SEP10	24AUG10	20SEP10	1	-134
<b>Construction of Man Access Adit (MAA)</b>													
06L1CI3112	Cast invert; 1 bay	7	7	15SEP10	22SEP10	15SEP10	22SEP10	15SEP10	22SEP10	15SEP10	22SEP10	1	-160
06L1CI3114	Cast walls	12	12	24SEP10	08OCT10	24SEP10	08OCT10	24SEP10	08OCT10	24SEP10	08OCT10	1	-160
06L1CI3116	Cast crown	12	12	09OCT10	23OCT10	09OCT10	23OCT10	09OCT10	23OCT10	09OCT10	23OCT10	1	-160
<b>Construction of Man Access Shaft (MAS)</b>													
06L1CI3122	Cast base	3	3	08JUL10	10JUL10	08JUL10	10JUL10	08JUL10	10JUL10	08JUL10	10JUL10	1	-160
06L1CI3124	Set up formworks	6	6	12JUL10	17JUL10	12JUL10	17JUL10	12JUL10	17JUL10	12JUL10	17JUL10	1	-160
06L1CI3126	Construct wall/stair; 14 landings @ 6 days/land.	84	84	19JUL10	27OCT10	19JUL10	27OCT10	19JUL10	27OCT10	19JUL10	27OCT10	1	-160
06L1CI3128	Construct wall above ground level	6	6	31MAR11	07APR11	31MAR11	07APR11	31MAR11	07APR11	31MAR11	07APR11	1	-9
06L1CI3129	Construct shaft roof	12	12	08APR11	21APR11	08APR11	21APR11	08APR11	21APR11	08APR11	21APR11	1	-9



@ 4 days/ landing @ 22m & 14 landings

**Construction of Deaeration Chamber (DC)**

06L1C13132	Construct base	9	9	25OCT10	03NOV10	25OCT10	03NOV10	1	-160
06L1C13134	Construct walls 2 lifts	12	12	04NOV10	17NOV10	04NOV10	17NOV10	1	-160
06L1C13136	Const. crown/underpin of air vent & drop shafts	18	18	18NOV10	08DEC10	18NOV10	08DEC10	1	-160

**Construction of Vortex Shaft (VS)**

06L1C13142	Set up formworks	6	6	17DEC10	23DEC10	17DEC10	23DEC10	1	-160
06L1C13144	Construction of drop shaft; 4m high	6	6	24DEC10	03JAN11	24DEC10	03JAN11	1	-160
06L1C13146	Construction of vortex structure	24	24	04JAN11	31JAN11	04JAN11	31JAN11	1	-160
06L1C13148	Construct remaining of the vortex	18	18	31MAR11	21APR11	31MAR11	21APR11	1	-160

**Construction of Air Vent Shaft Shaft (AVS)**

06L1C13152	Set up formworks	6	6	01FEB11	10FEB11	01FEB11	10FEB11	1	-160
06L1C13514	Cast 15m high circular wall	15	15	11FEB11	28FEB11	11FEB11	28FEB11	1	-160
06L1C13516	Construct upstand wall	12	12	01MAR11	14MAR11	01MAR11	14MAR11	1	-160

**Backfill Around Structure**

06L1C13162	Granular fill up to +54mPD; 623m3	7	7	09DEC10	16DEC10	09DEC10	16DEC10	1	-160
06L1C13164	Granular fill above +54mPD; 1400m3	14	14	15MAR11	30MAR11	15MAR11	30MAR11	1	-160

**Construction of Approach Channel**

09R1C13172	Excavation for Approach Channel	60	60	01NOV10*	12JAN11	01NOV10*	12JAN11	1	8
09R1C13174	Construction of Approach Channel; upstream	82	82	20DEC10	31MAR11	20DEC10	31MAR11	1	8
09R1C13176	Construction of boulder trap; 7 nos.	24	24	01NOV11*	28NOV11	01NOV11*	28NOV11	1	-165
09R1C13177	Construction of Approach Channel; downstream	40	40	01NOV11	16DEC11	01NOV11	16DEC11	1	-165
09R1C13178	Construction of trash grill	12	12	17DEC11	04JAN12	17DEC11	04JAN12	1	-165
09R1C13179	Removal of concrete bolt bund	6	6	05JAN12	11JAN12	05JAN12	11JAN12	1	-165

**Junction Between Main Tunnel & Adit Tunnel**

3CL1C13106	Temp. support & excavation breakthrough	48	48	19JUL11	12SEP11	19JUL11	12SEP11	1	-94
3CL1C13108	Construct collar between MT & AT	48	48	14SEP11	10NOV11	14SEP11	10NOV11	1	-94

**Remaining Works Prior to Handover to Client**

09R1C13142	Finishing & reinstatement works; Portion C	36	36	10DEC11	28JAN12	10DEC11	28JAN12	1	-155
09R1C13143	Pre-handover inspections and remedial works	30	30	28DEC11	04FEB12	28DEC11	04FEB12	1	-155
09R1C13144	Contractor serve notice for Works completion	7	7	05FEB12	11FEB12	05FEB12	11FEB12	2	667
09R1C13146	SO issues completion certificate	21	21	12FEB12	03MAR12	12FEB12	03MAR12	2	667
16R7C13142	Landscaping works at Portion C	120	120	31AUG11	28JAN12	31AUG11	28JAN12	1	-117
16R7C13144	Establishment Works at Portion C	365	365	29JAN12	27JAN13	29JAN12	27JAN13	2	-148
3DL1C13141	Install flow measurement devices at Intake I-3	12	12	12JAN12	28JAN12	12JAN12	28JAN12	1	-165

ID	Activity Description	AD04		AD04		AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
		Dur	WP3D Dur	Start	Finish					
3DL1C13143	Maintain & monitor flow monitoring	365	365	29JAN12	27JAN13	29JAN12	27JAN13	2	-148	
<b>Schedule of Milestones for Cost Centre No. 3cL</b>										
3CL1C13A02	3cL 1: On establishing tunnelling equipments	0	0		14JUL10		14JUL10	2	1,265	◆ equipment for tunnelling at Intake I-3
3CL1C13A04	3cL 2: On completion of 12.5% perm. tunnel lining	0	0		23JUL10		23JUL10	2	1,256	◆ Adit Tunnel at Intake I-3
3CL1C13A06	3cL 3: On completion of 25% perm. tunnel lining	0	0		02AUG10		02AUG10	2	1,246	◆ Adit Tunnel at Intake I-3
3CL1C13A08	3cL 4: On completion of 37.5% perm. tunnel lining	0	0		11AUG10		11AUG10	2	1,237	◆ Adit Tunnel at Intake I-3
3CL1C13A10	3cL 5: On completion of 50% perm. tunnel lining	0	0		20AUG10		20AUG10	2	1,228	◆ Adit Tunnel at Intake I-3
3CL1C13A12	3cL 6: On completion of 62.5% perm. tunnel lining	0	0		30AUG10		30AUG10	2	1,218	◆ Adit Tunnel at Intake I-3
3CL1C13A14	3cL 7: On completion of 75% perm. tunnel lining	0	0		08SEP10		08SEP10	2	1,209	◆ Adit Tunnel at Intake I-3
3CL1C13A16	3cL 8: On completion of 87.5% perm. tunnel lining	0	0		20SEP10		20SEP10	2	1,197	◆ Adit Tunnel at Intake I-3
3CL1C13A18	3cL 9: On completion of perm. tunnel lining	0	0		10NOV11		10NOV11	2	781	◆ Adit Tunnel at Intake I-3
3CL1C13A20	3cL 10: On completion of all works under this CC	0	0		10NOV11		10NOV11	2	781	◆ under this Cost Centre
<b>Schedule of Milestones for Cost Centre No. 6L</b>										
06L1C13M02	6L 1: On completion of 50% of excavation	0	0		26FEB10		26FEB10	2	1,403	◆ below G.L. except for Adit Tunnel at Intake I-3
06L1C13M04	6L 2: On completion of excavation works	0	0		07JUL10		07JUL10	2	1,272	◆ below G.L. except for Adit Tunnel at Intake I-3
06L1C13M08	6L 3: On completion of vortex shaft	0	0		21APR11		21APR11	2	984	◆ at Intake I-3
06L1C13M10	6L 4: On completion of de-aeration chamber	0	0		08DEC10		08DEC10	2	1,118	◆ chamber at Intake I-3
06L1C13M12	6L 5: On completion of vent shaft	0	0		14MAR11		14MAR11	2	1,022	◆ at Intake I-3
06L1C13M14	6L 6: On completion of man access shaft	0	0		21APR11		21APR11	2	984	◆ shaft at Intake I-3
06L1C13M16	6L 7: On completion of man access adit	0	0		23OCT10		23OCT10	2	1,164	◆ adit at Intake I-3
06L1C13M18	6L 8: On completion of all works under this CC	0	0		21APR11		21APR11	2	984	◆ under this Cost Centre
<b>Schedule of Milestone for Cost Centre No. 9R</b>										
09R1C13R02	9R 1: On completion of access road	0	0		25OCT11		25OCT11	2	797	◆ at Intake I-3
09R1C13R04	9R 2: On completion of 25% of excavation at G.L	0	0		11JUN09		11JUN09	2	1,663	
09R1C13R06	9R 3: On completion of 50% of excavation at G.L	0	0		01AUG09		01AUG09	2	1,612	
09R1C13R08	9R 4: On completion of 75% of excavation at G.L	0	0		13JAN10		13JAN10	2	1,447	
09R1C13R10	9R 5: On completion of excavation at G.L.	0	0		12JAN11		12JAN11	2	1,083	
09R1C13R12	9R 6: On completion of 50% of approach channel	0	0		22FEB11		22FEB11	2	1,042	◆ at G.L. at Intake I-3
09R1C13R14	9R 7: On completion of approach channel	0	0		31MAR11		31MAR11	2	1,005	◆ channel at Intake I-3
09R1C13R16	9R 8: On completion of trash grill	0	0		04JAN12		04JAN12	2	726	◆ channel and associated decking at Intake I-3
09R1C13R18	9R 9: On completion of all works under this CC	0	0		04FEB12		04FEB12	2	695	◆ at Intake I-3 ◆ under this Cost Centre
<b>Schedule of Milestones for Cost Centre No. 13R</b>										
13R4C13S01	13R 1: On completion of 30% soil nailing	0	0		29SEP09		29SEP09	2	1,553	
13R4C13S02	13R 2: On completion of 60% soil nailing	0	0		25FEB10		25FEB10	2	1,404	
13R4C13S03	13R 3: On completion of all soil nailing works	0	0		22SEP10		22SEP10	2	1,195	
13R4C13S04	13R 4: On completion of 10% piles by number	0	0		05DEC08A		05DEC08A	2		◆ at Intake I-3
13R4C13S05	13R 5: On completion of 20% piles by number	0	0		13DEC08A		13DEC08A	2		◆ at Intake I-3
13R4C13S06	13R 6: On completion of 30% piles by number	0	0		18DEC08A		18DEC08A	2		◆ at Intake I-3

ID	Activity Description	D04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Total Float
13R4CI3S07	13R 7; On completion of 40% piles by number	0	0	23DEC08A	23DEC08A	23DEC08A	23DEC08A	2
13R4CI3S08	13R 8; On completion of 50% piles by number	0	0	02JAN09A	02JAN09A	02JAN09A	02JAN09A	2
13R4CI3S09	13R 9; On completion of 60% piles by number	0	0	09JAN09A	09JAN09A	09JAN09A	09JAN09A	2
13R4CI3S10	13R 10; On completion of 70% piles by number	0	0	16JAN09A	16JAN09A	16JAN09A	16JAN09A	2
13R4CI3S11	13R 11; On completion of 80% piles by number	0	0	21JAN09A	21JAN09A	21JAN09A	21JAN09A	2
13R4CI3S12	13R 12; On completion of 90% piles by number	0	0	17MAR10	17MAR10	17MAR10	17MAR10	2
13R4CI3S13	13R 13; On completion of all piling works	0	0	03MAY10	03MAY10	03MAY10	03MAY10	2
13R4CI3S14	13R 14; On completion of boulder traps	0	0	28NOV11	28NOV11	28NOV11	28NOV11	2
13R4CI3S15	13R 15; On completion of all work under this CC	0	0	28NOV11	28NOV11	28NOV11	28NOV11	2
<b>Construction of Outfall O-1</b>								
<b>Preliminary Works</b>								
<b>VO # 06; Transparent Hoarding at Outfall</b>								
01R1DO0106	Receive VO6 for transparent hoarding	0	0	16APR08A	16APR08A	16APR08A	16APR08A	1
01R1DO0108	Procurement for transparent hoarding	21	21	17APR08A	20MAY08A	17APR08A	20MAY08A	1
01R1DO0110	Erect hoarding	18	18	21APR08A	02JUL08A	21APR08A	02JUL08A	1
<b>VO #16; Chain Link Fence at O-1</b>								
V01602	Issue VO16 for chain link fence	0	0	02JUL08A	02JUL08A	02JUL08A	02JUL08A	1
V01612	Preparation works for chain link fence	1	1	03JUL08A	18AUG08A	03JUL08A	18AUG08A	1
V01622	Erect chain link fence; 460m	38	38	19AUG08A	19SEP08A	19AUG08A	19SEP08A	1
<b>Temporary CLP Power Supply for TBM Operation</b>								
01R1DCLP02	Application/approval for temp. CLP Power Supply	200	200	07MAR08A	01AUG08A	07MAR08A	01AUG08A	2
01R1DCLP14	Appoint sub-contractor for design & build TX Rm	67	67	14JUL08A	07NOV08A	14JUL08A	07NOV08A	1
01R1DCLP24	Design for transformer room	24	24	08NOV08A	11MAR09A	08NOV08A	11MAR09A	1
01R1DCLP34	Construct transformer room	60	60	12MAR09A	14MAY09A	12MAR09A	14MAY09A	1
01R1DCLP44	CLP inspection & defect rectification	14	14	15MAY09A	10JUN09	15MAY09A	10JUN09	1
01R1DCLP54	CLP cabling to TX room & commissioning	32	32	11JUN09	18JUL09	11JUN09	18JUL09	1
01R1DCLP74	CLPE cabling from TX room to 24mPD platform	18	18	19SEP09	12OCT09	19SEP09	12OCT09	1
<b>VO#25; Revised Fencig Details at O-1 Next to GVT</b>								
V025-02	Receive VO16 for revised details next to GVT	0	0	17SEP08A	17SEP08A	17SEP08A	17SEP08A	1
V025-12	Preparation works	24	24	22JAN09A	07FEB09A	22JAN09A	07FEB09A	1
V025-22	Erect proposed transparent hoarding	4	4	09FEB09A	02MAR09A	09FEB09A	02MAR09A	1
V055-02	Receive VO#55 in lieu of VO#25	0	0	21JAN09A	21JAN09A	21JAN09A	21JAN09A	1
01R1DO0102	Obtain TTA (ingress & egress) approval	0	0	18APR08A	18APR08A	18APR08A	18APR08A	2
01R1DO0103	Implement TTA for diverting footpath	1	1	19APR08A	19APR08A	19APR08A	19APR08A	1
01R1DO0104	Obtain excavation permit	0	0	29MAY08A	29MAY08A	29MAY08A	29MAY08A	2
01R1DO0112	Erect catch fencing	10	10	26MAY08A	02JUL08A	26MAY08A	02JUL08A	1
01R1DO0114	Site establishment	30	30	21APR08A	15JUL08A	21APR08A	15JUL08A	1
01R1DO0116	Site clearance	30	30	21APR08A	05SEP08A	21APR08A	05SEP08A	1
01R1DO0118	Install remote control CCTV as per ER 4.4.10	12	12	28OCT08A	10NOV08A	28OCT08A	10NOV08A	1
16R1DO0110	Tree inspection & report	7	7	13MAR08A	28MAR08A	13MAR08A	28MAR08A	1

ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
<b>Form Temporary Access/Tree Felling</b>									
<b>Works Suspension Due to Obstruct. from Villagers</b>									
WS002	Works suspension due to obstruct. frm villagers	24	24	19JUL08A	10AUG08A	19JUL08A	10AUG08A	2	
10R1DO0202	Form temp. access road from +14mPD to +69mPD	158*	158*	19JUN08A	24DEC08A	19JUN08A	24DEC08A	1	
10R1DOAR04	Const. temp. steel decking over exist Outfall W	11	11	26AUG08A	06SEP08A	26AUG08A	06SEP08A	1	
10R1DOAR08	Form temp. access road from 14mPD to 28mPD	12	12	19JUN08A	18JUL08A	19JUN08A	18JUL08A	1	
10R1DOAR12	Preparation works for transplanting T160	53	53	11AUG08A	25OCT08A	11AUG08A	25OCT08A	1	
10R1DOAR42	Mobilize & set up crane for tree transplant	1	1	27OCT08A	27OCT08A	27OCT08A	27OCT08A	1	
10R1DOAR44	Crown pruning for T160	2	2	28OCT08A	29OCT08A	28OCT08A	29OCT08A	1	
10R1DOAR46	Cut root & uplift T160	1	1	30OCT08A	30OCT08A	30OCT08A	30OCT08A	1	
10R1DOAR54	Crown pruning/Cut root & uplift T142	10	10	21FEB09A	21FEB09A	21FEB09A	21FEB09A	1	
10R1DOAR56	Construct access road from +43 to +55mPD	30	30	31OCT08A	24DEC08A	31OCT08A	24DEC08A	1	
16R7DO0202	Tree transplant at Outfall O-1	105	105	02JUN08A	06MAR09A	02JUN08A	06MAR09A	1	
16R7DO0204	Tree transplant above +62mPD	11	11	31OCT08A	12NOV08A	31OCT08A	12NOV08A	1	
<b>Form Temporary Launching Platform</b>									
<b>Slope Cut &amp; Soil Nailing; +71mPD to +40mPD</b>									
10R1DO030	+71 to +40mPD (rows to A to P)	229*	229*	13NOV08A	22AUG09	13NOV08A	22AUG09	1	-184
10R1DO031	Remove boulder/Cut slope for rows A to D	9	9	13NOV08A	06DEC08A	13NOV08A	06DEC08A	1	
10R1DO032	Erect scaffold & Drill/install/grout/P1at row C	12	12	02DEC08A	16DEC08A	02DEC08A	16DEC08A	1	
10R1DO033	Drill/install/grout rows B to C; 18 nos.	14	14	17DEC08A	06JAN09A	17DEC08A	06JAN09A	1	
10R1DO034	Drill/install/grout/testing for P2 at row D	8	8	30DEC08A	06JAN09A	30DEC08A	06JAN09A	2	
10R1DO035	Drill/install/grout D1 to D11	7	7	07JAN09A	16JAN09A	07JAN09A	16JAN09A	1	
10R1DO036	Cut slope for E1 to G20; soil 620m3	2	2	15JAN09A	20JAN09A	15JAN09A	20JAN09A	1	
10R1DO037	Drill/install/grout E1 to G20; 51 nos.	19	19	20JAN09A	11FEB09A	20JAN09A	11FEB09A	1	
10R1DO038	Construct nail heads/remove platform; rows B-G	10	10	02FEB09A	17FEB09A	02FEB09A	17FEB09A	1	
10R1DO039	Erosion mat, wire mesh & hydroseed; rows B-G	10	10	21FEB09A	24FEB09A	21FEB09A	24FEB09A	1	
10R1DO040	Cut slope for H1 to I25; soil 1819m3	12	12	02FEB09A	17FEB09A	02FEB09A	17FEB09A	1	
10R1DO041	Drill/install/grout H1 to I25; 47 nos.	13	13	18FEB09A	04MAR09A	18FEB09A	04MAR09A	1	
10R1DO042	Cut slope for J1 to M37; soil 5834m3	20	20	19FEB09A	13MAR09A	19FEB09A	13MAR09A	1	
10R1DO043	Erect working platform for rows J to M	14	14	28FEB09A	16MAR09A	28FEB09A	16MAR09A	1	
10R1DO044	Test nails for P3, P4, P5 & P10	12	12	05MAR09A	07APR09A	05MAR09A	07APR09A	1	
10R1DO045	Drill/install/grout J1 to M37; 134 nos.	20	20	12MAR09A	07APR09A	12MAR09A	07APR09A	1	
10R1DO047	Construct nail heads/remove platform; rows H-M	20	20	14MAR09A	18APR09A	14MAR09A	18APR09A	1	-184
10R1DO048	Erosion mat, wire mesh & hydroseed; rows H-M	6	6	29MAY09	04JUN09	29MAY09	04JUN09	1	
10R1DO049	Excavate soil 5600m3 & boulds 229m3; Rows N to P	22	22	14MAR09A	18APR09A	14MAR09A	18APR09A	1	
10R1DO050	Erect working platform for rows N to P	10	10	20APR09A	24APR09A	20APR09A	24APR09A	1	
10R1DO051	Drill/install/grout N1 to P31; 111 nos.	20	20	23APR09A	13MAY09A	23APR09A	13MAY09A	1	
10R1DO053	Construct nail heads/remove platform; row N to P	14	14	14MAY09A	02JUN09	14MAY09A	02JUN09	1	-161
10R1DO054	Erosion mat, wire mesh & hydroseed; rows N to P	6	6	03JUN09	09JUN09	03JUN09	09JUN09	1	-161
<b>Slope Cut &amp; Soil Nailing; +40mPD to +24mPD</b>									
10R1DO130	+40 to +24mPD (rows Q to X)	205*	205*	20APR09A	22DEC09	20APR09A	22DEC09	1	-219

ID	Activity Description	D04		AD04		WP3D		Total Float
		Dur	Dur	Start	Finish	Start	Finish	
10R1DO131	Excavation; 40 to 30mPD; soil 8291m3/rock 2778m3	43	43	20APR09A	13AUG09	20APR09A	13AUG09	1 -219
10R1DO132	Reinstate temp. access	30	30	21APR09A	27MAY09A	21APR09A	27MAY09A	1 -219
10R1DO133	Erect working platform for rows Q to U	22	22	11MAY09A	17AUG09	11MAY09A	17AUG09	1 -219
10R1DO134	Test nails for P6, P7, P8 & P11	12	12	21MAY09A	24AUG09	21MAY09A	24AUG09	1 -219
10R1DO135	Drill/install/grout Q1 to U10; 99 nos.	13	13	12MAY09A	04SEP09	12MAY09A	04SEP09	1 -219
10R1DO136	Excavation; 30 to 24mPD; soil 4197m3/rock 7592m3	95	95	27MAY09A	08OCT09	27MAY09A	08OCT09	1 -219
10R1DO137	Drill/install/grout V1 to X14; 37 nos.	10	10	05SEP09	16SEP09	05SEP09	16SEP09	1 -219
10R1DO138	Construct nail heads/remove platform; row V to X	17	17	02SEP09	21SEP09	02SEP09	21SEP09	1 -219
10R1DO139	Erosion mat, wire mesh & hydroseed; rows V to X	10	10	22SEP09	05OCT09	22SEP09	05OCT09	1 -219
<b>TBM Launching Chamber</b>								
10R1DO1305	Pipe pile roof support	9	9	18SEP09	28SEP09	18SEP09	28SEP09	1 -212
10R1DO1310	Excavate/construct TBM launching chamber	63	63	09OCT09	22DEC09	09OCT09	22DEC09	1 -219
10R1DO1315	Form launching chamber cradle	12	12	09DEC09	22DEC09	09DEC09	22DEC09	1 -219
10R1DO1325	Ground treatment prior to TBM commence boring	4	4	23DEC09	29DEC09	23DEC09	29DEC09	1 -217
<b>Slope Cut &amp; TBM Access Road; +24 to +14mPD</b>								
10R1DO230	+24 to +14mPD	63*	63*	08JUN09	20AUG09	08JUN09	20AUG09	1 -181
10R1DO240	Relocate sedimentation tank	0	0	06JUN09*	06JUN09*	06JUN09*	06JUN09*	1 -172
10R1DO250	Form access for big breaker	12	12	08JUN09	20JUN09	08JUN09	20JUN09	1 -172
10R1DO260	Mobilization of big breaker	0	0	20JUN09	20JUN09	20JUN09	20JUN09	1 -172
10R1DO270	Form new TBM access +14mPD to +24mPD	14	14	22JUN09	08JUL09	22JUN09	08JUL09	1 -172
10R1DO280	Divert access to new TBM access	0	0	08JUL09	08JUL09	08JUL09	08JUL09	1 -172
10R1DO290	Demolish masonry & ret. wall at +14mPD	28	28	20JUL09	20AUG09	20JUL09	20AUG09	1 -181
<b>TBM Assembly Area at +24mPD</b>								
10R1DO185	Construct temporary drainage	6	6	16DEC09	22DEC09	16DEC09	22DEC09	1 -219
10R1DO195	Concrete slab	12	12	16DEC09	31DEC09	16DEC09	31DEC09	1 -219
3AL1DO0314	Commence TBM initial assembly	0	0	02JAN10	02JAN10	02JAN10	02JAN10	1 -219
<b>Tower Crane</b>								
3AL1DO2005	Foundation	8	8	21AUG09	29AUG09	21AUG09	29AUG09	1 -181
3AL1DO2010	Erection	3	3	08SEP09	10SEP09	08SEP09	10SEP09	1 -157
3AL1DO2015	Test & commissioning	1	1	11SEP09	11SEP09	11SEP09	11SEP09	1 -157
3AL1DO2025	Removal of tower crane & reinstatement	12	12	11APR12	24APR12	11APR12	24APR12	1 -207
<b>TBM Platform</b>								
3AL1DO2505	Pre-fabrication	40	40	18JUN09*	04AUG09	18JUN09*	04AUG09	1 -159
3AL1DO2515	Foundation	12	12	31AUG09	12SEP09	31AUG09	12SEP09	1 -181
3AL1DO2525	Erect steel framework	36	36	14SEP09	28OCT09	14SEP09	28OCT09	1 -181
3AL1DO2535	Install platform	12	12	29OCT09	11NOV09	29OCT09	11NOV09	1 -181
3AL1DO2545	ICE certification	3	3	12NOV09	14NOV09	12NOV09	14NOV09	1 -181
<b>Noise Enclosure</b>								
3AL1DO3005	Pre-fabrication	42	42	22JUN09*	10AUG09	22JUN09*	10AUG09	1 -120
3AL1DO3015	Foundation	12	12	23SEP09	08OCT09	23SEP09	08OCT09	1 -169
3AL1DO3025	Erect steel framework	18	18	09OCT09	30OCT09	09OCT09	30OCT09	1 -169
3AL1DO3035	Cladding	22	22	27JAN10	24FEB10	27JAN10	24FEB10	1 -195
3AL1DO3045	ICE certification	3	3	25FEB10	27FEB10	25FEB10	27FEB10	1 -195

ID	Activity Description	AD04		WP3D		AD04		WP3D		Cal ID	Total Float
		Dur	Dur	Start	Finish	Start	Finish	Start	Finish		
3AL1FT0802	Apply to EPD for CNP for 24 hrs. tunnel work	12	12	11FEB10	27FEB10	11FEB10	27FEB10	11FEB10	27FEB10	1	-195
3AL1FT0804	EPD process/approve CNP application	36	36	28FEB10	04APR10	28FEB10	04APR10	28FEB10	04APR10	2	-237
<b>105 Ton Gantry Crane</b>											
3AL1DO3505	Manufacture	99	99	29MAY09	22SEP09	29MAY09	22SEP09	29MAY09	22SEP09	1	-159
3AL1DO3515	Shipping to Hong Kong	6	6	23SEP09	29SEP09	23SEP09	29SEP09	23SEP09	29SEP09	1	-159
3AL1DO3525	Assembly	8	8	30SEP09	10OCT09	30SEP09	10OCT09	30SEP09	10OCT09	1	-159
3AL1DO3535	Install rails	4	4	23OCT09	28OCT09	23OCT09	28OCT09	23OCT09	28OCT09	1	-169
3AL1DO3545	Test & commission	3	3	29OCT09	31OCT09	29OCT09	31OCT09	29OCT09	31OCT09	1	-169
3AL1DO3555	Receive initial segments and stock	6	6	02JAN10	08JAN10	02JAN10	08JAN10	02JAN10	08JAN10	1	-209
<b>Muck Hopper</b>											
3AL1DO4005	Pre-fabrication	75	75	22JUN09*	17SEP09	22JUN09*	17SEP09	22JUN09*	17SEP09	1	-83
3AL1DO4015	Foundation	18	18	14SEP09	06OCT09	14SEP09	06OCT09	14SEP09	06OCT09	1	-97
3AL1DO4025	Erect steelwork	18	18	12NOV09	02DEC09	12NOV09	02DEC09	12NOV09	02DEC09	1	-127
3AL1DO4035	Erect hopper	18	18	03DEC09	23DEC09	03DEC09	23DEC09	03DEC09	23DEC09	1	-127
3AL1DO4045	Install transfer conveyor	4	4	24DEC09	30DEC09	24DEC09	30DEC09	24DEC09	30DEC09	1	-127
3AL1DO4055	M&E works	6	6	31DEC09	07JAN10	31DEC09	07JAN10	31DEC09	07JAN10	1	-127
3AL1DO4065	Test & commissioning	3	3	08JAN10	11JAN10	08JAN10	11JAN10	08JAN10	11JAN10	1	-127
<b>Marti Conveyor</b>											
3AL1DO4505	Engineering	50	50	29MAY09	27JUL09	29MAY09	27JUL09	29MAY09	27JUL09	1	-105
3AL1DO4515	Pre-fabrication	60	60	28JUL09	07OCT09	28JUL09	07OCT09	28JUL09	07OCT09	1	-105
3AL1DO4525	Delivery to Hong Kong	25	25	23SEP09	23OCT09	23SEP09	23OCT09	23SEP09	23OCT09	1	-105
3AL1DO4535	Pre-assembly at Portion I	6	6	24OCT09	31OCT09	24OCT09	31OCT09	24OCT09	31OCT09	1	-105
3AL1DO4545	Foundation	3	3	02JAN10	05JAN10	02JAN10	05JAN10	02JAN10	05JAN10	1	-155
3AL1DO4555	Install belt conveyor stage 1	24	24	06JAN10	02FEB10	06JAN10	02FEB10	06JAN10	02FEB10	1	-155
3AL1DO4565	Install transfer conveyor	1	1	03FEB10	03FEB10	03FEB10	03FEB10	03FEB10	03FEB10	1	-155
3AL1DO4575	Install belt conveyor stage 2	6	6	27APR10	04MAY10	27APR10	04MAY10	27APR10	04MAY10	1	-218
3AL1DO4585	M&E works	2	2	05MAY10	06MAY10	05MAY10	06MAY10	05MAY10	06MAY10	1	-218
3AL1DO4595	Test & commission	1	1	07MAY10	07MAY10	07MAY10	07MAY10	07MAY10	07MAY10	1	-218
<b>LV Station</b>											
3AL1DO5005	Delivery & install containers 1/2/3	4	4	12SEP09	16SEP09	12SEP09	16SEP09	12SEP09	16SEP09	1	-157
3AL1DO5015	M&E works	12	12	17SEP09	30SEP09	17SEP09	30SEP09	17SEP09	30SEP09	1	-157
3AL1DO5025	Test & commission	12	12	13OCT09	27OCT09	13OCT09	27OCT09	13OCT09	27OCT09	1	-165
<b>Cooling Water System</b>											
3AL1DO5505	Pre-fabrication	53	53	09JUL09	08SEP09	09JUL09	08SEP09	09JUL09	08SEP09	1	-129
3AL1DO5515	Foundation	10	10	09SEP09	19SEP09	09SEP09	19SEP09	09SEP09	19SEP09	1	-129
3AL1DO5525	Erect cooling system	12	12	21SEP09	06OCT09	21SEP09	06OCT09	21SEP09	06OCT09	1	-129
3AL1DO5535	M&E works	4	4	07OCT09	10OCT09	07OCT09	10OCT09	07OCT09	10OCT09	1	-129
3AL1DO5545	Test & commission	2	2	12OCT09	13OCT09	12OCT09	13OCT09	12OCT09	13OCT09	1	-129
<b>Grout System</b>											
3AL1DO6005	Pre-fabrication	90	90	22JUN09*	07OCT09	22JUN09*	07OCT09	22JUN09*	07OCT09	1	-134
3AL1DO6015	Erect system	6	6	16NOV09	21NOV09	16NOV09	21NOV09	16NOV09	21NOV09	1	-166
3AL1DO6025	M&E works	3	3	23NOV09	25NOV09	23NOV09	25NOV09	23NOV09	25NOV09	1	-166
3AL1DO6035	Test & commission	1	1	26NOV09	26NOV09	26NOV09	26NOV09	26NOV09	26NOV09	1	-166

ID	Activity Description	AD04 Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Total Float
<b>Pea Gravel Plant</b>							
3AL1D07505	Pre-fabrication	36	22JUN09	03AUG09	22JUN09	03AUG09	1 -82
3AL1D07515	Install hopper	4	06OCT09	09OCT09	06OCT09	09OCT09	1 -134
3AL1D07525	Erect conveyor	2	10OCT09	12OCT09	10OCT09	12OCT09	1 -134
3AL1D07535	M&E works	4	13OCT09	16OCT09	13OCT09	16OCT09	1 -134
3AL1D07545	Test & commission	2	17OCT09	19OCT09	17OCT09	19OCT09	1 -134
3AL1D07555	Install conveyor connecting to TBM	4	27APR10	30APR10	27APR10	30APR10	1 -213
<b>Ventilation System</b>							
3AL1D08005	Pre-fabrication	72	29MAY09	21AUG09	29MAY09	21AUG09	1 -14
3AL1D08015	Erect system	2	27APR10	28APR10	27APR10	28APR10	1 -213
3AL1D08025	M&E works	1	29APR10	29APR10	29APR10	29APR10	1 -213
3AL1D08035	Test & commission	1	30APR10	30APR10	30APR10	30APR10	1 -213
<b>Miscellaneous</b>							
3AL1D08502	Install transformer & harmonic filter	2	27APR10	28APR10	27APR10	28APR10	1 -218
3AL1D08512	Remove invert segments; 19 nos.	2	27APR10	28APR10	27APR10	28APR10	1 -218
3AL1D08522	Make good slab	3	28APR10	30APR10	28APR10	30APR10	1 -218
3AL1D08532	Install rail switch	1	03MAY10	03MAY10	03MAY10	03MAY10	1 -214
<b>VO # 49 &amp; 53; Additional Drainage &amp; Stairway</b>							
VO-04910	Received Variation orders	0	0	26FEB09A		26FEB09A	1
VO-04920	Preparation works for varied works	14	14	27FEB09A	14MAR09A	27FEB09A	1
VO-04930	Construct u-channel & stairway; +71mPD to +55mPD	60	60	16MAR09A	29MAY09	16MAR09A	1 -179
VO-04940	Construct u-channel & stairway; +55mPD to +47mPD	27	27	05JUN09	05JUN09	07JUL09	1 -184
VO-04950	Construct u-channel & stairway; +47mPD to +41mPD	40	40	08JUL09	22AUG09	08JUL09	1 -184
VO-04960	Construct u-channel & stairway; +41 to +24 mPD	60	60	06OCT09	06OCT09	15DEC09	1 -219
<b>VO #88; Revised Slope Profile with Add. Supports</b>							
VO-088000	Received VO #088	0	0	27MAY09A		27MAY09A	1
VO-088005	Excavate from 38.5mPD to 36.5mPD	6	6	29MAY09	04JUN09	29MAY09	1 -218
VO-088010	Procure and prepare materials	9	9	29MAY09	08JUN09	29MAY09	1 -219
VO-088015	SOR confirm soil nails location	2	2	05JUN09	06JUN09	05JUN09	1 -218
VO-088020	Drill/install/grout soil nails; rows AA-AB	7	7	09JUN09	16JUN09	09JUN09	1 -219
VO-088025	Install wire mesh & shorcrete 150mm	3	3	17JUN09	19JUN09	17JUN09	1 -219
VO-088030	Excavate from +36.5 mPD to 34.5mPD	6	6	20JUN09	26JUN09	20JUN09	1 -219
VO-088035	SOR confirm soil nails location	2	2	27JUN09	29JUN09	27JUN09	1 -219
VO-088040	Drill/install/grout soil nails; rows AC-AD	7	7	30JUN09	08JUL09	30JUN09	1 -219
VO-088045	Install wire mesh & shorcrete 150mm	3	3	09JUL09	11JUL09	09JUL09	1 -219
VO-088050	Excavate from +34.5 mPD to 32.5mPD	6	6	13JUL09	18JUL09	13JUL09	1 -219
VO-088055	SOR confirm soil nails location	2	2	20JUL09	21JUL09	20JUL09	1 -219
VO-088060	Drill/install/grout soil nails; rows AE-AF	7	7	22JUL09	29JUL09	22JUL09	1 -219
VO-088065	Install wire mesh & shorcrete 150mm	3	3	30JUL09	01AUG09	30JUL09	1 -219
VO-088070	Excavate from +34.5 mPD to 32.5mPD	6	6	03AUG09	08AUG09	03AUG09	1 -219
VO-088075	SOR confirm soil nails location	2	2	10AUG09	11AUG09	10AUG09	1 -219
VO-088080	Drill/install/grout soil nails; row AG	5	5	12AUG09	17AUG09	12AUG09	1 -219
VO-088085	Install wire mesh & shorcrete 150mm	3	3	18AUG09	20AUG09	18AUG09	1 -219



ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
<b>Instruction from SOR</b>									
SORI-10	Suspension of rock drilling & breaking	1	1	20JUN09*	20JUN09	20JUN09	20JUN09	1	-219
SORI-20	Erection of noise barriers	3	3	22JUN09	24JUN09	22JUN09	24JUN09	1	-219
<b>Construct Spiral Ramp &amp; Associ. Vehicular Access</b>									
<b>Spiral Ramp</b>									
10R1DO0402	Install 273mm dia. temp. pipe piles; 40 nos.	12	12	08MAY10	22MAY10	08MAY10	22MAY10	1	-93
10R1DO0404	Soil excavation & install walling & tie backs	24	24	24MAY10	21JUN10	24MAY10	21JUN10	1	-93
10R1DO0406	Rock excavation for spiral ramp; 4629m <sup>3</sup>	70	70	22JUN10	11SEP10	22JUN10	11SEP10	1	-93
10R1DO0414	Construct base of spiral ramp; Outfall O-1	12	12	13SEP10	27SEP10	13SEP10	27SEP10	1	-93
10R1DO0416	Cast spiral ramp up to +6.73mPD	15	15	28SEP10	15OCT10	28SEP10	15OCT10	1	-93
10R1DO0418	Cast spiral ramp up to +11.58mPD	15	15	19OCT10	03NOV10	19OCT10	03NOV10	1	-93
10R1DO0420	Cast spiral ramp up to +16.00mPD	15	15	04NOV10	20NOV10	04NOV10	20NOV10	1	-93
10R1DO0422	Cast spiral ramp up to +20.00mPD	15	15	22NOV10	08DEC10	22NOV10	08DEC10	1	-93
10R1DO0424	Cast spiral ramp up to +24.23mPD	15	15	09DEC10	28DEC10	09DEC10	28DEC10	1	-93
10R1DO0425	Backfill spiral ramp; 1700m <sup>3</sup>	4	4	29DEC10	03JAN11	29DEC10	03JAN11	1	-93
10R1DO0426	Construct spiral ramp top; Outfall O-1	20	20	04JAN11	26JAN11	04JAN11	26JAN11	1	-93
10R1DO0428	Construct vehicular access bet. tunnel & s. ramp	10	10	12JUL11	22JUL11	12JUL11	22JUL11	1	-2
10R1DO0430	Commission of Spiral Ramp	6	6	27JAN11	02FEB11	27JAN11	02FEB11	1	-93
<b>Vehicular Access</b>									
10R1DO0407	Install 40 nos. roof piles # 375mm c/c	24	24	11OCT10	08NOV10	02NOV10	29NOV10	1	-128
10R1DO0408	Excavation for vehicular access underneath CPR	70	70	09NOV10	01FEB11	30NOV10	25FEB11	1	-128
10R1DO0410	Construct base for vehicular access	12	12	02FEB11	18FEB11	26FEB11	11MAR11	1	-128
10R1DO0412	Construct wall & roof for vehicular access	24	24	19FEB11	18MAR11	12MAR11	09APR11	1	-128
<b>Lower Part Box Culvert/Open Channel By Mining</b>									
10R1DO0502	Site possession of Portion E-650d of DOC	0	0	08OCT09		08OCT09		2	-453
10R1DO0504	Divert exist. outfall "W" under CPR arch bridge	36	36	09NOV09	19DEC09	30NOV09	13JAN10	1	-395
10R1DO0506	Remove rock armour & form platform @+2.3mPD	36	36	21DEC09	03FEB10	14JAN10	27FEB10	1	-395
10R1DO0508	Install temp. pile for pipe roofing	96	96	04FEB10	05JUN10	01MAR10	28JUN10	1	-395
10R1DO0510	Excavate for box-culvert; 2 cells	44	44	07JUN10	29JUL10	29JUN10	19AUG10	1	-395
10R1DO0512	Construct base slabs of box culvert; 2 cells	20	20	30JUL10	21AUG10	20AUG10	11SEP10	1	-395
10R1DO0514	Construct wall & roof of box culvert; 2 cells	44	44	11OCT10	09OCT10	13SEP10	01NOV10	1	-395
10R1DO0516	Excavate for box-culvert; 2 cells	20	20	02DEC10	24DEC10	02NOV10	22DEC10	1	-395
10R1DO0518	Construct base slabs of box culvert; 2 cells	40	40	28DEC10	16FEB11	19JAN11	09MAR11	1	-395
10R1DO0520	Construct wall & roof of box culvert; 2 cells	24	24	17FEB11	16MAR11	10MAR11	07APR11	1	-395
10R1DO0522	Excavate for open channel	24	24	17MAR11	14APR11	08APR11	09MAY11	1	-395
10R1DO0526	Construct open channel at 2.3 mPD	24	24	17MAR11	14APR11	08APR11	09MAY11	1	-395
10R1DO0528	Reinstate existing outfall "W"	6	6	08APR11	14APR11	03MAY11	09MAY11	1	-395
<b>Construct Portal Head &amp; Associated Structures</b>									
10R1DO0602	Excavate tapered open channel/ upper cascade	24	24	12JUL11	08AUG11	12JUL11	08AUG11	1	-219
10R1DO0604	Construct tapered open channel & upper cascade	48	48	09AUG11	06OCT11	09AUG11	06OCT11	1	-131

3M starts operating day & night 40 nos. ~13m long  
 432m<sup>3</sup> soil including temp. supports measures  
 4000m<sup>3</sup> rock including temp. supports measures

@ 5m<sup>3</sup>/5minutes/480m<sup>3</sup>/day

sheet pile roofing & lagging ~180m<sup>2</sup> soil 450m<sup>3</sup> + rock 50m<sup>3</sup>

40m<sup>3</sup>

cells; 210 nos.

soil 2900m<sup>3</sup>

Concrete 160m<sup>3</sup>

concrete 390m<sup>3</sup>

soil 2900m<sup>3</sup>

Concrete 160m<sup>3</sup>

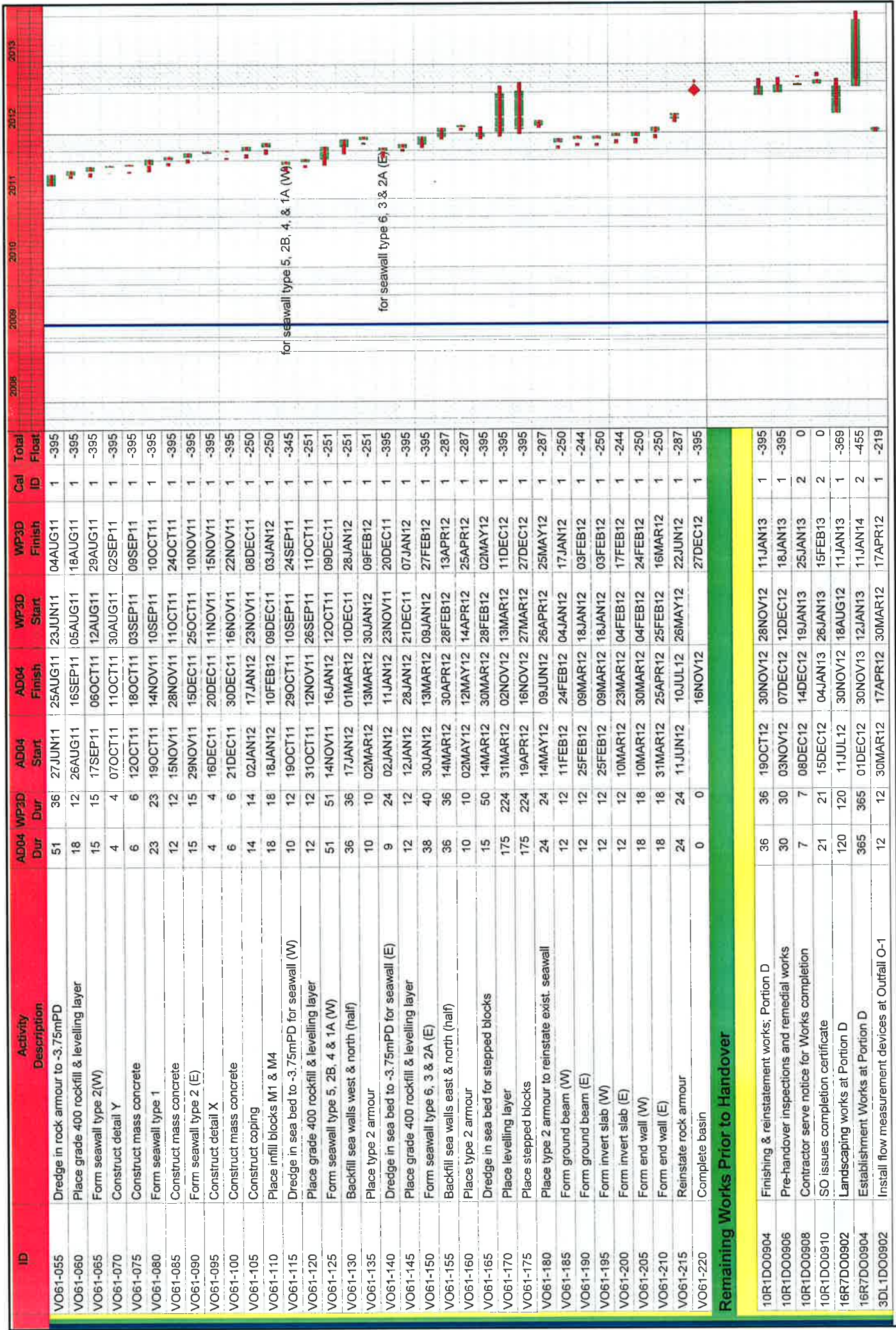
concrete 390m<sup>3</sup>

ID	Activity Description	D04		WP3D		AD04		WP3D		Total Float
		Dur	Dur	Start	Finish	Start	Finish	Start	Finish	
10R1DO0606	Dismantle & removal of tower crane	12	12	17NOV12	30NOV12	28DEC12	11JAN13	1	-395	
3AL1DO0602	Dismantle/remove TBM backup system	24	24	13JUN11	11JUL11	13JUN11	11JUL11	1	-219	
3AL1DO0606	Construct portal head wall	24	24	09AUG11	05SEP11	09AUG11	05SEP11	1	-131	
<b>Cascade &amp; Upper Part Box Culvert by Mining</b>										
<b>Upper Cascade</b>										
10R1DO0704	Drive sheet piles	18	18	12JUL11	01AUG11	12JUL11	01AUG11	1	-219	
10R1DO0706	Excavate & temp. support to services	60	60	02AUG11	13OCT11	02AUG11	13OCT11	1	-219	
10R1DO0708	Construct base slab	24	24	14OCT11	10NOV11	14OCT11	10NOV11	1	-219	
10R1DO0710	Construct side walls	18	18	11NOV11	01DEC11	11NOV11	01DEC11	1	-219	
10R1DO0712	Construct roof	24	24	02DEC11	03JAN12	02DEC11	03JAN12	1	-219	
10R1DO0714	Construct upstand	12	12	04JAN12	17JAN12	04JAN12	17JAN12	1	-219	
10R1DO0716	Backfill	6	6	16JAN12	21JAN12	16JAN12	21JAN12	1	-219	
10R1DO0730	Excavate for lower cascade construction	13	13	26JAN12	09FEB12	26JAN12	09FEB12	1	-219	
10R1DO0732	Construct lower cascade	48	48	10FEB12	10APR12	10FEB12	10APR12	1	-219	
10R1DO0734	Construct, baffle, railing etc.	48	48	10FEB12	10APR12	10FEB12	10APR12	1	-207	
<b>Seabed Protection Works</b>										
<b>Preliminary Works for Outfall Basin Construction</b>										
VO061-002	Receive VO # 061	0	0		30JUN09*		30JUN09*	1	-395	
VO061-004	Appoint Independent Hydrographic Surveyor	60	60	02JUL09	09SEP09	02JUL09	09SEP09	1	-395	
VO061-006	Carry out sounding survey	6	6	10SEP09	16SEP09	08OCT09	14OCT09	1	-395	
VO061-008	Prepare/submit drwgs./report of sounding survey	6	6	17SEP09	23SEP09	15OCT09	21OCT09	1	-395	
VO061-010	SOR approves drwgs./report of sounding survey	6	6	24SEP09	30SEP09	22OCT09	29OCT09	1	-395	
VO061-012	SOR issue Supplm. Environmental Review Report	30	30	02JUL09	05AUG09	02JUL09	05AUG09	1	-59	
VO061-014	Apply for Variation Environmental Permit (VEP)	6	6	06AUG09	12AUG09	06AUG09	12AUG09	1	-59	
VO061-016	EPD review/issue VEP	30	30	13AUG09	16SEP09	13AUG09	16SEP09	1	-59	
VO061-018	Prepare/submit Revised EM&A Manual by ET	30	30	17SEP09	23OCT09	17SEP09	23OCT09	1	-59	
VO061-020	IEC endorse Revised EM&A Manual	12	12	24OCT09	07NOV09	24OCT09	07NOV09	1	-59	
VO061-022	EPD acknowledge Revised EM&A Manual	6	6	09NOV09	14NOV09	09NOV09	14NOV09	1	-59	
VO061-024	Carry out baseline monitoring	28	28	16NOV09	17DEC09	16NOV09	17DEC09	1	-59	
VO061-026	Prepare/submit baseline report by ET	12	12	18DEC09	04JAN10	18DEC09	04JAN10	1	-59	
VO061-028	IEC endorse baseline report	12	12	05JAN10	18JAN10	05JAN10	18JAN10	1	-59	
VO061-030	EPD approve baseline report	30	30	19JAN10	25FEB10	19JAN10	25FEB10	1	-59	
VO061-032	Appoint sub-contractor for varied works	60	60	02JUL09	09SEP09	02JUL09	09SEP09	1	-377	
VO061-034	Prepare/submit method statement	30	30	02OCT09	07NOV09	10SEP09	16OCT09	1	-395	
VO061-036	IEC endorse method statement	12	12	09NOV09	21NOV09	17OCT09	31OCT09	1	-7	
VO061-038	SOR approve method statement	24	24	23NOV09	19DEC09	02NOV09	28NOV09	1	-7	
VO061-040	Apply for marine notice	6	6	09NOV09	14NOV09	30NOV09	05DEC09	1	-395	
VO061-042	Review/issue marine notice by Marine Department	30	30	16NOV09	19DEC09	07DEC09	13JAN10	1	-395	
VO061-044	Apply for dumping permit	6	6	09NOV09	14NOV09	30NOV09	05DEC09	1	-37	
VO061-046	Review/issue dumping permit by EPD	60	60	16NOV09	27JAN10	07DEC09	20FEB10	1	-37	
VO061-048	Commence works for basin construction	0	0	15APR11		11MAY11		1	-395	
<b>VO #061; Outfall Basin Construction</b>										
VO061-050	Excavation in rock armour to +2.3mPD	57	36	15APR11	25JUN11	11MAY11	22JUN11	1	-395	

Following removal of TBM & TBM facilities

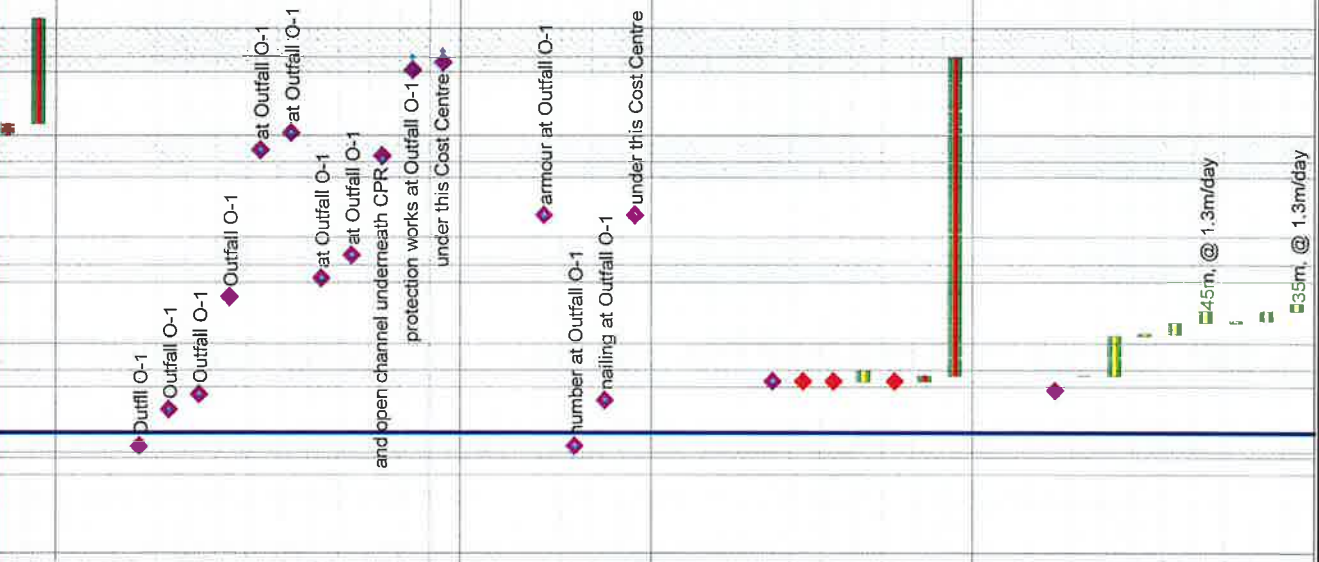
including gantry crane

following construction of box culvert

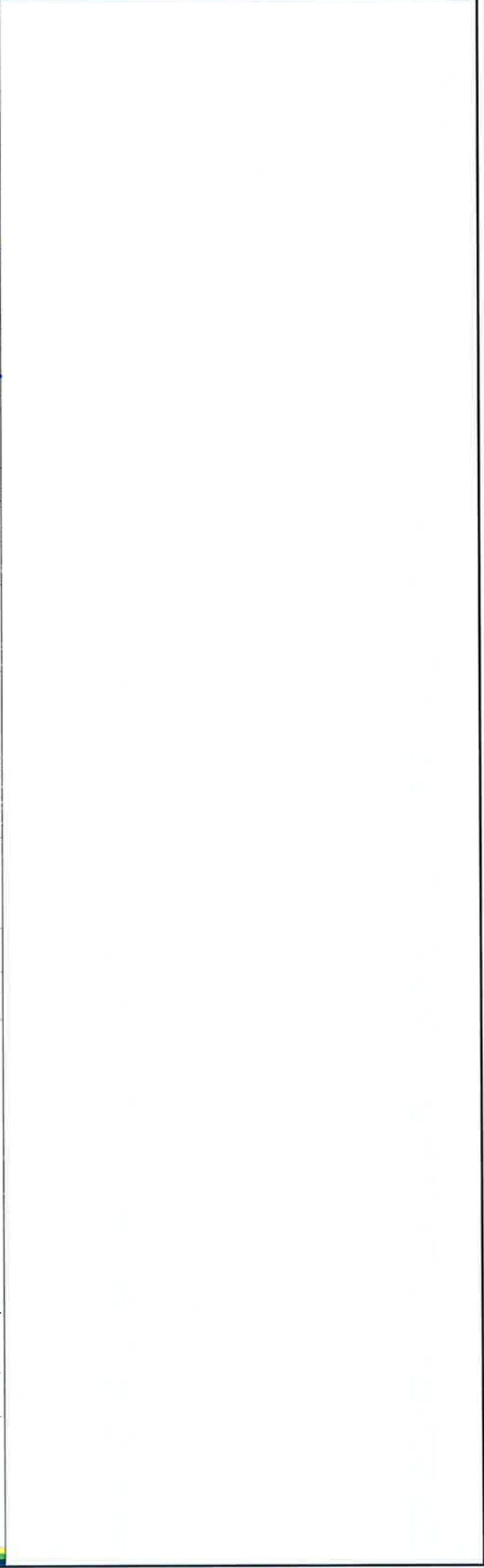


ID	Activity Description	AD04 Dur	WP3D Dur	AD04 Start	AD04 Finish	WP3D Start	WP3D Finish	Cal ID	Total Float
VO61-055	Dredge in rock armour to -3.75mPD	51	36	27JUN11	25AUG11	23JUN11	04AUG11	1	-395
VO61-060	Place grade 400 rockfill & levelling layer	18	12	26AUG11	16SEP11	05AUG11	18AUG11	1	-395
VO61-065	Form seawall type 2(W)	15	15	17SEP11	06OCT11	12AUG11	29AUG11	1	-395
VO61-070	Construct detail Y	4	4	07OCT11	11OCT11	30AUG11	02SEP11	1	-395
VO61-075	Construct mass concrete	6	6	12OCT11	18OCT11	03SEP11	09SEP11	1	-395
VO61-080	Form seawall type 1	23	23	19OCT11	14NOV11	10SEP11	10OCT11	1	-395
VO61-085	Construct mass concrete	12	12	15NOV11	28NOV11	11OCT11	24OCT11	1	-395
VO61-090	Form seawall type 2 (E)	15	15	29NOV11	15DEC11	25OCT11	10NOV11	1	-395
VO61-095	Construct detail X	4	4	16DEC11	20DEC11	11NOV11	15NOV11	1	-395
VO61-100	Construct mass concrete	6	6	21DEC11	30DEC11	16NOV11	22NOV11	1	-395
VO61-105	Construct coping	14	14	02JAN12	17JAN12	23NOV11	08DEC11	1	-250
VO61-110	Place infill blocks M1 & M4	18	18	16JAN12	10FEB12	09DEC11	03JAN12	1	-250
VO61-115	Dredge in sea bed to -3.75mPD for seawall (W)	10	12	19OCT11	29OCT11	10SEP11	24SEP11	1	-345
VO61-120	Place grade 400 rockfill & levelling layer	12	12	31OCT11	12NOV11	26SEP11	11OCT11	1	-251
VO61-125	Form seawall type 5, 2B, 4 & 1A (W)	51	51	14NOV11	16JAN12	12OCT11	09DEC11	1	-251
VO61-130	Backfill sea walls west & north (half)	36	36	17JAN12	01MAR12	10DEC11	28JAN12	1	-251
VO61-135	Place type 2 armour	10	10	02MAR12	13MAR12	30JAN12	09FEB12	1	-251
VO61-140	Dredge in sea bed to -3.75mPD for seawall (E)	9	24	02JAN12	11JAN12	23NOV11	20DEC11	1	-395
VO61-145	Place grade 400 rockfill & levelling layer	12	12	12JAN12	28JAN12	21DEC11	07JAN12	1	-395
VO61-150	Form seawall type 6, 3 & 2A (E)	38	40	30JAN12	13MAR12	09JAN12	27FEB12	1	-395
VO61-155	Backfill sea walls east & north (half)	36	36	14MAR12	30APR12	28FEB12	13APR12	1	-287
VO61-160	Place type 2 armour	10	10	02MAY12	12MAY12	14APR12	25APR12	1	-287
VO61-165	Dredge in sea bed for stepped blocks	15	50	14MAR12	30MAR12	28FEB12	02MAY12	1	-395
VO61-170	Place levelling layer	175	224	31MAR12	02NOV12	13MAR12	11DEC12	1	-395
VO61-175	Place stepped blocks	175	224	19APR12	16NOV12	27MAR12	27DEC12	1	-395
VO61-180	Place type 2 armour to reinstate exist. seawall	24	24	14MAY12	09JUN12	26APR12	25MAY12	1	-287
VO61-185	Form ground beam (W)	12	12	11FEB12	24FEB12	04JAN12	17JAN12	1	-250
VO61-190	Form ground beam (E)	12	12	25FEB12	09MAR12	18JAN12	03FEB12	1	-244
VO61-195	Form invert slab (W)	12	12	25FEB12	09MAR12	18JAN12	03FEB12	1	-250
VO61-200	Form invert slab (E)	12	12	10MAR12	23MAR12	04FEB12	17FEB12	1	-244
VO61-205	Form end wall (W)	18	18	10MAR12	30MAR12	04FEB12	24FEB12	1	-250
VO61-210	Form end wall (E)	18	18	31MAR12	25APR12	25FEB12	16MAR12	1	-250
VO61-215	Reinstate rock armour	24	24	11JUN12	10JUL12	26MAY12	22JUN12	1	-287
VO61-220	Complete basin	0	0		16NOV12		27DEC12	1	-395
<b>Remaining Works Prior to Handover</b>									
10R1DO0904	Finishing & reinstatement works; Portion D	36	36	19OCT12	30NOV12	28NOV12	11JAN13	1	-395
10R1DO0906	Pre-handover inspections and remedial works	30	30	03NOV12	07DEC12	12DEC12	18JAN13	1	-395
10R1DO0908	Contractor serve notice for Works completion	7	7	08DEC12	14DEC12	19JAN13	25JAN13	2	0
10R1DO0910	SO issues completion certificate	21	21	15DEC12	04JAN13	26JAN13	15FEB13	2	0
16R7DO0902	Landscaping works at Portion D	120	120	11JUL12	30NOV12	18AUG12	11JAN13	1	-369
16R7DO0904	Establishment Works at Portion D	365	365	01DEC12	30NOV13	12JAN13	11JAN14	2	-455
3DL1DO0902	Install flow measurement devices at Outfall O-1	12	12	30MAR12	17APR12	30MAR12	17APR12	1	-219

ID	Activity Description	AD04		WP3D		AD04	AD04	WP3D	WP3D	Total Float	
		Dur	Start	Dur	Start						Finish
3DL1DO0903	T & C for flow measurement system	28	02APR12	28	02APR12	10MAY12	10MAY12	10MAY12	10MAY12	1	-219
3DL1DO0904	Maintain & monitor flow monitoring	365	11MAY12	365	11MAY12	10MAY13	10MAY12	10MAY12	10MAY13	2	0
<b>Schedule of Milestones for Cost Centre No. 10R</b>											
10R1DO1002	10R 1; On completion of 20% excavation works	0		0		09APR09A	09APR09A	09APR09A	09APR09A	2	
10R1DO1004	10R 2; On completion of 40% excavation works	0		0		13AUG09	13AUG09	13AUG09	13AUG09	2	1,600
10R1DO1006	10R 3; On completion of 60% excavation works	0		0		08OCT09	08OCT09	08OCT09	08OCT09	2	1,544
10R1DO1008	10R 4; On completion of 80% excavation works	0		0		11SEP10	11SEP10	11SEP10	11SEP10	2	1,206
10R1DO1010	10R 5; On completion all excavation works	0		0		09FEB12	09FEB12	09FEB12	09FEB12	2	690
10R1DO1012	10R 6; On completion of cascade structure	0		0		10APR12	10APR12	10APR12	10APR12	2	629
10R1DO1014	10R 7; On completion of spiral ramp to +16mPD	0		0		20NOV10	20NOV10	20NOV10	20NOV10	2	1,136
10R1DO1016	10R 8; On completion of spiral access ramp	0		0		02FEB11	02FEB11	02FEB11	02FEB11	2	1,062
10R1DO1018	10R 9; On completion box-culvert & open channel	0		0		17JAN12	17JAN12	17JAN12	17JAN12	2	713
10R1DO1020	10R 10; On completion of seabed protection wks	0		0		16NOV12	16NOV12	16NOV12	16NOV12	2	409
10R1DO1022	10R 11; On completion of all works under this CC	0		0		07DEC12	07DEC12	07DEC12	07DEC12	2	388
<b>Schedule of Milestones for Cost Centre No. 14R</b>											
14R5DO1102	14R 1; On complet. of remove exist. rock armour	0		0		25JUN11	25JUN11	25JUN11	25JUN11	2	919
14R5DO1104	14R 2; On complet. of 50% soil nailing by number	0		0		07APR09A	07APR09A	07APR09A	07APR09A	2	
14R5DO1106	14R 3; On completion all soiling works	0		0		16SEP09	16SEP09	16SEP09	16SEP09	2	1,566
14R5DO1108	14R 4; On completion of all works under this CC	0		0		25JUN11	25JUN11	25JUN11	25JUN11	2	919
<b>Drainage Improvement Works at Portion G</b>											
<b>Preliminary Works</b>											
01R6GG0102	SO consent; Drainage Impact Assessment Report.	0		0		24NOV09	24NOV09	24NOV09	24NOV09	1	181
01R6GG0112	Obtain TTA (ingress & egress) approval	0		0		25NOV09	25NOV09	25NOV09	25NOV09	2	0
01R6GG0114	Possession of Portion G - 700d of DOC	0		0	26NOV09	26NOV09	26NOV09	26NOV09	26NOV09	2	0
01R6GG0116	Site clearance/Site Establishment	30	30	30	26NOV09	02JAN10	26NOV09	02JAN10	02JAN10	1	165
3DL6GG0104	Obtain approval for Geotechnical Instrumentation	0		0		25NOV09	25NOV09	25NOV09	25NOV09	2	0
3DL6GG0106	Installation of Geotechnical Instrumentation	12	12	12	26NOV09	09DEC09	26NOV09	09DEC09	09DEC09	1	0
3DL6GG0108	Monitor/report Geotechnical Instrumentation	904	904	904	10DEC09	29DEC12	10DEC09	29DEC12	29DEC12	1	0
<b>Piling Works</b>											
15R6GG0200	Obtain SO's consent for temp. works design	0		0		17OCT09	17OCT09	17OCT09	17OCT09	1	209
15R6GG0202	Mobilization & set up for temp. platform	3	3	3	10DEC09	12DEC09	10DEC09	12DEC09	12DEC09	1	165
15R6GG0204	Construct steel working platform for H-piling	110	110	110	14DEC09	03MAY10	14DEC09	03MAY10	03MAY10	1	165
15R6GG0206	Mobilization & set up for H-piling; Wall 1	3	3	3	04MAY10	06MAY10	04MAY10	06MAY10	06MAY10	1	165
15R6GG0208	52 nos. 600mm dia. H-piles; Wall 1 @1.5 nr/day	35	35	35	07MAY10	18JUN10	07MAY10	18JUN10	18JUN10	1	165
15R6GG0210	Excavate & construct skin wall 1 at Portion G	35	35	35	19JUN10	30JUL10	19JUN10	30JUL10	30JUL10	1	165
15R6GG0212	Mobilization & set up for H-piling; Wall 2	3	3	3	19JUN10	19JUN10	19JUN10	19JUN10	19JUN10	1	165
15R6GG0214	40 nos. 600mm dia. H-piles; Wall 2 @1.5 nr/day	27	27	27	23JUN10	24JUL10	23JUN10	24JUL10	24JUL10	1	165
15R6GG0216	Excavate & construct skin wall 2 at Portion G	27	27	27	26JUL10	26JUL10	26JUL10	26JUL10	26JUL10	1	165



ID	Activity Description	AD04		WP3D		AD04	AD04	WP3D	Cal ID	Total Float	
		Dur	Dur	Start	Finish						Start
<b>Drainage Improvement Works</b>											
15R6GG0301	Obtain approval of ELS design package incl MS	0	0	02NOV09	02NOV09	2	284				
15R6GG0302	Install ELS & construct shaft for pipe jacking	90	90	04JAN10	26APR10	1	180				
15R6GG0304	Construct 1.5m dia. drainage by pipe jacking	85	85	27APR10	07AUG10	1	180				
15R6GG0306	Construct 1.5m dia. drainage by open trenching	24	24	01NOV10*	27NOV10	1	111				
15R6GG0308	Construct .75m & 1.5m U and Stepped Channel	12	12	29NOV10	11DEC10	1	111				
15R6GG0310	Construct 3 nos. manhole & 2 nos. catchpit	35	35	13DEC10	25JAN11	1	111				
<b>Remaining Works Prior to Handover to Client</b>											
15R6GG0312	Reinstate carriageway & footway	24	24	26JAN11	25FEB11	1	111				
15R6GG0402	Pre-handover inspections and remedial works	12	12	26FEB11	11MAR11	1	111				
15R6GG0404	Contractor serve notice for Works completion	7	7	12MAR11	18MAR11	2	997				
15R6GG0408	SO issues completion certificate	21	21	19MAR11	08APR11	2	997				
<b>Schedule of Milestones for Cost Centre No. 15R</b>											
15R6GG0502	15R 1; On completion of all temp. works	0	0	25APR10	26APR10	2	1,344				
15R6GG0504	15R 2; On completion of 25% of pipejacking	0	0	06MAY10	06MAY10	2	1,334				
15R6GG0506	15R 3; On completion of 50% of pipejacking	0	0	14MAY10	14MAY10	2	1,326				
15R6GG0508	15R 4; On completion of 75% of pipejacking	0	0	25MAY10	25MAY10	2	1,315				
15R6GG0510	15R 5; On completion of all pipejacking	0	0	07AUG10	07AUG10	2	1,241				
15R6GG0512	15R 6; On completion of all wks under this CC	0	0	11MAR11	11MAR11	2	1,025				



## Appendix D

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# Implementation Status of Environmental Mitigation Measures

## IMPLEMENTATION SCHEDULE April 2011

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
<b>Air Quality</b>					
3.6.1	<p><b>Specific</b></p> <p>As mentioned in Section 3.5, exceedances of 1-hour and 24-hour average TSP guideline levels have been predicted at most of the ASRs. Hence, mitigation measures are considered necessary in order to suppress the potential dust impact.</p> <p>The dust suppression measures set out in the <i>Air Pollution Control (Construction Dust) Regulation</i>, in fact, are more extensive. Therefore, it is expected that with watering the construction site every four times daily together with strict implementation of dust suppression measures as stipulated in the <i>Air Pollution Control (Construction Dust) Regulation</i>, the dust level is expected to be reduced by over 75%.</p> <p><b>General</b></p> <p>To further ensure compliance with the guideline and AQO limit at the ASRs at all time, it is recommended to implement the <i>Air Pollution Control (Construction Dust) Regulation</i> and include good site practice in the contract clauses to minimize cumulative dust impact. In addition, a comprehensive dust monitoring and audit programme is recommended to ensure proper implementation of the identified mitigation measures. Details of the monitoring and audit requirements are provided in a separate EM&amp;A Manual.</p> <ul style="list-style-type: none"> <li>• effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level of the scaffolding where a scaffolding is erected around the perimeter of a building under construction;</li> <li>• dump truck for material transport should be totally enclosed by impervious sheeting;</li> <li>• any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated within 24 hours of the excavation or unloading;</li> <li>• stockpile of dusty materials should not extend beyond the pedestrian barriers, fencing or traffic cones;</li> <li>• dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads;</li> </ul>	DSD's Contractor	Construction Work Sites	Air Pollution Control (Construction Dust) Regulation	<p>✓</p> <p>✓</p> <p>N/A</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>

## Appendix D

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
3.6.1	<ul style="list-style-type: none"> <li>• the area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;</li> </ul>	DSD's Contractor	Construction Work Sites	Air Pollution Control (Construction Dust) Regulation	✓
	<ul style="list-style-type: none"> <li>• where a site boundary adjoins a road, street or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length except for a site entrance or exit;</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet;</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• the portion of road leading only to a construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials;</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• stockpile of dusty materials should be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet;</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• all dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• vehicle speed should be limited to 10 kph except on completed access roads;</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites;</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• the load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• the working area of excavation should be sprayed with water immediately before, during and immediately after the operations so as to maintain the entire surface wet.</li> </ul>				✓
<b>Noise</b>					
4.6.1	<b>During Construction</b>	DSD's Contractor	Construction Work Sites	PN 2/93 Noise from Construction Activities & EIAO	✓
	Appropriate mitigation measures such as the use of quiet equipment and movable barriers will be developed to ensure that noise can be reduced to acceptable levels without causing programme delays				
	<i>Good Site Practice</i> Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during construction:				
	<ul style="list-style-type: none"> <li>• only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction works;</li> </ul>				✓
<ul style="list-style-type: none"> <li>• machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;</li> </ul>	✓				



## Appendix D

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
4.6.1	<ul style="list-style-type: none"> <li>• plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs;</li> </ul>	DSD's Contractor	Construction Work Sites	PN 2/93 Noise from Construction Activities & EIAO	✓
	<ul style="list-style-type: none"> <li>• mobile plant should be sited as far away from NSRs as possible; and</li> </ul>				✓
	<ul style="list-style-type: none"> <li>• material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.</li> </ul>				✓
	<i>For Drill and Blast Works</i> <ul style="list-style-type: none"> <li>• Charge mass per delay should be decreased by minimising the number of blastholes firing on each delay.</li> </ul>				N/A
	<ul style="list-style-type: none"> <li>• Smaller blasthole patterns and longer delays should be used between dependent charges.</li> </ul>				N/A
	<ul style="list-style-type: none"> <li>• Times of blasting should be established to suit the situation and firing blasts when neighbours are busy with their daily tasks (and at a regular time such as lunch time).</li> </ul>				N/A
	<i>For TBM Tunnelling</i> <ul style="list-style-type: none"> <li>• For the tunnel excavation, it is anticipated that beyond the initial length (say within 30m), excavation will be carried out well within the tunnel and door should be provided to further minimize the noise nuisance to the nearby receivers.</li> </ul>				N/A
4.6.2	<p><b>During Operation</b></p> <p>Good site practice and noise management can significantly reduce the impact of maintenance activities on nearby NSRs. The following package of measures should be followed during construction</p> <ul style="list-style-type: none"> <li>• only well-maintained plant should be operated on-site;</li> <li>• machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; and</li> <li>• plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs.</li> </ul>	DSD's Contractor	Project Area	NCO & EIAO	N/A N/A N/A
<b>Water Quality</b>					
5.9.1	<p><b>During Construction</b></p> <p>Mitigation measures and a spill control and response plan have been prepared for works at the intakes and work sites.</p> <p><i>Precautions to be taken at any time of year when rainstorms are likely:</i></p> <ul style="list-style-type: none"> <li>• Temporarily exposed surfaces should be covered e.g. by tarpaulin.</li> <li>• Temporary access roads should be protected by crushed stone or gravel.</li> <li>• Trenches should be dug and backfilled in short sections. Measures should be taken to minimize the ingress of rainwater into trenches.</li> </ul> <p><i>Actions to be taken when a rainstorm is imminent or forecast:</i></p> <ul style="list-style-type: none"> <li>• Silt removal facilities, should be checked to ensure that they can function properly.</li> </ul>	DSD's Contractor	Construction Work Sites	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO	✓ ✓ ✓ ✓ ✓

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
5.9.1	<ul style="list-style-type: none"> <li>Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric.</li> </ul>	DSD's Contractor	Construction Work Sites	WQO	✓
	<ul style="list-style-type: none"> <li>All temporary covers to slopes and stockpiles should be secured.</li> </ul>				✓
	<p><i>Actions to be taken during or after rainstorms:</i></p> <ul style="list-style-type: none"> <li>Silt removal facilities should be checked and maintained to ensure satisfactory working conditions.</li> </ul>				✓
	<b><u>Spill Control and Response Plan</u></b>				
	<b>1 Prevention and Precaution Measures</b>				
	<b><i>General Precautions</i></b>				
	<ul style="list-style-type: none"> <li>No discharge of silty water into watercourses.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>All materials to be used during construction and operation shall be identified and their hazard potential evaluated.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Maintenance of vehicles and equipment involving activities with potential for leakage and spillage shall only be undertaken with the areas appropriately equipped to control these discharges.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Any construction plant which causes pollution to catchwaters or water gathering ground due to leakage of oil or fuel shall be removed off-site immediately.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Suitable containers shall be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Chemical waste containers shall be suitably labelled to notify and warn the personnel who are handling the wastes to avoid accidents.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Storage areas shall be selected at safe locations on site and adequate space shall be allocated to the storage area.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Prevent obstructions and tripping hazards.</li> </ul>				✓
	<b><i>Storage Precautions</i></b>				
	<ul style="list-style-type: none"> <li>All chemical storage containers shall be correctly labelled.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Solid and impermeable enclosure walls or storage shelves shall be used.</li> </ul>				✓
<ul style="list-style-type: none"> <li>Only compatible chemical wastes shall be stored in the same storage area.</li> </ul>	✓				
<ul style="list-style-type: none"> <li>The storage areas shall be inspected to detect any leakages or defective containers on a regular basis.</li> </ul>	✓				
<ul style="list-style-type: none"> <li>Suitable notices warning of hazards, emergency response plans, telephone numbers etc shall be posted around the site, including storage areas.</li> </ul>	✓				
<ul style="list-style-type: none"> <li>Large and heavy containers shall be stored at ground level.</li> </ul>	✓				

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
	<ul style="list-style-type: none"> <li>Chemical waste containers shall be stored below eye level.</li> </ul>				✓
5.9.1	<ul style="list-style-type: none"> <li>Adequate space for handling of the containers shall be provided</li> <li>Spill response kits shall be located adjacent/near to the storage areas.</li> <li>A log of chemical wastes shall be maintained.</li> <li>Incompatible chemicals shall be stored separately.</li> </ul>	DSD's Contractor	Construction Work Sites	WQO	✓
	<ul style="list-style-type: none"> <li>A log of chemical wastes shall be maintained.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Incompatible chemicals shall be stored separately.</li> </ul>				✓
	<b>2 Responses/Action Plan</b>				
	All Workers shall be made aware of emergency telephone numbers and the location of all relevant pollution control equipment. Training be given in emergency response/action plans. The action include the following steps:				✓
	<ul style="list-style-type: none"> <li>Only trained personnel who are equipped with protective clothing and equipment shall be allowed to enter the spillage area for clean up.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Spills shall be transferred appropriate back into containers using suitable equipment.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Absorbent materials shall be used to clean up the spills and shall be disposed of as chemical wastes.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Where appropriate suitable solvents may be used to clean the contaminated area after removal of all contaminated materials.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>All necessary protective devices, safety equipment, containers and clean up materials for emergency use shall be maintained to a high standard.</li> </ul>				✓
	<b>3 Spill Clean Up and Disposal</b>				
	Effect the response plan.				✓
	Control the leakage and absorb the spillage using suitably absorbent materials.				✓
	Provide safety equipment and personal protective equipment for handling of chemical wastes would be similar to that for handling of chemicals.				✓
	<i>Safety equipment includes but is not limited to:</i>				✓
	<ul style="list-style-type: none"> <li>Fire extinguishers.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Spades, brushes, dustpan, mop and bucket (or similar readily available on site).</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Absorbent material such as dry sand, tissues and toweling (all materials readily available on-site).</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Containers including plaster bags, drums, etc.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Absorbing materials.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Pumps.</li> </ul>				✓
	<i>Personal protective equipment includes as appropriate:</i>				✓
	<ul style="list-style-type: none"> <li>First-aid kits.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Safety helmet and goggles.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Gloves which can resist chemical reaction.</li> </ul>				✓

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
5.9.1	<ul style="list-style-type: none"> <li>Protective boot and clothing.</li> </ul>	DSD's Contractor	Construction Work Sites	WQO	✓
	<ul style="list-style-type: none"> <li>Respirators and gas masks.</li> </ul>				✓
	<ul style="list-style-type: none"> <li>Face visor and masks.</li> </ul>				✓
5.9.2	<p><b>Emergency Responses to Spillages</b></p> <p>Emergency plans and clean up procedures will need to be provided by the Contractor recognising his specific working methods and construction programme, activities and sequences. Agreement must be sought prior to commencement of the construction work but the following principles should be considered.</p> <p><i>The emergency plans should include the procedures for:</i></p> <ul style="list-style-type: none"> <li>spill prevention and precaution;</li> <li>response actions; and</li> <li>spill clean up and disposal.</li> </ul> <p><i>Spill prevention and precaution embraces good site practice and covers:</i></p> <ul style="list-style-type: none"> <li>good housekeeping practices;</li> <li>chemical storage requirements; and</li> <li>chemical transfer and transport.</li> </ul>	DSD's Contractor	Project Area		✓
	✓				
	✓				
5.9.3	<p><b>During Operation</b></p> <p>Regular inspection of the tunnels is essential to monitor the structural integrity and proper functioning of the drainage tunnel, which allows repairing of structural deterioration when it begins to develop. It is recommended that routine inspection shall be carried out at least two times per year for the drainage tunnel at the beginning and end of wet season from April to September.</p>	DSD's Contractor	Project Area		N/A
<b>Waste Management</b>					
6.5.1	<p><b>During Construction</b></p> <p><i>Vegetation Removed from Site Clearance</i> Wastes generated from site clearance shall be sorted and excavated topsoil segregated from roots for re-use in landscaping works, thus eliminating the need for off-site disposal.</p>	DSD's Contractor	Construction Work Sites	Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Wastes) (General) Regulation (Cap 354) and ETWBTC No. 15/2003, Waste anagement on Construction Site	✓
	<p><i>Construction and Demolition Materials</i> The Contractor should reuse any C&amp;D material on-site. C&amp;D waste should be segregated and stored in different containers to other wastes to encourage the re-use or recycling of materials and their proper disposal. The use of wooden hoardings shall not be allowed. An alternative material, which can be reused or recycled, for example, metal (aluminium, alloy, etc) shall be used.</p>				✓

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
6.5.1	As referred to the section 6.4.1, the 317,936m <sup>3</sup> of inert surplus material generated by the project is suitable for public fill. The public fill reception facility at Tuen Mun Area 38 provides a suitable facility for the reuse of surplus inert C&D material generated from the project.	DSD's Contractor	Construction Work Sites	WDO (Cap.354), ETWBTC No. 15/2003, ETWBTC No. 12/2002 and ETWBTC No. 31/2004	
	Under the contract, the contractor will be required to minimise the generation of C&D material and reuse it on site through the following:				
	(a) to plan in the design and construction, methods to minimise the generation of C&D material;				✓
	(b) to submit a Waste Management Plan (WMP) in accordance with Environment Transport and Works Bureau Technical Circular (ETWBTC) No. 15/2003 or any superseding circular(s);				✓
	(c) to reuse recycled aggregates in accordance with ETWBTC No. 12/2002 or any superseding circular(s);				✓
	(d) to observe the requirements of the Trip-Ticket System, stipulated in ETWBTC No. 31/2004 or any superceding circular(s), for disposal of C&D material;				✓
	(e) to incorporate a Waste Management System into the WMP for effective management and control of C&D materials to avoid/reduce/minimise the generation of C&D material during construction.				✓
	The contractor will be required to properly sort into inert C&D materials, metals, timber and other non-inert C&D material in the workplace to prevent cross-contamination.		✓		
	In addition, DSD will conduct site inspection to monitor the contractors' performance in the implementation of the WMP and other relevant specified requirements.	DSD	Construction Work Sites	WDO (Cap.354) and ETWBTC No. 15/2003	✓
	<i>Excavated Materials</i> Excavated materials should be segregated from other wastes to avoid contamination thereby ensuring acceptability at public filling areas and avoiding the need for disposal at landfill.	DSD's Contractor	Construction Work Sites	WDO (Cap.354) and ETWBTC No. 15/2003	✓
	<i>Municipal Waste</i> Temporary refuse collection facilities should be set-up by the contractor and wastes should be stored in appropriate containers prior to collection and disposal.				✓
	Domestic effluent generated by the workforce will be directed to foul sewer or chemical toilets if public facilities are not available.				✓
6.5.1	<i>Waste Management Plan</i> A Waste Management Plan (WMP) for the construction of the Project should be prepared as part of the contractors submission. It will provide recommendations for appropriate recycling or disposal route and should include method statement for stockpiling and transportation of the excavated material and other construction wastes should also be included in the WMP and approved before the commencement of construction. All mitigation measures arising from the approved WMP shall be fully implemented.	DSD's Contractor	Construction Work Sites	WDO (Cap.354), ETWBTC No. 15/2003 and ETWBTC No. 33/2002	✓

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
	For the purpose of enhancing the management of C&D material including rock, and to minimize its generation at source, a C&D Material Management Plan (C&DMMP) has been prepared for this project and would be processed in accordance with the Environment, Transport and Works Bureau Technical Circular (Works) No. 33/2002 - Management of Construction and Demolition Material Including Rock.				N/A
<b>Ecology</b>					
7.7.1	<p><b>Avoidance</b></p> <p>The surface structures are located mainly on existing disturbed areas (ie pollution and urbanisation) and have generally avoided the natural stream sections of higher species diversity and abundance of aquatic organisms.</p> <p>The major construction activities at streams are scheduled to avoid wet season of high water flow which may adversely affect the downstream natural habitats due to the construction runoff.</p>	DSD's Contractor	Construction Work Sites	EIAO	✓
					✓
7.7.2	<p><b>Minimisation</b></p> <p>The previous discussion in Section 7.6.4 has indicated that the impacts on ecological resources due to the construction and operation of the proposed Project are generally expected to be low. The following mitigation measures to minimise impacts and disturbance to the surrounding habitats, are recommended.</p> <p><i>Measures for Construction Runoff</i> Install sheet piles/cofferdam/weir along the boundary of the works area within the stream habitats in particular Sam Dip Tam Stream and Tso Kung Tam Stream before the commencement of works to prevent construction runoff during construction. Provision of adequate designed sand/ silt removal facilities such as sand traps, silt traps and sediment basin in the areas which could potentially be affected may be required.</p> <p><i>Good Construction Practice</i></p>				
	<p>Erect fences along the boundary of the works area before the commencement of works to prevent tipping, vehicle movements, and encroachment of personnel onto adjacent areas, particularly the stream habitats.</p> <p>Avoid any damage and disturbance, particularly those caused by filling and illegal dumping, to the remaining and surrounding natural stream habitats.</p> <p>Regularly check the work site boundaries to ensure that they are not breached and that no damage occurs to surrounding areas.</p> <p>Prohibit and prevent open fires within the site boundary during construction and provide temporary fire fighting equipment in the work areas.</p> <p>Treat any damage that may have occurred to individual major trees in the adjacent area with surgery.</p>	DSD's Contractor	Construction Work Sites	EIAO	✓
					✓
					✓
					✓
					✓

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
	Reinstate temporary work sites/disturbed areas, particularly stream of natural bottom and bank, plantation, intertidal habitat, and the areas located within the proposed Ecological Park, immediately after completion of the construction works, ie through on-site tree/shrub planting and reprovision of natural or semi-natural bottom (also refer to Section 7.7.3), in order to facilitate the recolonisation of the wildlife recorded during the baseline surveys. Tree/shrub species used should make reference from those in the surrounding area	DSD's Contractor	Construction Work Sites	EIAO	✓
7.7.3	<p><b>Compensation</b></p> <p>Provide natural stream bed (approximately 0.03 ha) for the new Dry Weather Flow Channel (created from village-orchard) by laying natural stones at Intake I-2 (Figure 7.7). The reinstated stream bed shall mimic the existing natural conditions with certain portion of big boulders creating the lentic and lotic zones for the aquatic fauna, and while it will be developed during detailed design may draw on concepts shown in Figure 2.18.</p> <p>Provide natural stream bed (approximately 0.5 ha,) for the Approach Channel and Dry Weather Flow Channel by laying natural stones at Intake I-3 (Figure 7.8). The reinstated stream bed shall mimic the existing natural conditions (rocky bottom with very limited aquatic plants) with certain portion of big boulders creating the lentic and lotic zones for the aquatic fauna, and while it will be developed during detailed design may draw on concepts shown in Figure 2.18.</p> <p>Provide natural bottom (ie retain the existing stream bed or reinstate the stream bed by providing boulders/ rocks, riprap or gabion) for the affected stream sections (Figure 7.8) in order to allow natural colonisation of aquatic fauna.</p> <p>Provide at least 2.2 ha of compensatory planting on the permanent and temporary affected plantation areas, particularly the slopes along access road and adjacent to Intake I-3 and cascade at Outfall O-1, after construction to stabilise the slope to present soil erosion and consequent stream sedimentation. Among the 2.2 ha compensatory planting, at least 0.5 ha of compensatory tree planting on the new formed slope along the access road of the Intake I-3 and 0.5 ha of compensatory tree planting over the cascade (by constructing intermediate platform) at Outfall O-1 will be provided (location refer to Figures 7.4 – 7.6). Species used for planting should take reference from the species identified in Appendix F and be native to Hong Kong or South China region.</p> <p>Provide armour rocks for the affected intertidal habitat in order to allow natural colonisation of intertidal organisms.</p>				N/A
					N/A
					N/A
					N/A
					N/A

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
<b>Cultural Heritage</b>					
8.6	As no impacts on recorded archaeological sites or area with archaeological potential were identified within the Study Area, no mitigation measure for archaeological resources is considered necessary.				N/A
	The construction methods to be employed should seek to avoid potential vibration impacts to Kuen Yuen Tung Monastery at Lo Wai, the Western Monastery, Yuen Yuen Home for the Aged, Hong Hoi Chee Hong Temple, Chiu Yum Tsing Yuen, Tse's Grave, Wan Lin Bridge and Sam Dip Tam Rock Carving in Sam Dip Tam and the Tin Hau Temple, Yam Kom Tau Village Rural Committee and the Yeung's Ancestral Hall in Yau Kom Tau as these sites fall within 50 m of the Preferred Option of the drainage tunnel alignment or associated Intakes/Outfall construction activities. Construction works that generates excessive vibration in close proximity to these sites should be restricted to protect the building from adverse vibration impacts and to ensure that the building structures will not be damaged as a result of these impacts.	DSD's Contractor	Construction Work Sites	EIAO	✓
	In order to ensure that no structural or superficial damage will be caused by the construction activities, a precautionary approach involving a pre-construction condition survey and establishment of appropriate vibration limits for the potentially impacted structures should be adopted. Protection measures for the potentially impacted structures, if considered necessary from the pre-construction condition survey, should be implemented prior to the commencement of construction works. Vibration monitoring during the construction phase should be undertaken as part of the EM&A programme.	Qualified archaeologist/ built heritage specialist	Construction Work Sites	EIAO	✓
<b>Fisheries</b>					
10.6	In accordance with the guidelines in the <i>EIAO-TM</i> on fisheries impact assessment the general policy for mitigating impacts to fisheries, in order of priority are avoidance, minimization and compensation.	DSD's Contractor	Construction Work Sites	EIAO	N/A
	Impacts to fisheries resources and fishing operations have largely been avoided during the construction and operation of the drainage tunnel through the avoidance of dredging, reclamation and filling activities. Good construction practice and associated measures were recommended in Water Quality Assessment in Section 5 to control water quality impacts to within acceptable levels and are also expected to control impacts to fisheries resources. Hence, no fisheries-species mitigation measures are required during construction and operation of the drainage tunnel.				N/A

Remarks:

- ✓ Compliance of mitigation measure
- × Non-compliance of mitigation measure
- N/A Not applicable



## Appendix E

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### Status of License and Permit



**Updated Status of Environmental Permit & Licence**

Application Date	Environmental Permit / Licence	Issued Date	Ref No.	Account No.	Permit / Licence No.	Permit / Licence Validity Date	Remarks
2 Jan 2008	Registration as a Waste Producer	3 Jan 2008	001026707	----	----	----	Valid
2 Jan 2008	Waste Disposal (Chemical Waste) (General) - Chemical Waste Producer	26 Feb 2008	----	5111-324-M2703-01	----	----	Valid
2 Jan 2008	Waste Disposal (Charges for Disposal of Construction Waste) Regulation - Billing Account	17 Jan 2008	----	7006574	----	----	Valid
10 Jan 2008	Notification Pursuant to Section 3(1) of the Air Pollution Control (Construction Dust) Regulation	10 Jan 2008	001026901	----	----	----	Valid
25 Feb 2008	Water Discharge Licence – Outfall O-1	7 Aug 2008	001028154	----	EP760/323/012997I	7 Aug 2008 - 31 Aug 2013	Valid
18 Apr 2008	Water Discharge Licence – Intake I-1	19 Jun 2008	001029978	----	EP760/327/013315I	19 Jun 2008 - 30 Jun 2013	Valid
18 Apr 2008	Water Discharge Licence – Intake I-2	2 Jul 2008	001029959	----	EP760/321/013020I	2 Jul 2008 - 31 Jul 2013	Valid
18 Apr 2008	Water Discharge Licence – Intake I-3	5 Aug 2008	001029960	----	EP760/323/013324I	5 Aug 2008 - 31 Aug 2013	Valid
18 Apr 2008	Water Discharge Licence – Portion I	26 Jun 2008	001029974	----	EP760/350/013334I	26 Jun 2008 - 30 Jun 2013	Valid
23 Jul 2008	Water Discharge Licence – Intake I-1 (Intersection of Wo Yi Hop Lane and Ho Fung College)	27 Aug 2008	001031974	----	EP760/325/013536I	27 Aug 2008 - 31 Aug 2013	Valid
2 Sep 2008	Variation of Environmental Permit	25 Sep 2008	VEP-271/2008	----	EP-275/2007/B	----	Valid
29 Apr 2009	Water Discharge Licence – Intake I-3 (Additional Discharge Point)	25 Mar 2010	305058	----	WT00005917-2010	25 Mar 2010 - 31 Mar 2015	Valid
5 Oct 2009	Further Environmental Permit	27 Oct 2009	FEP-096/2009	----	FEP-01/275/2007/B	----	Valid



**Updated Status of Environmental Permit & Licence**

Application Date	Environmental Permit / Licence	Issued Date	Ref No.	Account No.	Permit / Licence No.	Permit / Licence Validity Date	Remarks
13 Jul 2010	Application for Vessel Chits for Disposal of Construction Waste for Existing Account Holder (Billing Account)	23 Jul 2010	----	7011131	----	02 Oct 2010 - 30 Apr 2011	Expired
22 Jul 2010	Application for a Permit to Dump Material at Sea - Dredged / Excavated Sediment Requiring Type 1 - Open Sea Disposal	20 Sep 2010	319729	----	EP/MD/11-049	02 Oct 2010 - 01 Apr 2011	Expired
4 Sep 2010	Water Discharge Licence – Portion G	28 Oct 2010	321337	----	WT00007685-2010	28 Oct 2010 - 31 Oct 2015	Valid
8 Nov 2010	Construction Noise Permit - Intake 2	24 Nov 2010	323325	----	GW-RW0629-10	24 Nov 2010 - 14 May 2011	Valid
12 Nov 2010	Construction Noise Permit - Outfall (For Mining Works and Probe Drilling to 24hrs)	29 Nov 2010	323497	----	GW-RW0656-10	04 Dec 2010 - 03 Jun 2011	Canceled and Superseded by GW-RW0212-11
23 Nov 2010	Construction Noise Permit - Valve House (Near the Wonderland at Castle Peak Road, Ting Kau - Ventilation Fan)	23 Nov 2010	323886	----	GW-RW0652-10	26 Nov 2010 - 25 May 2011	Valid
1 Dec 2010	Construction Noise Permit - Chai Wan Kok - Valve House (Group A + B)	9 Dec 2010	324176	----	GW-RW0680-10	27 Dec 2010 - 26 Jun 2011	Valid
1 Dec 2010	Construction Noise Permit - Intake I-1	13 Dec 2010	234178	----	GW-RW0701-10	13 Dec 2010 - 03 Jun 2011	Valid
1 Dec 2010	Construction Noise Permit - Intake I-3	9 Dec 2010	234179	----	GW-RW0682-10	09 Dec 2010 - 02 Jun 2011	Canceled and Superseded by GW-RW0254-11
15 Dec 2010	Water Discharge Licence – Outfall O-1 (Additional Discharge Point)	----	----	----	----	----	Submission made on 15 Dec 2010 and acknowledge received by EPD on 15 Dec 2010.
12 Jan 2011	Construction Noise Permit - Portion G - (Water Pump)	27 Jan 2011	325763	----	GW-RW0049-11	09 Feb 2011 - 08 Aug 2011	Valid
1 Mar 2011	Application for a Permit to Dump Material at Sea - Dredged / Excavated Sediment Requiring Type 1 - Open Sea Disposal	16 Mar 2011	----	----	EP/MD/11-156	02 Apr 2011 - 01 Oct 2011	Valid



**Updated Status of Environmental Permit & Licence**

Application Date	Environmental Permit / Licence	Issued Date	Ref No.	Account No.	Permit / Licence No.	Permit / Licence Validity Date	Remarks
15 Mar 2011	Construction Noise Permit - Intake 2	29 Mar 2011	327938	----	GW-RW0219-11	15 May 2011 - 14 Nov 2011	To be effective on 15 May 2011
18 Mar 2011	Construction Noise Permit - Outfall (For Mining Works and Probe Drilling to 24hrs, Additional AquaSeq added)	29 Mar 2011	328153	----	GW-RW0212-11	30 Apr 2011 - 29 Oct 2011	Valid
30 Mar 2011	Application for Vessel Chits for Disposal of Construction Waste for Existing Account Holder (Billing Account)	21 Apr 2011	----	7011131	----	21 Apr 2011 - 30 Sep 2011	Valid
31 Mar 2011	Construction Noise Permit - Intake I-3	15 Apr 2011	328636	----	GW-RW0254-11	18 Apr 2011 - 07 Oct 2011	Valid
8 Apr 2011	Construction Noise Permit - Intake I-1	20 Apr 2011	328892	----	GW-RW0279-11	04 Jun 2011 - 02 Dec 2011	To be effective on 04 Jun 2011

## Appendix F

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# Calibration Certificates

**High Volume Air Sampler Calibration Worksheet**

**Project Title:** Design and Construction of Tsuen Wan Drainage Tunnel  
**Monitoring Location:** Ho Fung College (ASR 1)  
**Calibration Date:** 17-Mar-11  
**Calibration Due Date:** 16-May-11  
**Time:** 08:00

Sampler Model:	BM2000HX
Serial No.:	4994
Calibrator Orifice no.:	1785
Slope (m):	2.01637
Intercept (b):	-0.02316
Correction coeff. (r)	0.99996

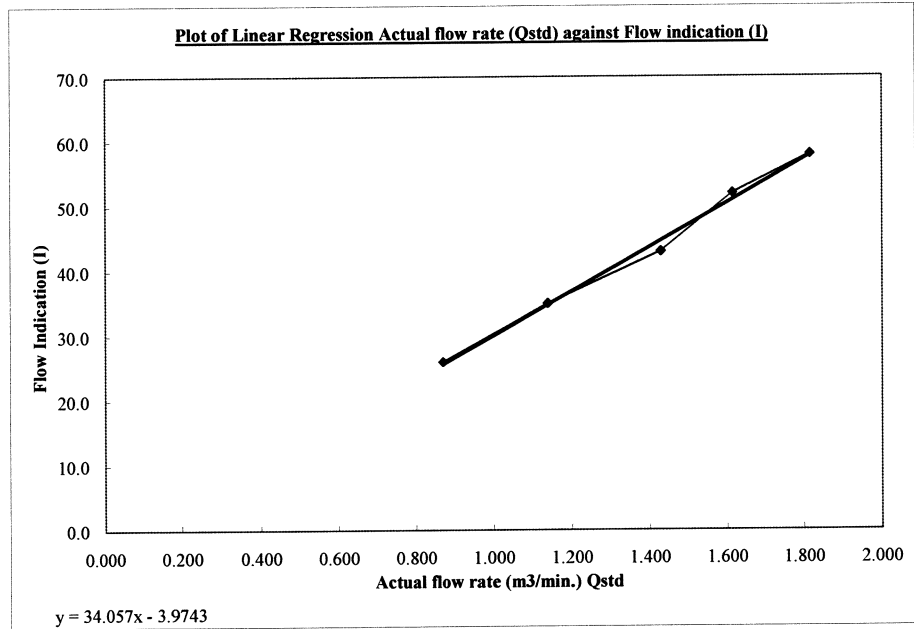
Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	766.3
Calibration temp. (K) Ta:	289.2

$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left( \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m <sup>3</sup> /min	Actual flow rate (Qstd), m <sup>3</sup> /min	Flow indication (I), arbitrary
1	12.8	3.637	1.815	58.0
2	10.1	3.231	1.614	52.0
3	7.9	2.858	1.429	43.0
4	5.0	2.273	1.139	35.0
5	2.9	1.731	0.870	26.0

Correlation Coefficient : 0.9969



Remark  
 1HPa = 0.750062 mmHg

**Calibrated by:** Arthur Chiu  
 ( *Arthur Chiu* )

**Date:** 17/3/2011

**Checked by:** F.C. Tsang  
 ( *F.C. Tsang* )

**Date:** 17/3/2011

**High Volume Air Sampler Calibration Worksheet**

**Project Title:** Design and Construction of Tsuen Wan Drainage Tunnel  
**Monitoring Location:** Heng Hoi Chi Hong Ship Temple (ASR 3)  
**Calibration Date:** 17-Mar-11  
**Calibration Due Date:** 16-May-11  
**Time:** 08:15

Sampler Model:	BM2000HX
Serial No.:	5875
Calibrator Orifice no.:	1785
Slope (m):	2.01637
Intercept (b):	-0.02316
Correction coeff. (r)	0.99996

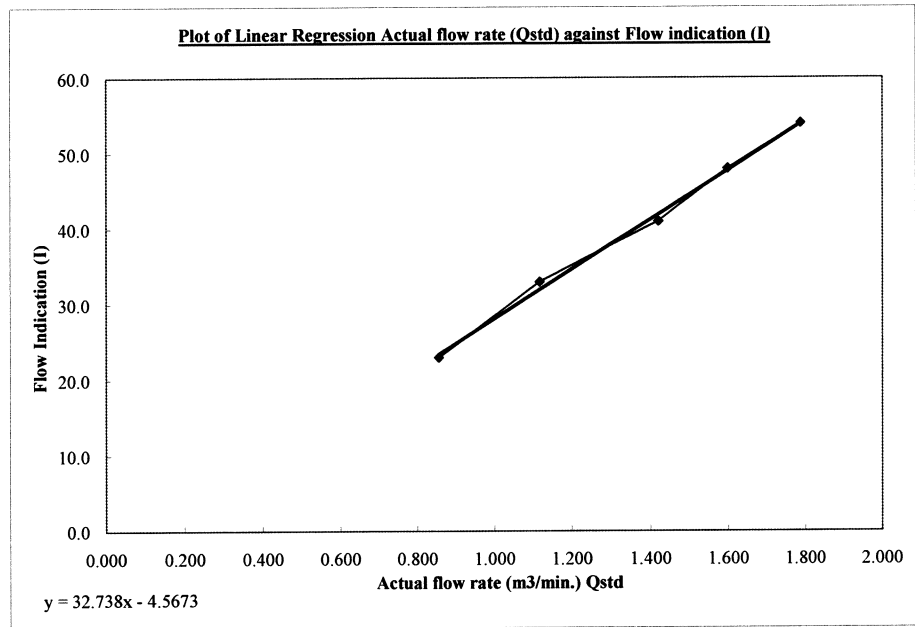
Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	766.3
Calibration temp. (K) Ta:	289.2

$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left( \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m <sup>3</sup> /min	Actual flow rate (Qstd), m <sup>3</sup> /min	Flow indication (I), arbitrary
1	12.4	3.580	1.787	54.0
2	9.9	3.199	1.598	48.0
3	7.8	2.839	1.420	41.0
4	4.8	2.227	1.116	33.0
5	2.8	1.701	0.855	23.0

Correlation Coefficient : 0.9982



Remark  
 1HPa = 0.750062 mmHg

Calibrated by: **Arthur Chiu**  
 ( *Arthur Chiu* )

Date: 17/3/2011

Checked by: **F.C. Tsang**  
 ( *F.C. Tsang* )

Date: 17/3/2011

**High Volume Air Sampler Calibration Worksheet**

**Project Title:** Design and Construction of Tsuen Wan Drainage Tunnel  
**Monitoring Location:** Long Beach Gardan (ASR 8)  
**Calibration Date:** 17-Mar-11  
**Calibration Due Date:** 16-May-11  
**Time:** 08:30

Sampler Model:	TE5005X
Serial No.:	1059
Calibrator Orifice no.:	1785
Slope (m):	2.01637
Intercept (b):	-0.02316
Correction coeff. (r)	0.99996

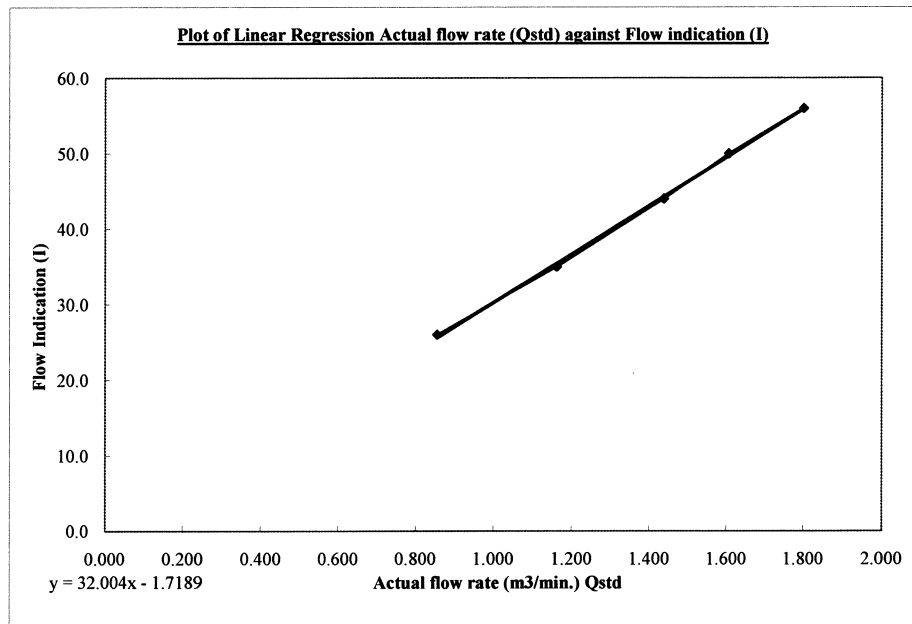
Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	766.3
Calibration temp. (K) Ta:	289.2

$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left( \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m <sup>3</sup> /min	Actual flow rate (Qstd), m <sup>3</sup> /min	Flow indication (I), arbitrary
1	12.6	3.609	1.801	56.0
2	10.0	3.215	1.606	50.0
3	8.0	2.876	1.438	44.0
4	5.2	2.318	1.161	35.0
5	2.8	1.701	0.855	26.0

Correlation Coefficient : 0.9995



Remark  
 1HPa = 0.750062 mmHg

**Calibrated by:** Arthur Chiu  
 ( *Arthur Chiu* )

**Date:** 17/3/2011

**Checked by:** F.C. Tsang  
 ( *F.C. Tsang* )

**Date:** 17/3/2011



**High Volume Air Sampler Calibration Worksheet**

**Project Title:** Design and Construction of Tsuen Wan Drainage Tunnel  
**Monitoring Location:** Greenview Terrace (ASR 9)  
**Calibration Date:** 17-Mar-11  
**Calibration Due Date:** 16-May-11  
**Time:** 08:45

Sampler Model:	TE5005X
Serial No.:	1713
Calibrator Orifice no.:	1785
Slope (m):	2.01637
Intercept (b):	-0.02316
Correction coeff. (r)	0.99996

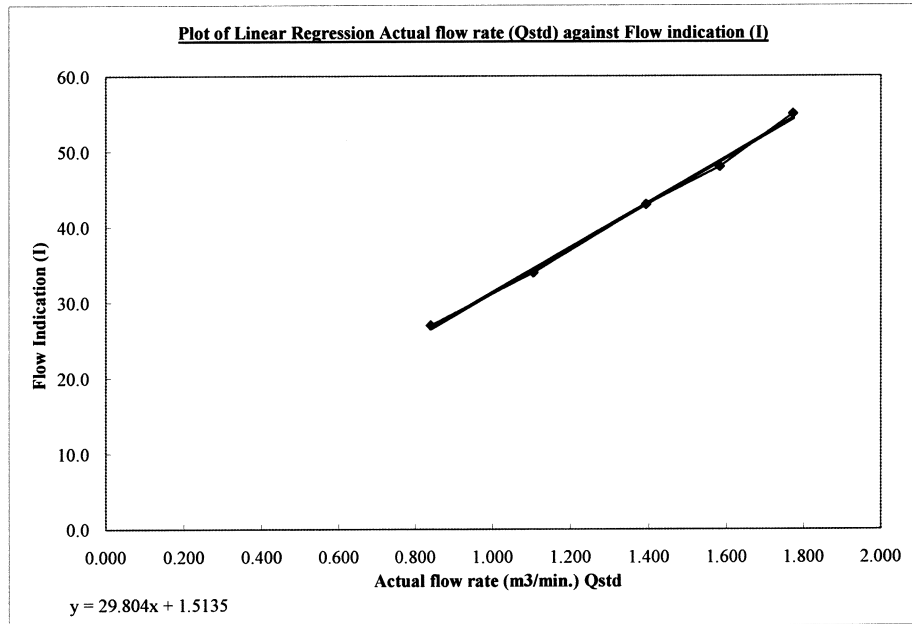
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	766.3
Calibration temp. (K) Ta:	289.2

$$Qstd = \frac{1}{m} \times \left( \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m <sup>3</sup> /min	Actual flow rate (Qstd), m <sup>3</sup> /min	Flow indication (I), arbitrary
1	12.2	3.551	1.773	55.0
2	9.7	3.166	1.582	48.0
3	7.5	2.784	1.392	43.0
4	4.7	2.204	1.105	34.0
5	2.7	1.671	0.840	27.0

Correlation Coefficient : 0.9987



Remark  
 1HPa = 0.750062 mmHg

**Calibrated by:** Arthur Chiu  
 ( *Arthur Chiu* )

**Date:** 17/3/2011

**Checked by:** F.C. Tsang  
 ( *F.C. Tsang* )

**Date:** 17/3/2011



TISCH ENVIRONMENTAL, INC.  
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 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 10, 2010 Rootmeter S/N 9833620 Ta (K) - 296  
 Operator Tisch Orifice I.D. - 1785 Pa (mm) - 750.57

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.3960	3.2	2.00
2	NA	NA	1.00	0.9840	6.4	4.00
3	NA	NA	1.00	0.8790	7.9	5.00
4	NA	NA	1.00	0.8390	8.7	5.50
5	NA	NA	1.00	0.6940	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9900	0.7092	1.4102	0.9957	0.7133	0.8881
0.9858	1.0018	1.9943	0.9915	1.0076	1.2560
0.9837	1.1191	2.2296	0.9894	1.1256	1.4042
0.9827	1.1713	2.3385	0.9884	1.1781	1.4728
0.9774	1.4084	2.8203	0.9830	1.4165	1.7762
Qstd slope (m) = 2.01637			Qa slope (m) = 1.26262		
intercept (b) = -0.02316			intercept (b) = -0.01458		
coefficient (r) = 0.99996			coefficient (r) = 0.99996		
y axis = SQRT[H2O(Pa/760)(298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol} [(Pa - \text{Diff. Hg}) / 760] (298 / Ta)$$

$$Qstd = Vstd / \text{Time}$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg}) / Pa]$$

$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

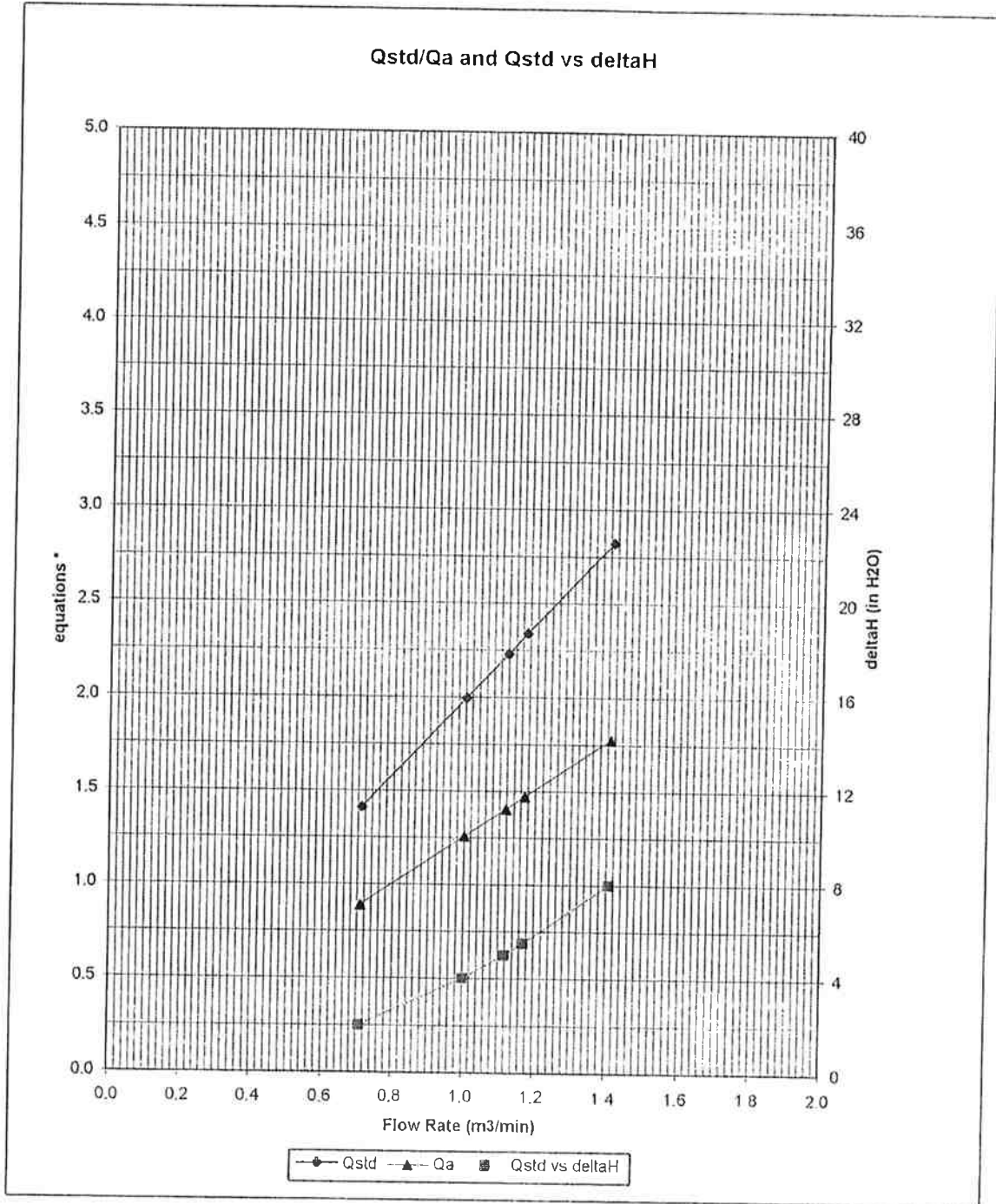
$$Qstd = 1/m \{ [\text{SQRT}(\text{H2O}(\text{Pa}/760)(298/\text{Ta}))] - b \}$$

$$Qa = 1/m \{ [\text{SQRT}(\text{H2O}(\text{Ta}/\text{Pa}))] - b \}$$



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AIR POLLUTION MONITORING EQUIPMENT



\* y-axis equations:

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

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

#1785



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C102904

## Certificate of Calibration

*This is to certify that the equipment*

*Description : Sound Level Meter*

*Manufacturer : Rion*

*Model No. : NL-31*

*Serial No. : 00410224*

*has been calibrated for the specific items and ranges.*

*The results are shown in the Calibration Report No. C102904.*

*The equipment is supplied by*

*Co. Name : Envirotech Services Co.*

*Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road,  
Hong Kong*

*Date of Issue : 31 May 2010*

*Certified by :*

*K C Lee*

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o T.F. Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: call@suncreation.com Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C106297

## *Certificate of Calibration*

*This is to certify that the equipment*

*Description : Integrating Sound Level Meter*

*Manufacturer : Bruel & Kjaer*

*Model No. : 2238*

*Serial No. : 2448529*

*has been calibrated for the specific items and ranges.  
The results are shown in the Calibration Report No. C106297.*

*The equipment is supplied by*

*Co. Name : Hyder Consulting Limited*

*Address : 47/F., Hopewell Centre, 183 Queen's Road East,  
Wanchai, Hong Kong*

*Date of Issue : 16 November 2010*

*Certified by :*

*K/C Lee*

The test equipment used for calibration are traceable to the National Standards as specified in this report.  
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong  
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com



# Calibration Certificate

Certificate No. 07436

Page 1 of 3 Pages

**Customer :** Hyder Consulting Limited

**Address :** 47/F., Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

**Order No. :** Q02884

**Date of receipt :** 28-Dec-10

## Item Tested

**Description :** Sound Level Meter

**Manufacturer :** B&K

**Model :** 2238

**Serial No. :** 2562782

## Test Conditions

**Date of Test :** 29-Dec-10

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure: Z01.

## Test Results

All results were within the IEC 651 Type 1 & IEC 804 Type 1 specification.

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

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

**Calibrated by :** 

P. F. Wong

**Approved by :** 

Dorothy Cheuk

**Date:** 30-Dec-10

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

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# Calibration Certificate

Certificate No. **07436**

Page 2 of 3 Pages

Results :

## 1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Freq. Wgt.	Bandwith	Center Freq.		
20 ~ 100	A	BB/F	--	94.0	94.1
	A	BB/S	--		94.1
	C	BB/F	--		94.0
40 ~ 120	A	BB/F	--	94.0	94.1
	A	BB/F	--	114.0	113.9

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.01$  dB

## 3. Linearity

### 3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
140	114.0	114.3	+0.2	$\pm 0.7$ dB
130	104.0	104.3	+0.2	
120	94.0	94.1 (Ref.)	--	
110	84.0	83.9	-0.2	
100	74.0	73.9	-0.2	
90	64.0	63.9	-0.2	
80	54.0	54.2	+0.1	

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. **07436**

Page 3 of 3 Pages

## 3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	83.9	-0.2	± 0.4 dB
	94.0	94.1 (Ref.)	--	
	95.0	95.1	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

## 4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-40.0	- 39.4 dB, ± 1.5 dB
63 Hz	-26.7	- 26.2 dB, ± 1.5 dB
125 Hz	-16.6	- 16.1 dB, ± 1 dB
250 Hz	-9.1	- 8.6 dB, ± 1 dB
500 Hz	-3.5	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.5	+ 1.2 dB, ± 1 dB
4 kHz	+1.3	+ 1.0 dB, ± 1 dB
8 kHz	-0.7	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.3	- 6.6 dB, + 3 dB ~ - ∞

Uncertainty : ± 0.1 dB

## 5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 <sup>2</sup>	40.0	40.0	
1/10 <sup>3</sup>	40.0	40.5	± 1.0 dB
1/10 <sup>4</sup>	40.0	41.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric pressure : 1 012 hPa.

----- END -----





# Calibration Certificate

Certificate No. 07437

Page 1 of 2 Pages

**Customer :** Hyder Consulting Limited

**Address :** 47/F., Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

**Order No. :** Q02884

**Date of receipt :** 28-Dec-10

## Item Tested

**Description :** Sound Level Calibrator

**Manufacturer :** B&K

**Model :** Type 4231

**Serial No. :** 2699361

## Test Conditions

**Date of Test :** 29-Dec-10

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

## Test Results

All results were within the IEC 942 Class 1 specification.

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

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	03926	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PRC & SCL-HKSAR
S041	Universal Counter	04461	SCL-HKSAR
S206	Sound Level Meter	04462	SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
P. F. Wong

**Approved by :**   
Dorothy Cheuk

**Date:** 30-Dec-10



# Calibration Certificate

Certificate No. 07437

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.02	± 0.3 dB
114	114.10	

Uncertainty : ± 0.1 dB

## 2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1.000 kHz	± 2 %

Uncertainty : ± 3.6 x 10<sup>-6</sup>

## 3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

## 4. Total Harmonic Distortion : < 0.5 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurement.

3. The uncertainty claimed is for a confidence probability of not less than 95%.

4. Atmospheric Pressure : 1012 hPa.

----- END -----

# CERTIFICATE OF ANALYSIS



Work Order: HK1104774  
Date of Issue: 02/03/2011  
Client: HYDER CONSULTING LIMITED  
Client Reference:

## Calibration of Multimeter

Item : Multimeter Model No.: WTW pH/Oxi 340i  
ALS Lab ID: HK1104774 -001 Serial No.: 08101283  
Date of Calibration: 01 March 2011

### Testing Results :

pH

Expected Reading	Recording Reading
4.00	4.10
7.00	7.10
10.0	10.18
Allowing Deviation	± 0.2 unit

**Testing Method:**

APHA (20th edition), 4500-H<sup>+</sup>B

Temperature

Expected Reading	Recording Reading
17.0 °C	16.5 °C
21.0 °C	20.5 °C
34.5 °C	34.3 °C
Allowing Deviation	±2.0°C

**Testing Method:**

In-House Method

Dissolved Oxygen

Expected Reading	Recording Reading
7.92 mg/L	8.08 mg/L
8.62 mg/L	8.71 mg/L
9.26 mg/L	9.36 mg/L
Allowing Deviation	± 0.2 mg/L

**Testing Method:**

APHA (20th edition), 4500-OC & G

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1106728  
Date of Issue: 22/03/2011  
Client: HYDER CONSULTING LIMITED



Description: Turbidimeter  
Brand Name: Eutech Instruments  
Model No.: TN-100  
Serial No.: 215619  
Equipment No.: N/A  
Date of Calibration: 22 March, 2011

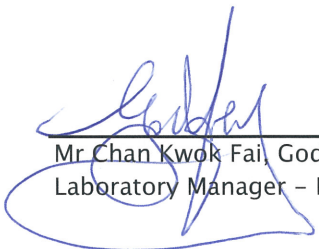
Date of next Calibration: 22 June, 2011

## Parameters:

### Turbidity

Method Ref: ALPHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.19	--
4	3.99	-0.2%
40	37.8	-5.5%
80	74.2	-7.3%
400	419	4.8%
800	744	-7.0%
Tolerance Limit ( $\pm$ %)		10.0

  
Mr Chan Kwok Fai, Godfrey  
Laboratory Manager - Hong Kong

## Appendix G

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# Monitoring Locations

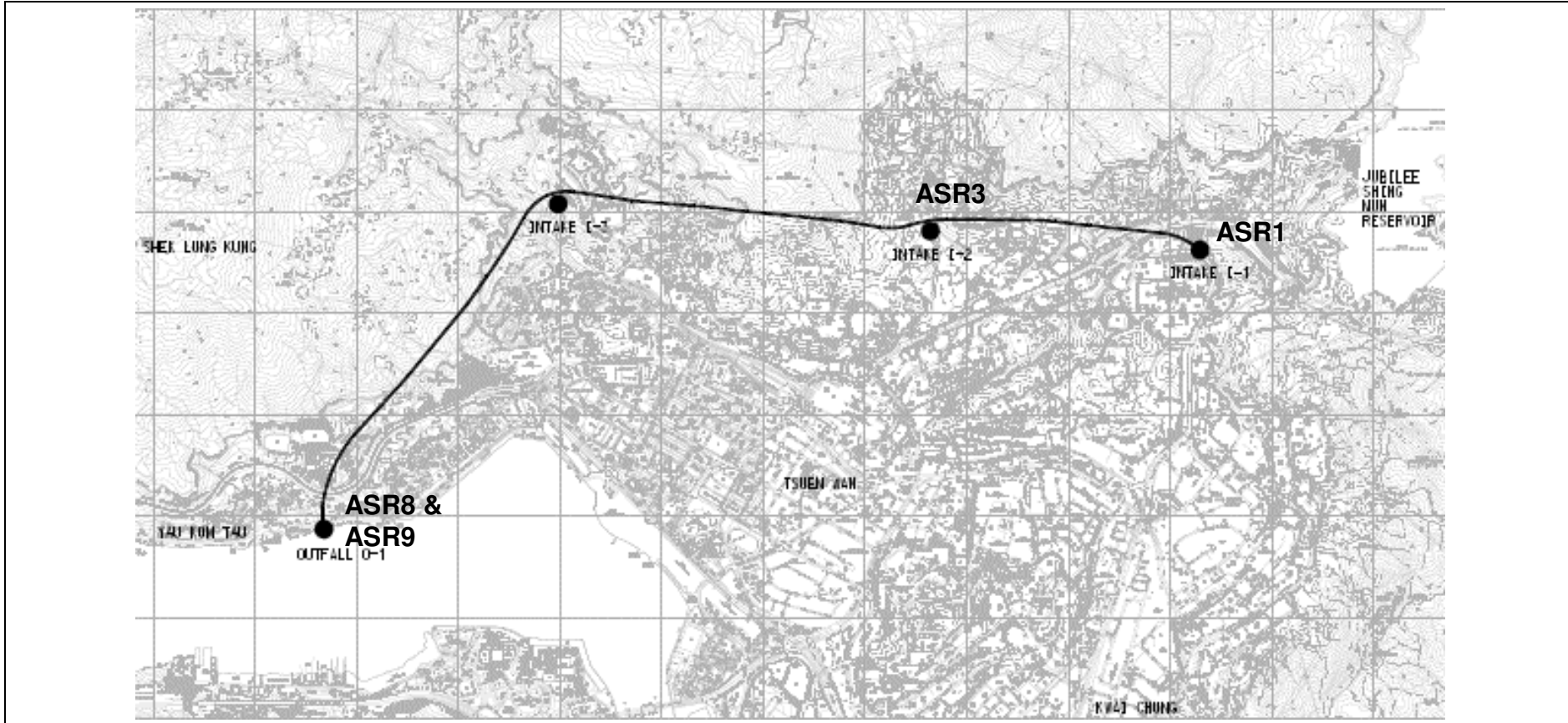


Figure 1 Air Quality Monitoring Stations

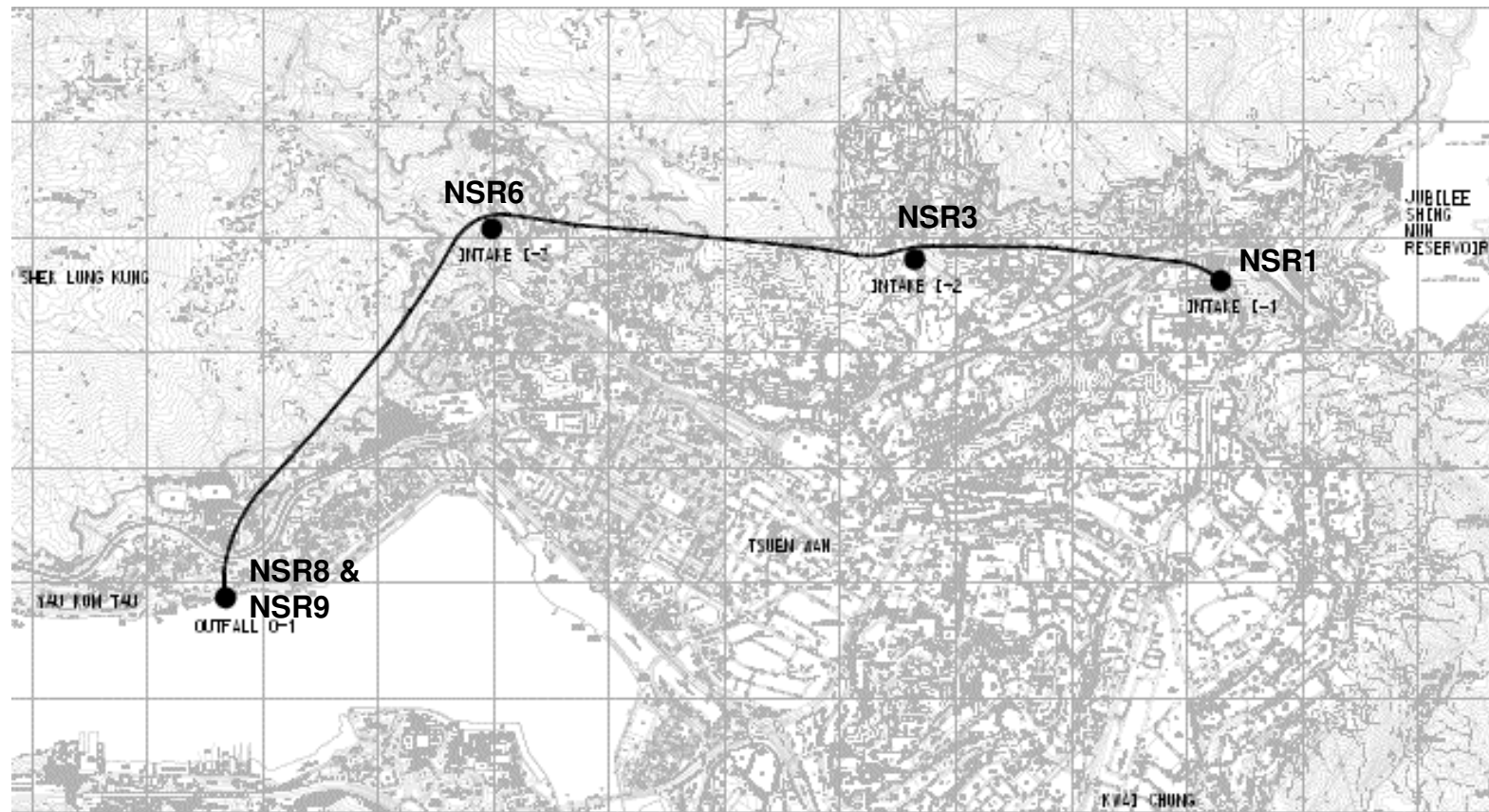


Figure 2 Noise Monitoring Stations

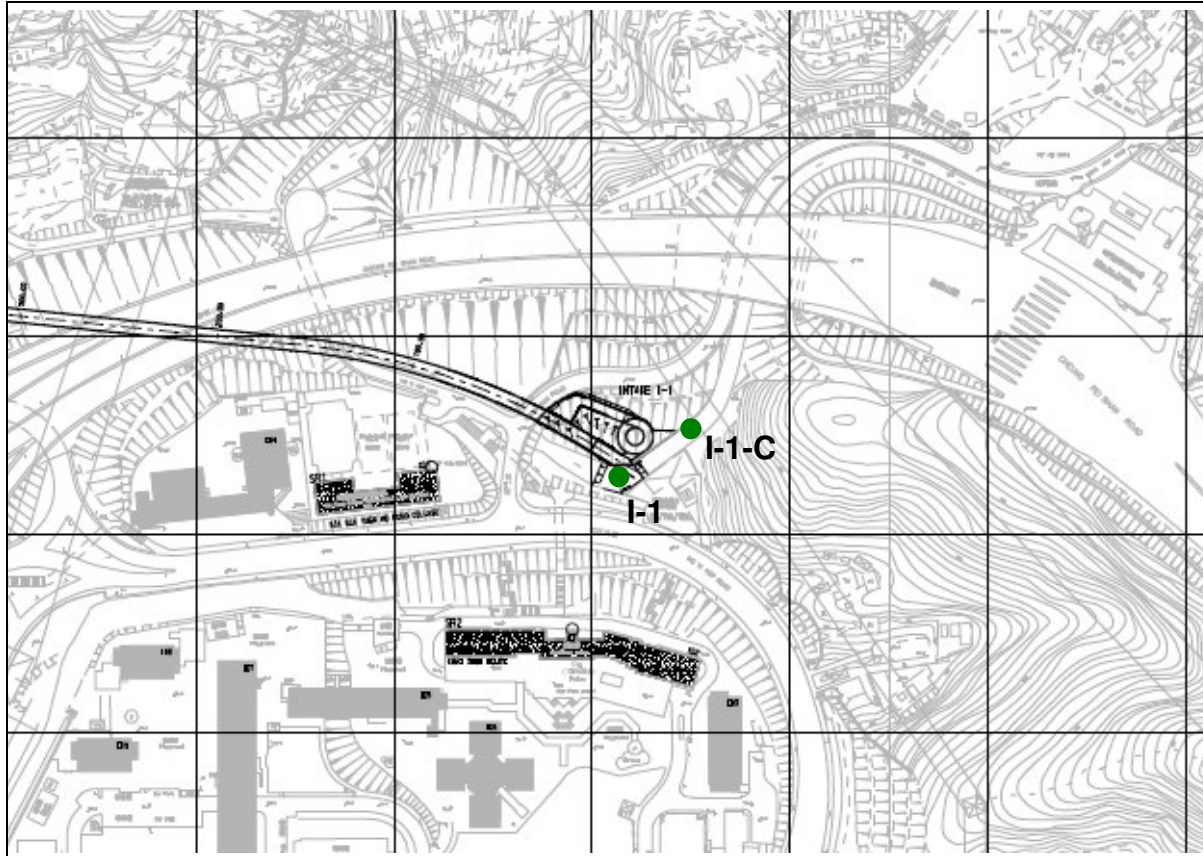


Figure 3 Water Quality Monitoring Stations: I-1 & I-1-C at Intake I-1



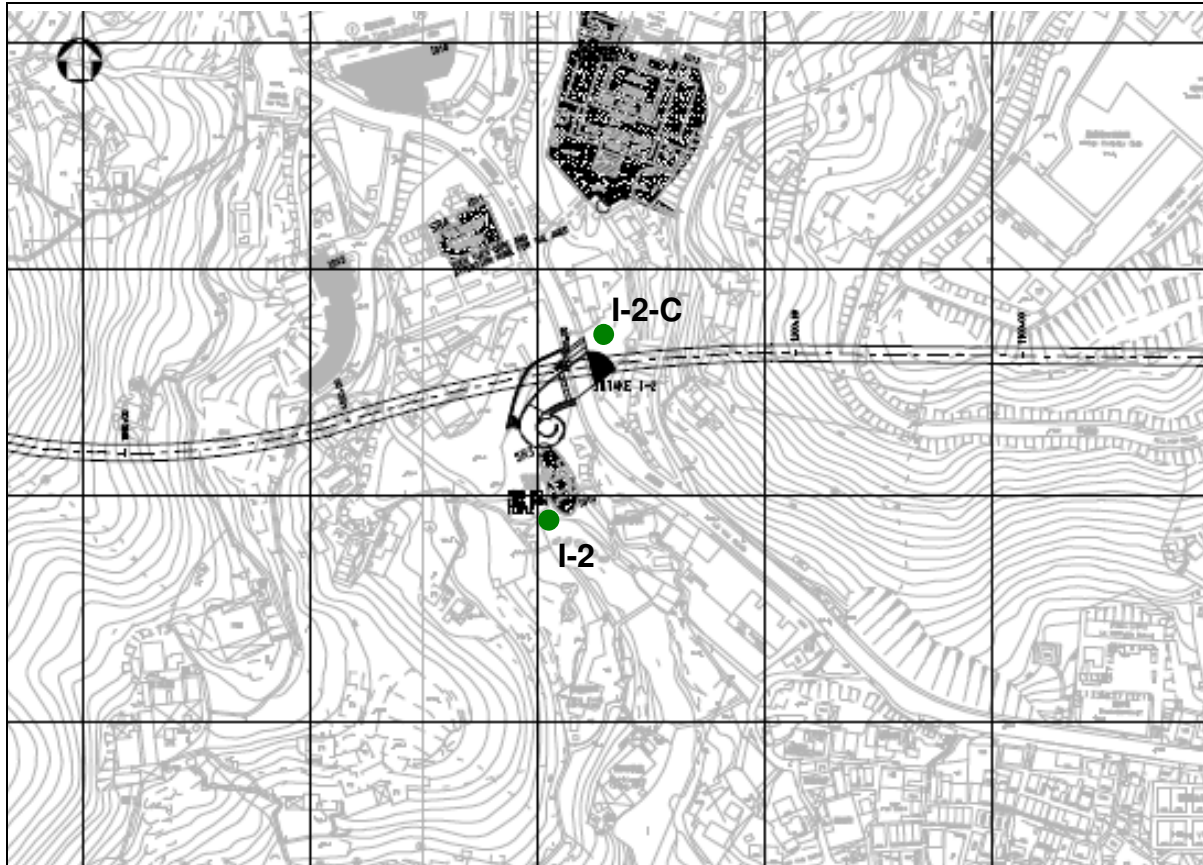


Figure 4 Water Quality Monitoring Stations: I-2 & I-2-C at Intake I-2

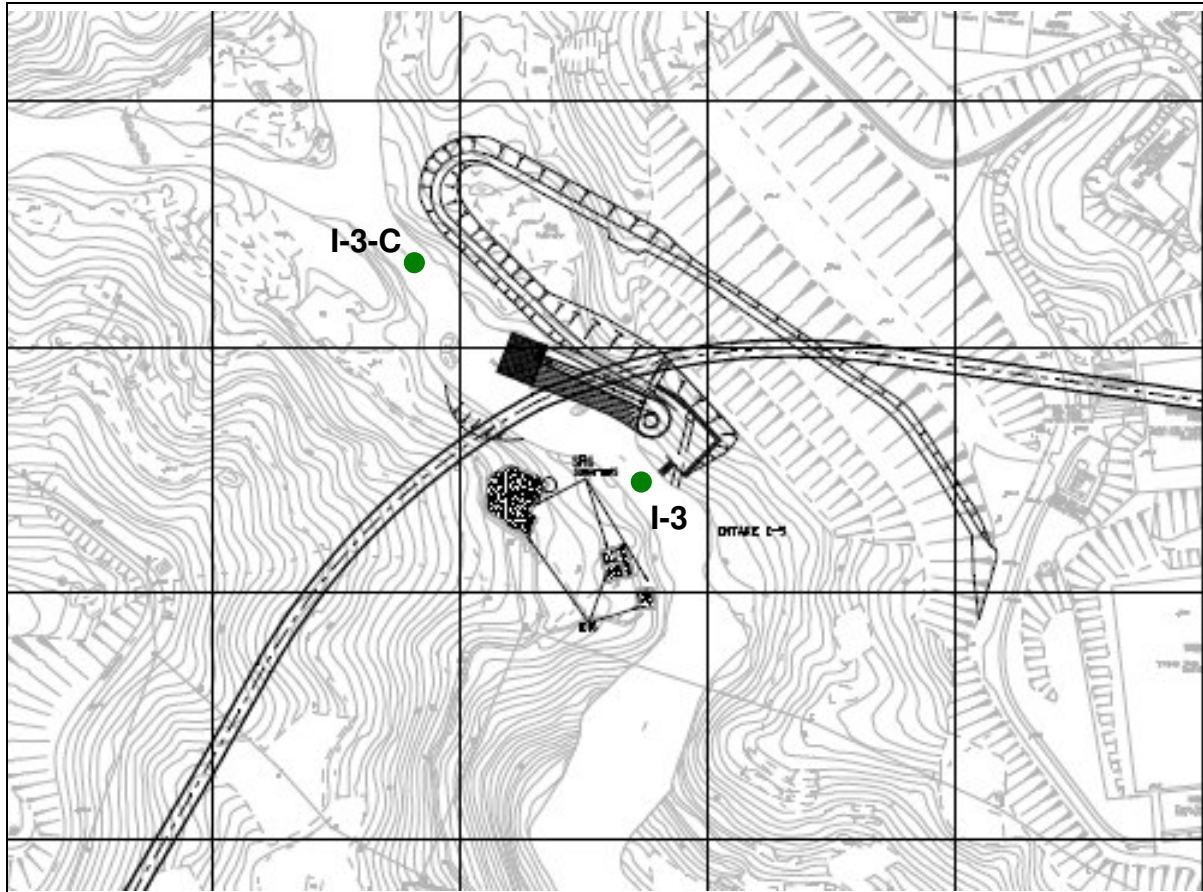
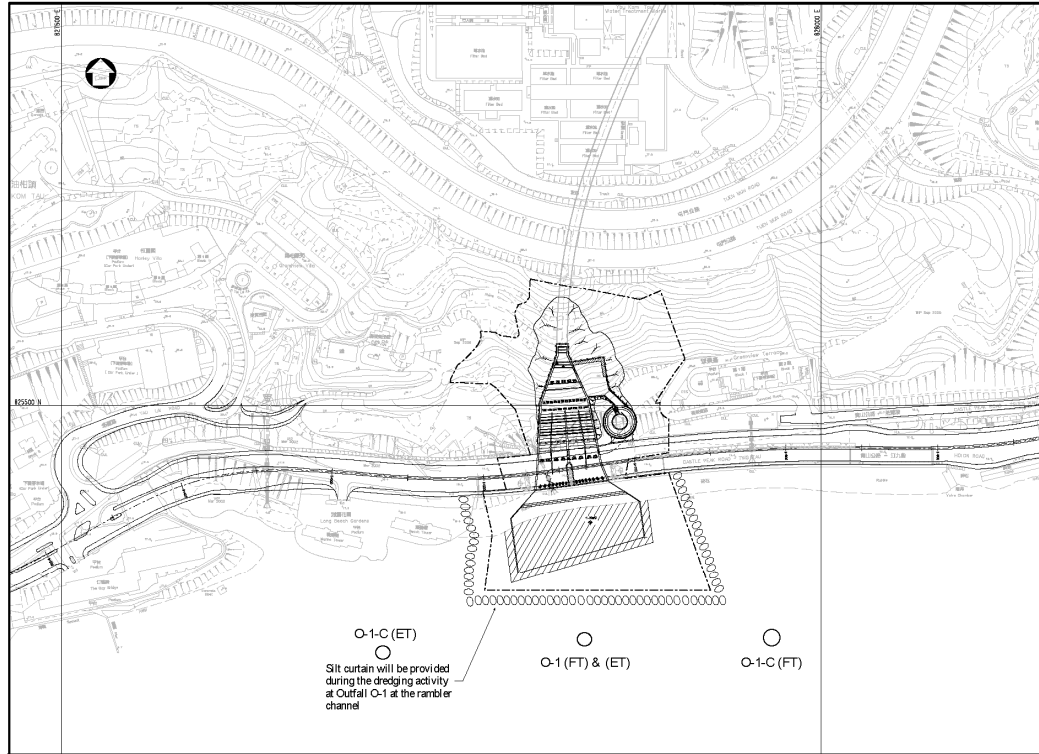
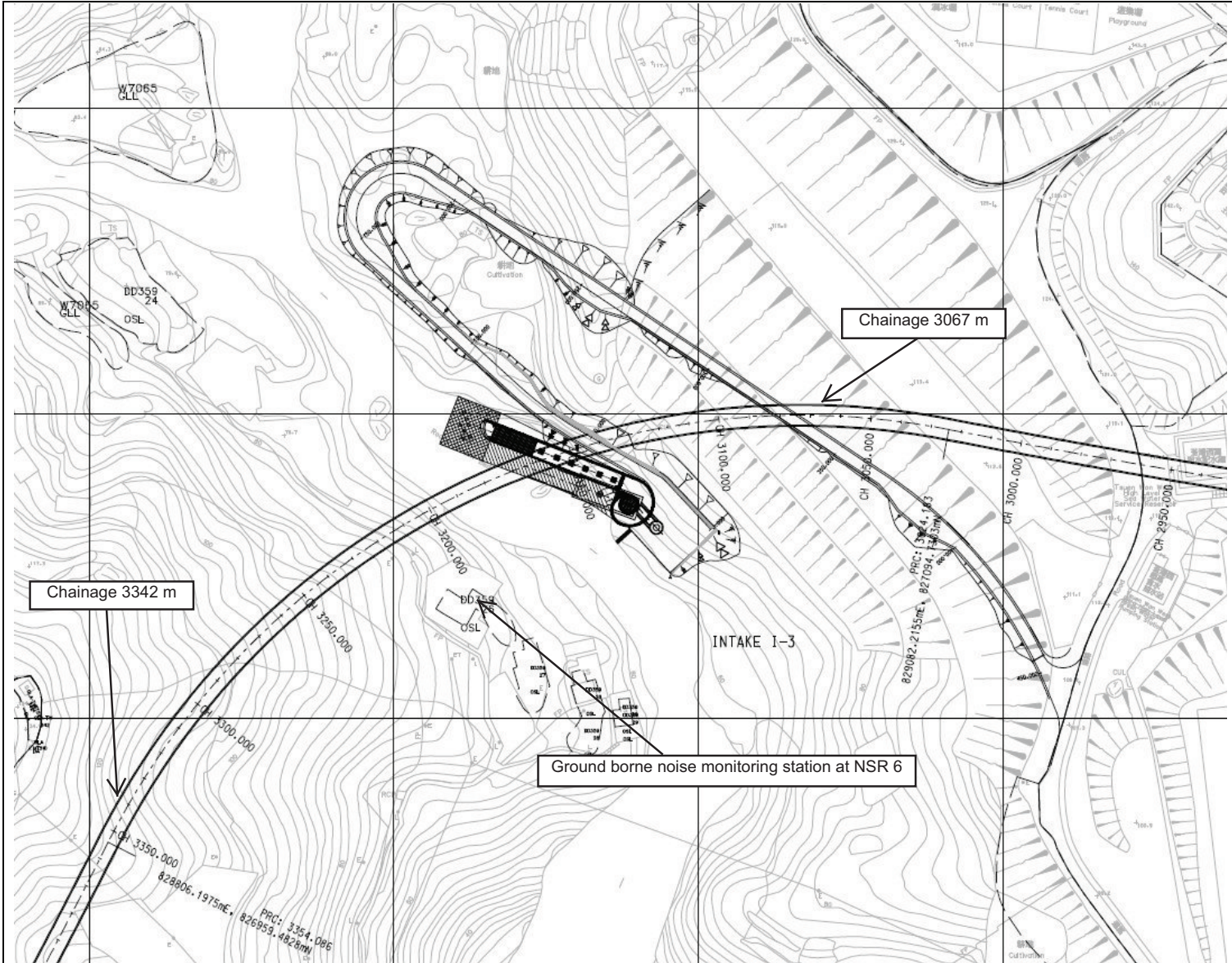


Figure 5 Water Quality Monitoring Stations: I-3 & I-3-C at Intake I-3



**Figure 6 Water Quality Monitoring Stations: O-1 (FT) & (ET), O-1-C(FT) & O-1-C(FT) at Outfall O-1**



**Figure 7 Ground borne noise monitoring station at NSR 6**

## Appendix H

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### EM&A Schedule

**Contract No. DC/2007/12 – Design and Construction of  
Tsuen Wan Drainage Tunnel  
Impact Monitoring Programme – April 11**

Date		Air	Noise	Water	Ground Borne Noise
01-Apr-11	Fri			✓	
02-Apr-11	Sat				
03-Apr-11	Sun				
04-Apr-11	Mon	✓	✓	✓	✓ (NSR 6)
05-Apr-11	Tue				
06-Apr-11	Wed			✓	
07-Apr-11	Thu				
08-Apr-11	Fri	✓		✓	
09-Apr-11	Sat				
10-Apr-11	Sun				
11-Apr-11	Mon			✓	
12-Apr-11	Tue				
13-Apr-11	Wed			✓	
14-Apr-11	Thu	✓	✓		✓ (NSR 6)
15-Apr-11	Fri			✓	
16-Apr-11	Sat				
17-Apr-11	Sun				
18-Apr-11	Mon			✓	
19-Apr-11	Tue				
20-Apr-11	Wed	✓	✓	✓	
21-Apr-11	Thu				
22-Apr-11	Fri				
23-Apr-11	Sat				
24-Apr-11	Sun				
25-Apr-11	Mon				
26-Apr-11	Tue	✓	✓	✓	
27-Apr-11	Wed				
28-Apr-11	Thu			✓	
29-Apr-11	Fri	✓			
30-Apr-11	Sat			✓	

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Ground borne Nose – Ground borne noise measurements is undertaken once every week at (0700-1900 Monday to Saturday) from chainage 3067m to 3042 m at NSR 6 and from 1224m to 1477m at NSR 3

Water –Water quality monitoring is undertaken three times per week

**Contract No. DC/2007/12 – Design and Construction of  
Tsuen Wan Drainage Tunnel  
Impact Monitoring Programme – May 11 (Tentative)**

Date		Air	Noise	Water
01-May-11	Sun			
02-May-11	Mon			
03-May-11	Tue			✓
04-May-11	Wed			
05-May-11	Thu	✓	✓	✓
06-May-11	Fri			
07-May-11	Sat			✓
08-May-11	Sun			
09-May-11	Mon			✓
10-May-11	Tue			
11-May-11	Wed	✓	✓	✓
12-May-11	Thu			
13-May-11	Fri			✓
14-May-11	Sat			
15-May-11	Sun			
16-May-11	Mon			✓
17-May-11	Tue	✓	✓	
18-May-11	Wed			✓
19-May-11	Thu			
20-May-11	Fri			✓
21-May-11	Sat			
22-May-11	Sun			
23-May-11	Mon	✓	✓	✓
24-May-11	Tue			
25-May-11	Wed			✓
26-May-11	Thu			
27-May-11	Fri	✓		✓
28-May-11	Sat			
29-May-11	Sun			
30-May-11	Mon			✓
31-May-11	Tue			

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Water –Water quality monitoring is undertaken three times per week

**Contract No. DC/2007/12 – Design and Construction of  
Tsuen Wan Drainage Tunnel  
Impact Monitoring Programme – June 11 (Tentative)**

Date		Air	Noise	Water
01-Jun-11	Wed			✓
02-Jun-11	Thu	✓	✓	
03-Jun-11	Fri			✓
04-Jun-11	Sat			
05-Jun-11	Sun			
06-Jun-11	Mon			
07-Jun-11	Tue			✓
08-Jun-11	Wed	✓	✓	
09-Jun-11	Thu			✓
10-Jun-11	Fri			
11-Jun-11	Sat			✓
12-Jun-11	Sun			
13-Jun-11	Mon			✓
14-Jun-11	Tue	✓	✓	
15-Jun-11	Wed			✓
16-Jun-11	Thu			
17-Jun-11	Fri			✓
18-Jun-11	Sat			
19-Jun-11	Sun			
20-Jun-11	Mon	✓	✓	✓
21-Jun-11	Tue			
22-Jun-11	Wed			✓
23-Jun-11	Thu			
24-Jun-11	Fri	✓		✓
25-Jun-11	Sat			
26-Jun-11	Sun			
27-Jun-11	Mon			✓
28-Jun-11	Tue			
29-Jun-11	Wed			✓
30-Jun-11	Thu	✓	✓	

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Water –Water quality monitoring is undertaken three times per week



**Contract No. DC/2007/12 – Design and Construction of  
Tsuen Wan Drainage Tunnel  
Impact Monitoring Programme – July 11 (Tentative)**

Date		Air	Noise	Water
01-Jul-11	Fri			
02-Jul-11	Sat			✓
03-Jul-11	Sun			
04-Jul-11	Mon			✓
05-Jul-11	Tue			
06-Jul-11	Wed	✓	✓	✓
07-Jul-11	Thu			
08-Jul-11	Fri			✓
09-Jul-11	Sat			
10-Jul-11	Sun			
11-Jul-11	Mon			✓
12-Jul-11	Tue	✓	✓	
13-Jul-11	Wed			✓
14-Jul-11	Thu			
15-Jul-11	Fri			✓
16-Jul-11	Sat			
17-Jul-11	Sun			
18-Jul-11	Mon	✓	✓	✓
19-Jul-11	Tue			
20-Jul-11	Wed			✓
21-Jul-11	Thu			
22-Jul-11	Fri	✓		✓
23-Jul-11	Sat			
24-Jul-11	Sun			
25-Jul-11	Mon			✓
26-Jul-11	Tue			
27-Jul-11	Wed			✓
28-Jul-11	Thu	✓	✓	
29-Jul-11	Fri			✓
30-Jul-11	Sat			
31-Jul-11	Sun			

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Water –Water quality monitoring is undertaken three times per week

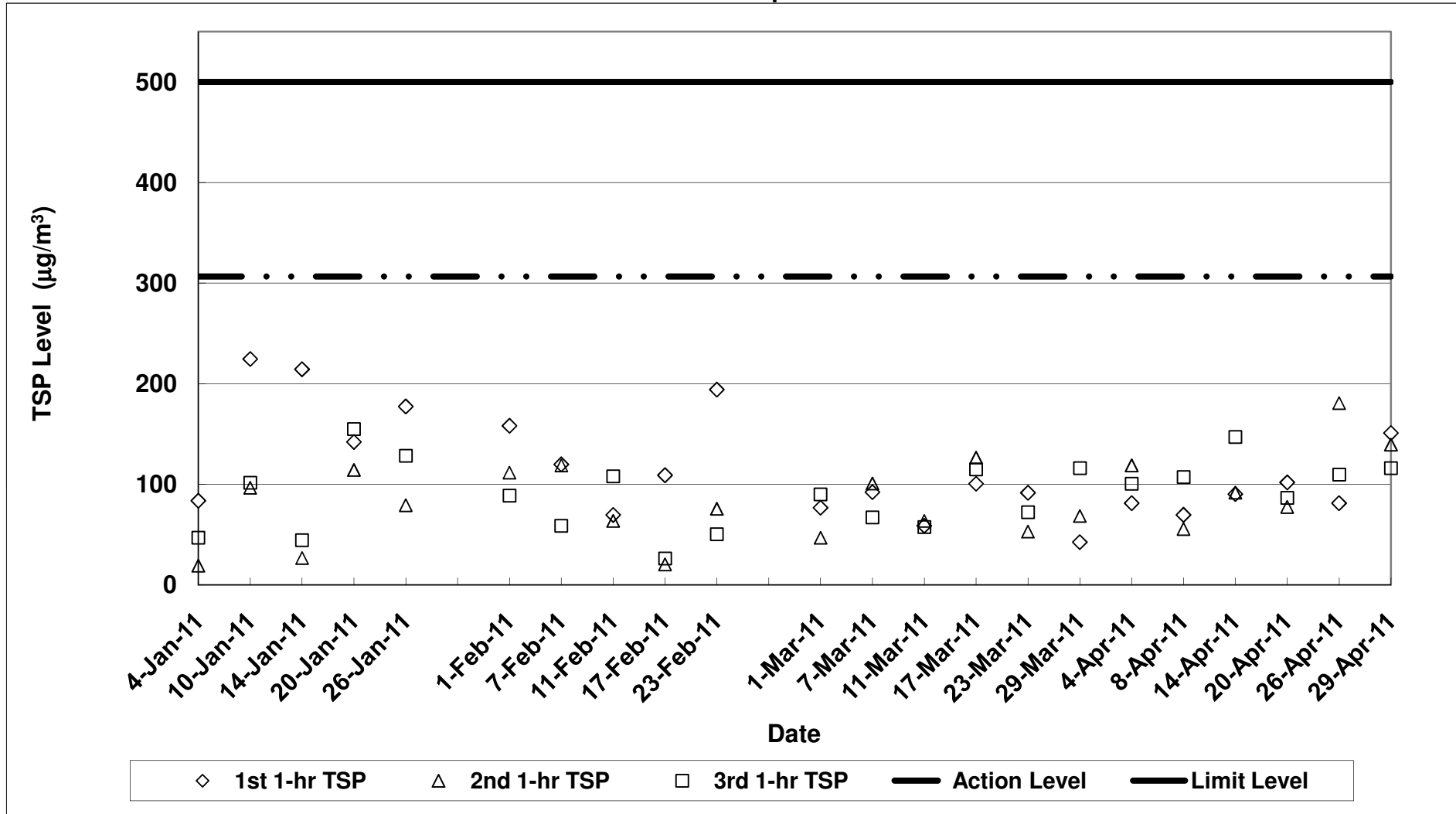
## Appendix I

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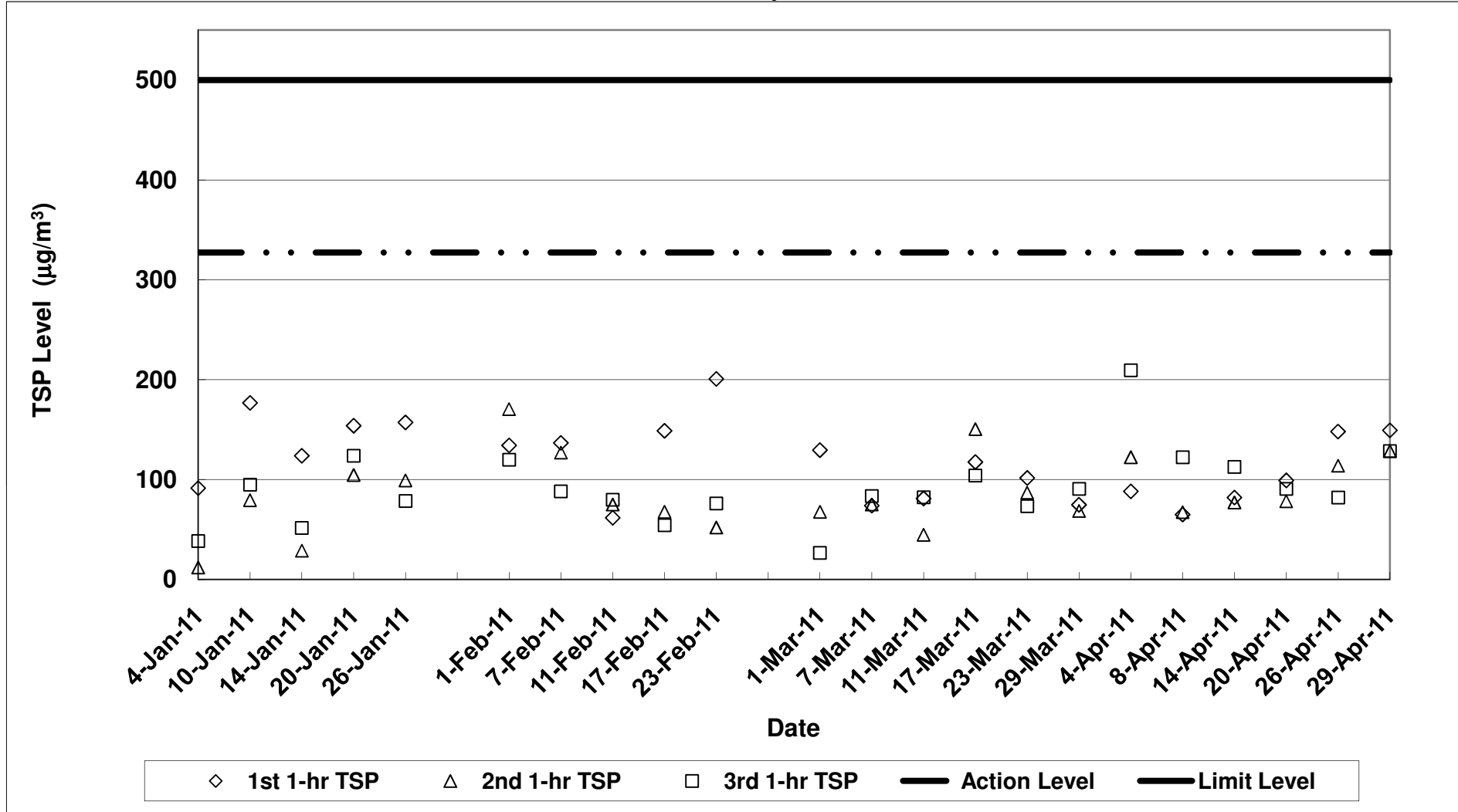
# Monitoring Results



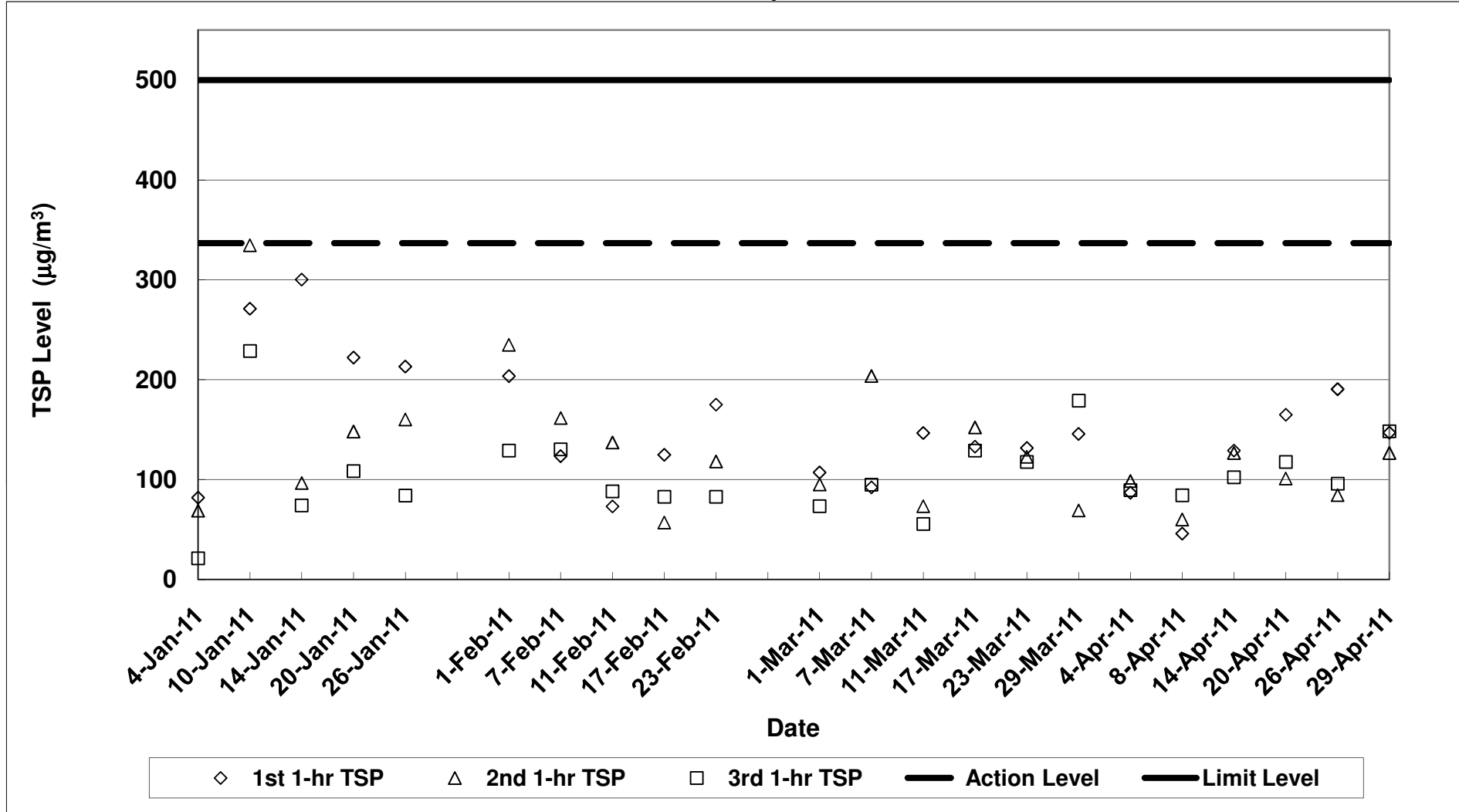
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Air Quality Monitoring (1-hr TSP) Results at Sik Sik Yuen Ho Fung College - Intake (ASR1)  
 Jan-11 to Apr-11**



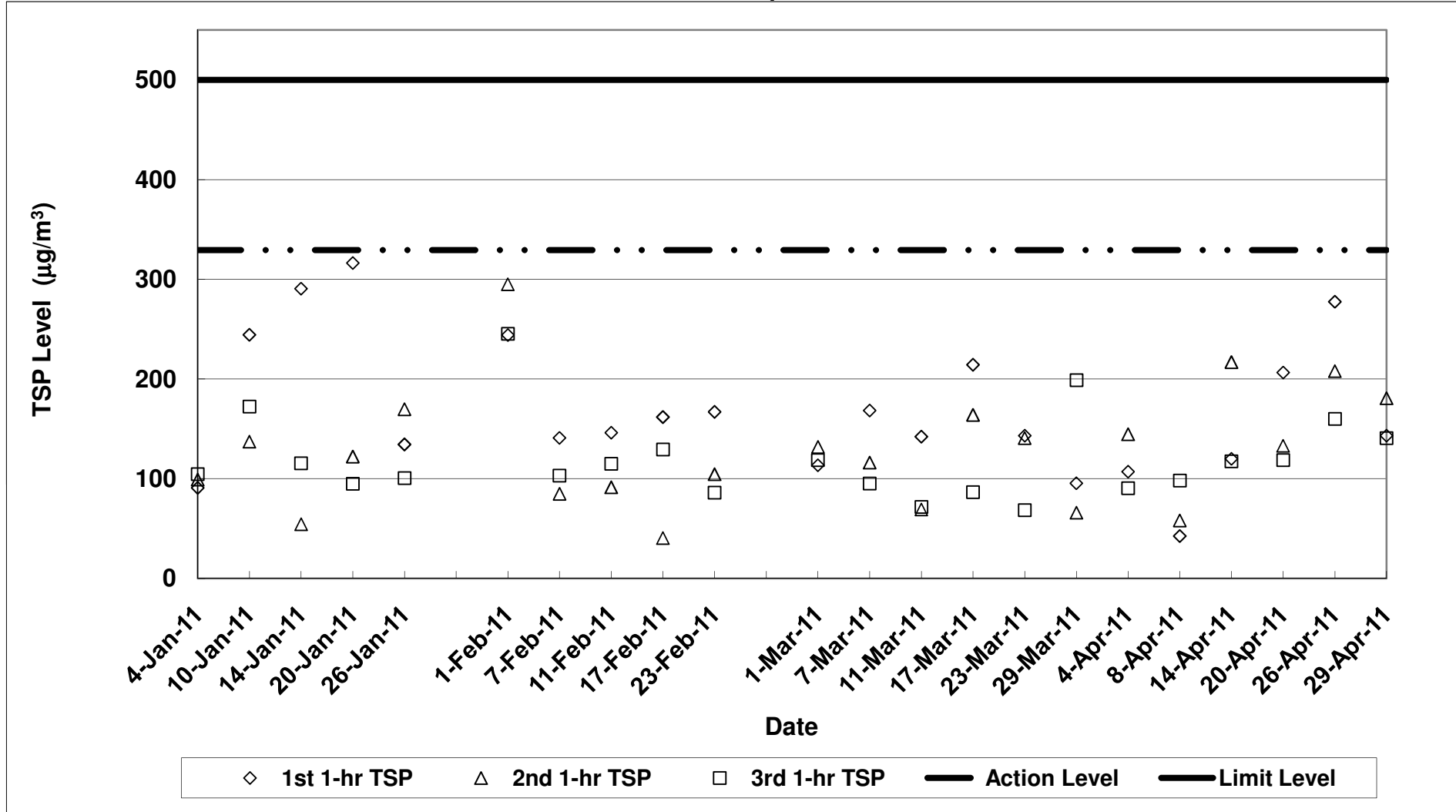
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Air Quality Monitoring (1-hr TSP) Results at Hong Hoi Chee Hong Temple - Intake (ASR3)  
Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Air Quality Monitoring (1-hr TSP) Results at Long Beach Gardens - Outfall (ASR8)  
 Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Air Quality Monitoring (1-hr TSP) Results at Greenview Terrace - Outfall (ASR9)  
 Jan-11 to Apr-11**



Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel

Noise Impact Monitoring Results

Monitoring Locations	Date	Weather Conditions	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Start Time	End Time	BL <sup>1</sup> dB(A)	LL <sup>2</sup> dB(A)	L <sub>eq</sub> (30min) dB(A)	L <sub>10</sub> (30min) dB(A)	L <sub>90</sub> (30min) dB(A)	CNL <sup>3</sup> dB(A)	Observation / Site Condition	Remark
Sik Sik Yuen Ho Fung College NSR 1	04-Apr-11	Cloudy	19	0.3	E	17:07	17:37	66.1	70	64.2	65.8	61.6	-	Concrete works	Traffic noise
	14-Apr-11	Sunny	23	0.4	E	15:45	16:15		70	62.6	65.4	58.4	-	Crane operation and steel bending	Traffic noise and aircraft noise
	20-Apr-11	Fine	22	0.3	E	16:25	16:55		70	64.2	66.4	60.2	-	Crane operation and concrete works	Traffic noise and aircraft noise
	26-Apr-11	Sunny	27	0.3	E	15:50	16:20		70	64.4	66.9	60.6	-	Crane operation	Traffic noise and aircraft noise
									70					-	
Hong Hoi Chee Hong Temple NSR 3	04-Apr-11	Cloudy	19	0.3	E	16:29	16:59	57.9	75	67.3	69.8	59.4	-	Drilling and cutting	Traffic noise
	14-Apr-11	Sunny	23	0.2	E	15:07	15:37		75	68.4	70.3	62.1	-	Drilling	Traffic noise and aircraft noise
	20-Apr-11	Fine	22	0.2	E	15:40	16:10		75	60.9	62.2	58.2	-	Drilling	Traffic noise and aircraft noise
	26-Apr-11	Sunny	27	0.3	E	15:00	15:30		75	62.6	64.7	59.2	-	Drilling	Traffic noise and aircraft noise
									75					-	
Squatters NSR 6	04-Apr-11	Cloudy	19	0.3	E	10:50	11:20	61.2	75	63.7	64.9	60.1	-	Crane operation and drilling	Birds
	14-Apr-11	Sunny	23	0.3	E	10:20	10:50		75	66.2	68.9	61.1	-	Crane operation and drilling	Aircraft noise and insect noise
	20-Apr-11	Sunny	22	0.2	E	11:16	11:46		75	58.2	60.0	55.5	-	Crane operation and drilling	Aircraft noise and birds
	26-Apr-11	Sunny	27	0.2	E	14:00	14:30		75	63.3	65.8	59.6	-	Crane operation and drilling	Aircraft noise
									75					-	
Long Beach Gardens NSR 8	04-Apr-11	Cloudy	19	0.5	E	09:54	10:24	60.9	75	65.5	67.2	62.7	-	Crane operation and excavator	Traffic noise
	14-Apr-11	Sunny	23	0.3	E	14:20	14:50		75	63.7	66.0	60.8	-	Crane operation and excavator	Traffic noise and aircraft noise
	20-Apr-11	Sunny	22	0.5	E	09:50	10:20		75	68.8	71.6	63.1	-	Crane operation and excavator	Traffic noise and aircraft noise
	26-Apr-11	Sunny	27	0.5	E	10:05	10:35		75	65.1	67.2	61.9	-	Crane operation and breaker	Traffic noise and aircraft noise
									75					-	
Greenview Terrace NSR 9	04-Apr-11	Cloudy	19	0.8	E	09:15	09:45	59.7	75	74.1	76.6	69.9	-	Crane operation and breaker	Traffic noise
	14-Apr-11	Sunny	23	0.5	E	13:40	14:10		75	68.3	70.0	66.2	-	Crane operation and excavator	Traffic noise and aircraft noise
	20-Apr-11	Sunny	22	0.5	E	10:28	10:58		75	68.8	70.6	65.4	-	Crane operation and excavator	Traffic noise and aircraft noise
	26-Apr-11	Sunny	27	0.5	E	10:45	11:15		75	73.4	76.6	67.9	-	Crane operation and breaker	Traffic noise and aircraft noise
									75					-	

1: Baseline Noise Level

2: Limit Level

3: Corrected Noise Level

Note:

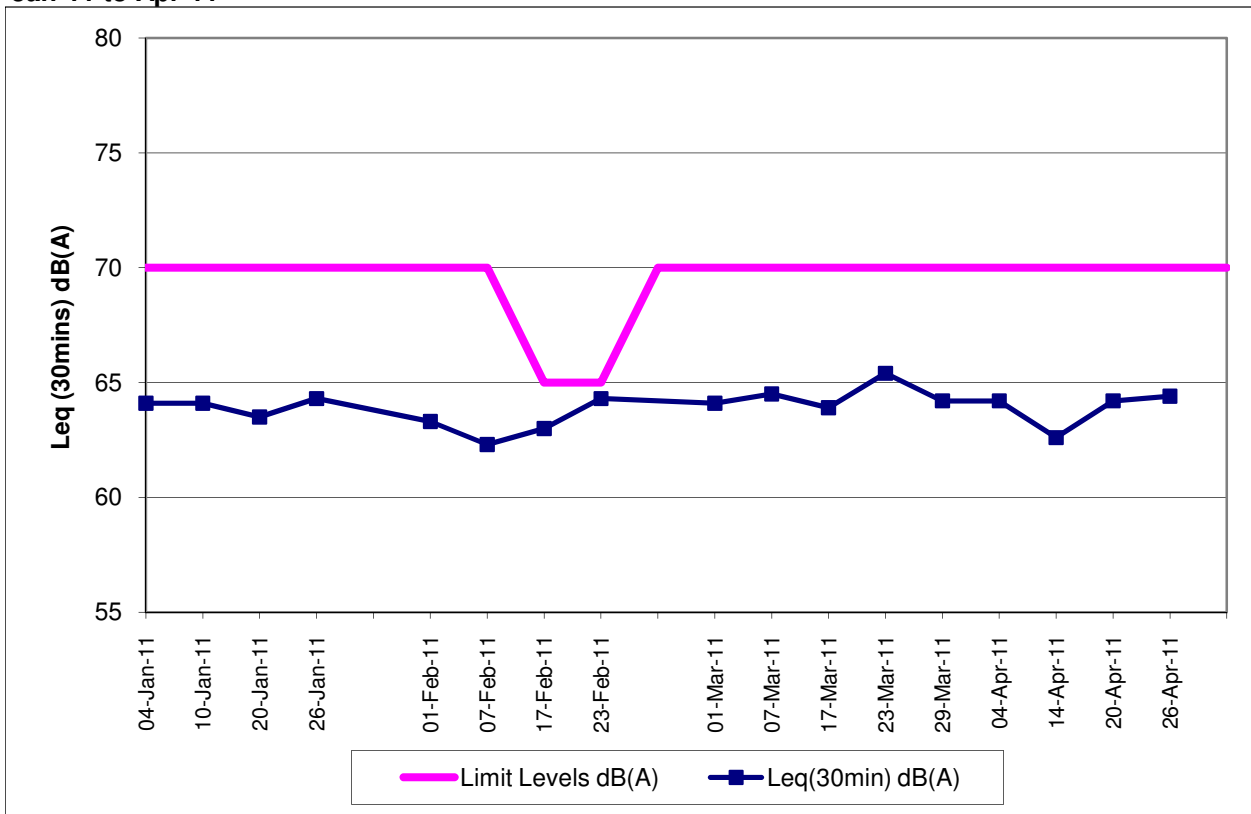
The limit level of NSR1 is 65dB(A) during school examination period.

**Red Bold indicates an exceedance of Limit Level**

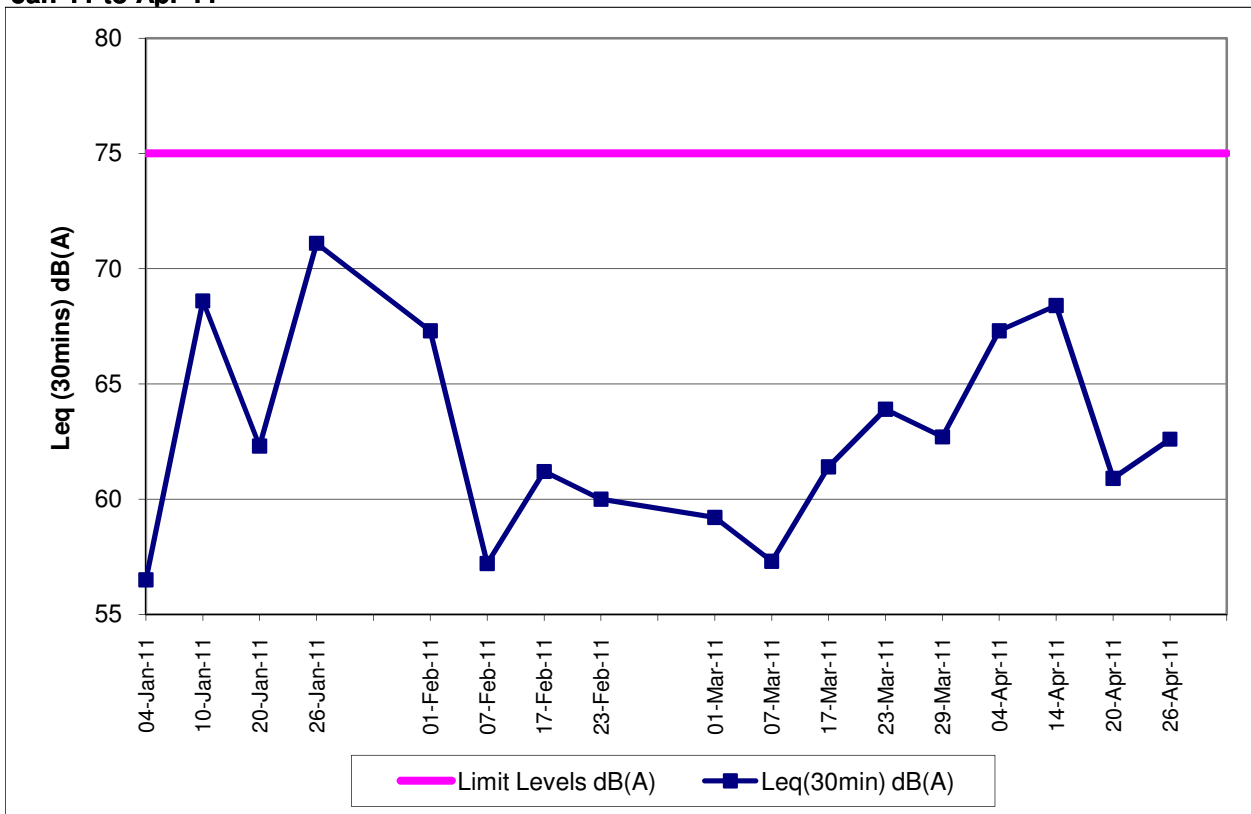
\* means additional noise monitoring



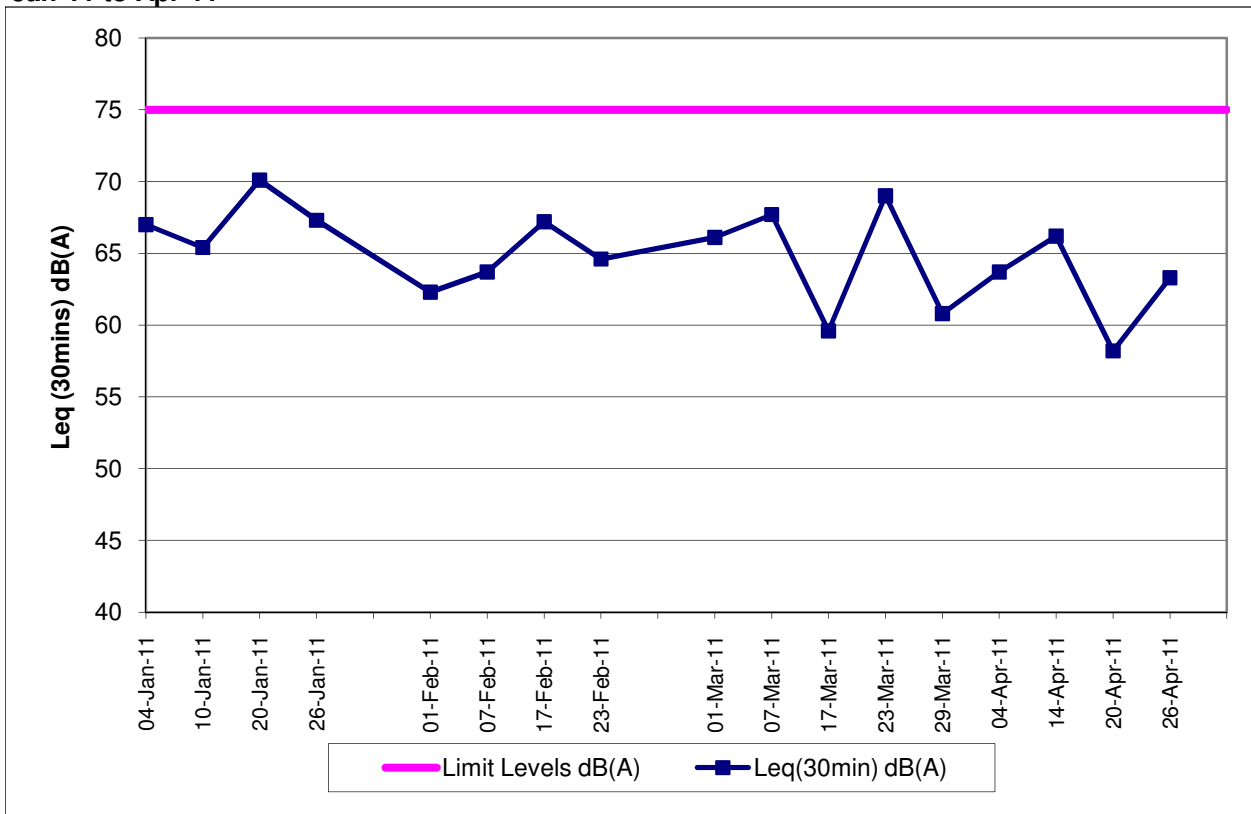
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Noise Monitoring Results at Sik Sik Yuen Ho Fung College (NSR 1)  
Jan-11 to Apr-11**



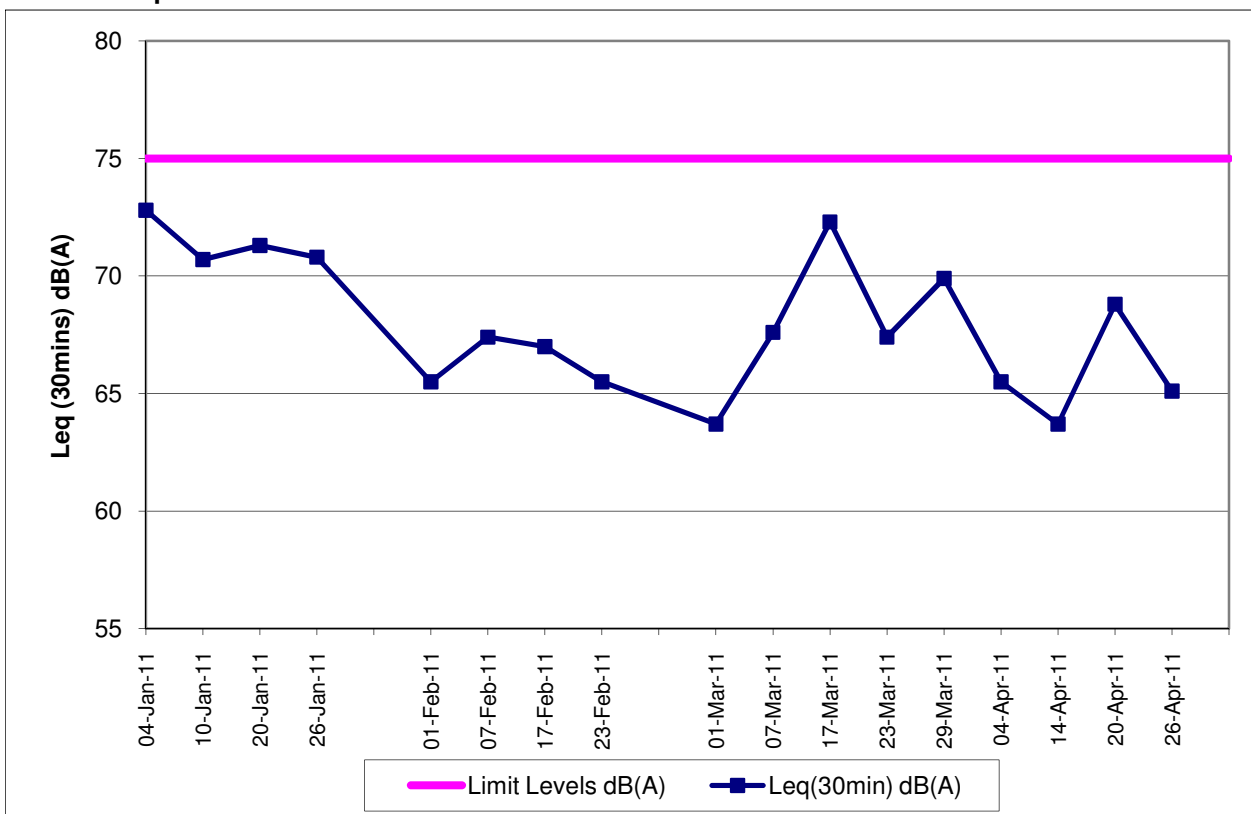
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Noise Monitoring Results at Hong Hoi Chee Hong Temple (NSR 3)  
Jan-11 to Apr-11**



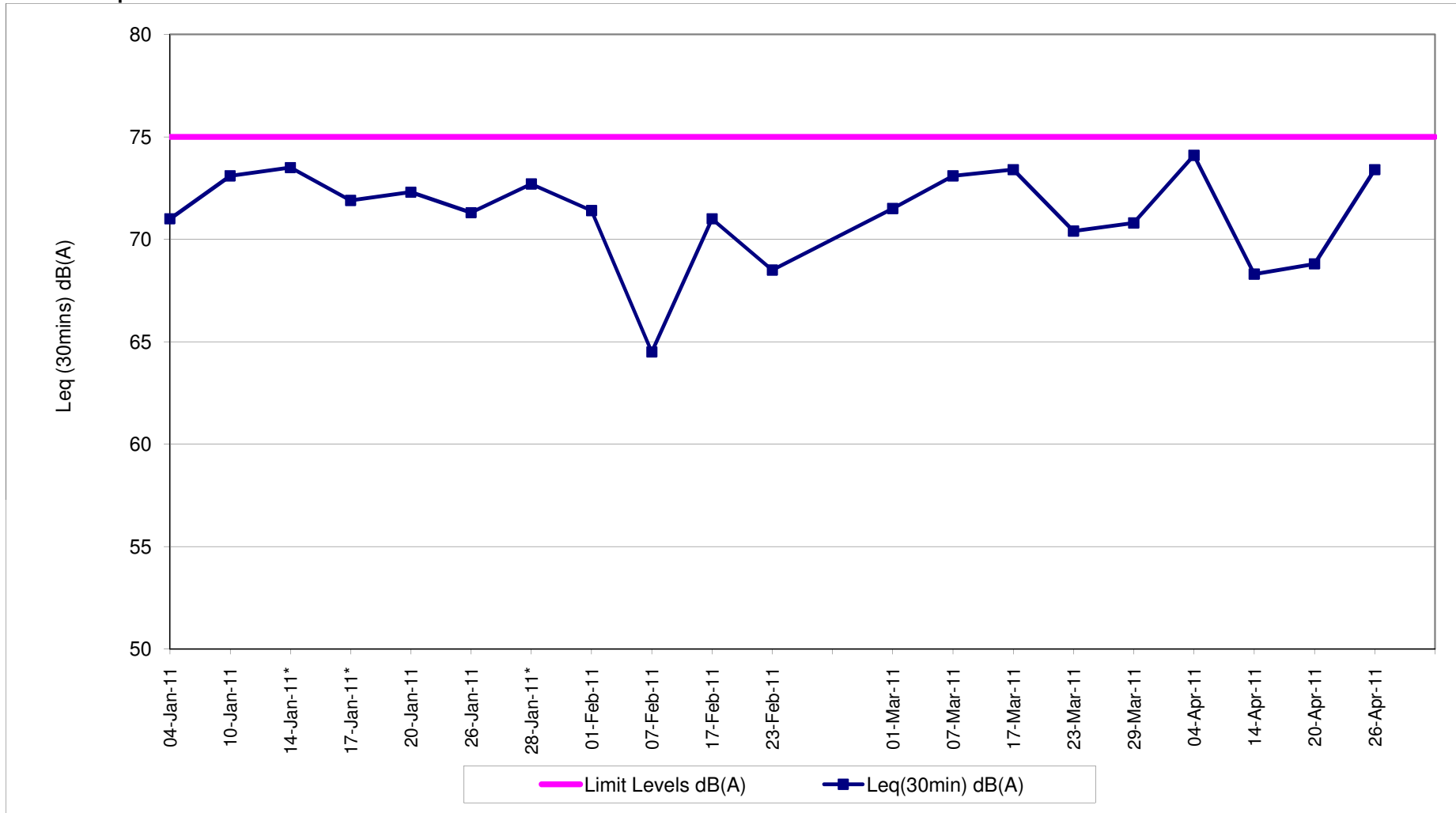
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Noise Monitoring Results at Squatters (NSR 6)  
 Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Noise Monitoring Results at Long Beach Gardens (NSR 8)  
 Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Noise Monitoring Results at Greenview Terrace (NSR 9)  
Jan-11 to Apr-11**



\* Additional Noise Monitoring

Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel

Groundborne Noise Impact Monitoring Results

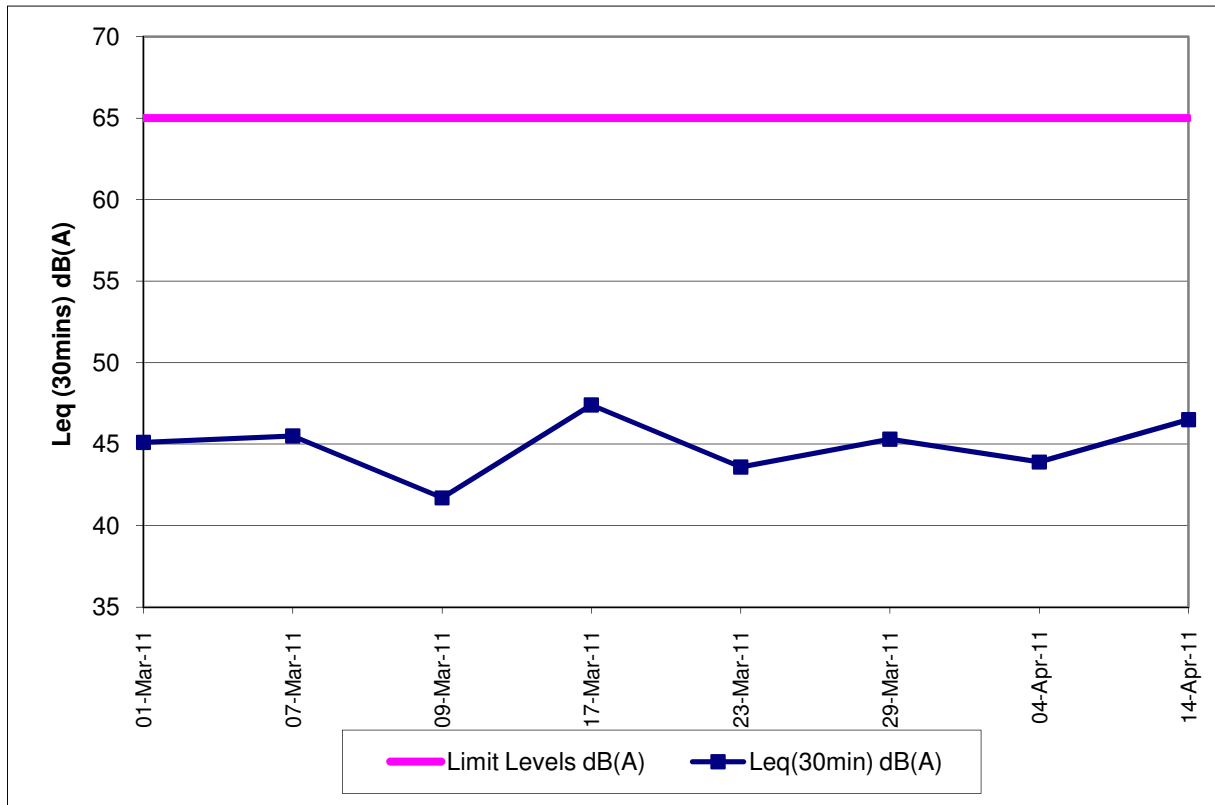
Monitoring Locations	Date	TBM Location	Weather	Temperature	Start Time	End Time	Limit Level	L <sub>eq</sub> (30min)	L <sub>10</sub> (30min)	L <sub>90</sub> (30min)	Observation / Site Condition	Remark
		Chainage (m)	Conditions	(°C)			dB(A)	dB(A)	dB(A)	dB(A)		
Squatters	04-Apr-11	3121	Cloudy	19	11:05	11:35	65	43.9	45.2	39.4	Drilling	Nil
NSR 6	14-Apr-11	2991	Sunny	23	10:53	11:23	65	46.5	49.1	40.7	Drilling	Nil

Note:

**Red Bold indicates an exceedance of Limit Level**

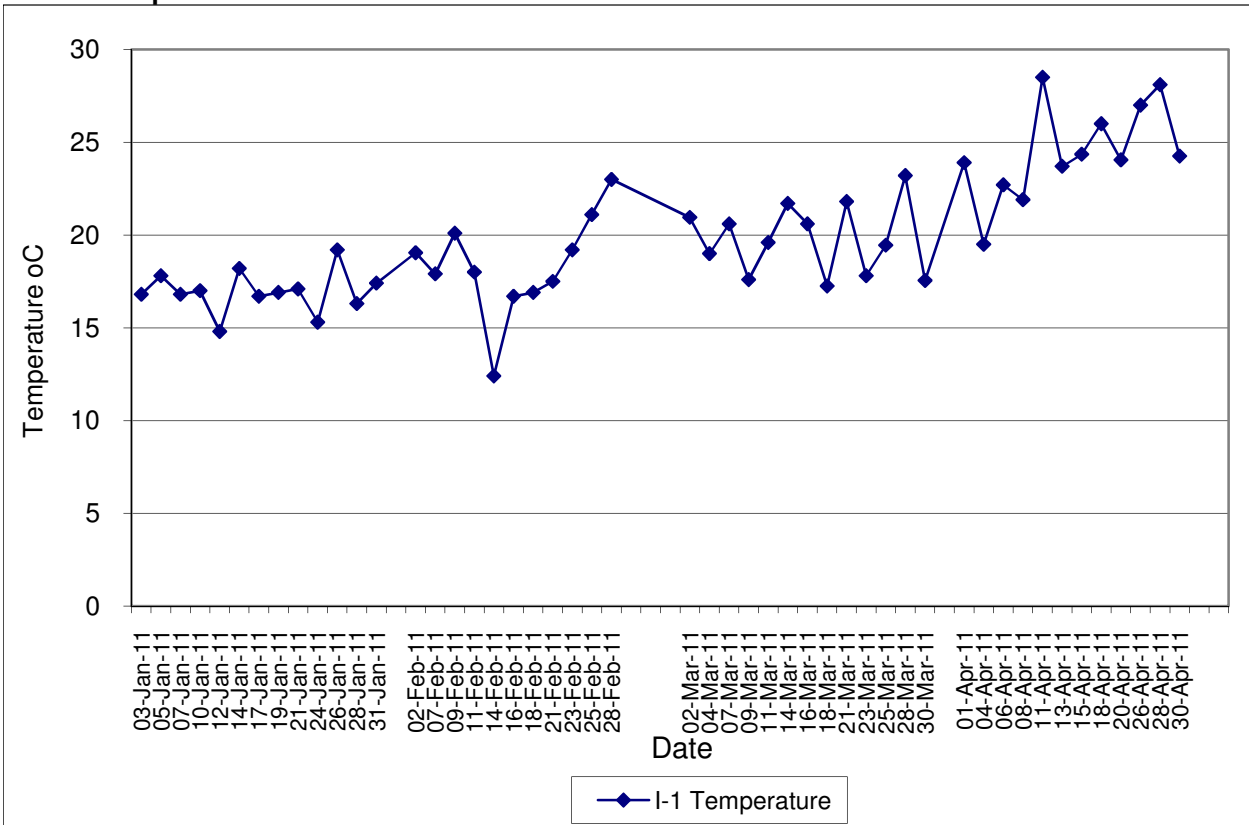
\* means additional noise monitoring

**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Groundborne Noise Monitoring Results at NSR 6  
Mar 11 to Apr 11**

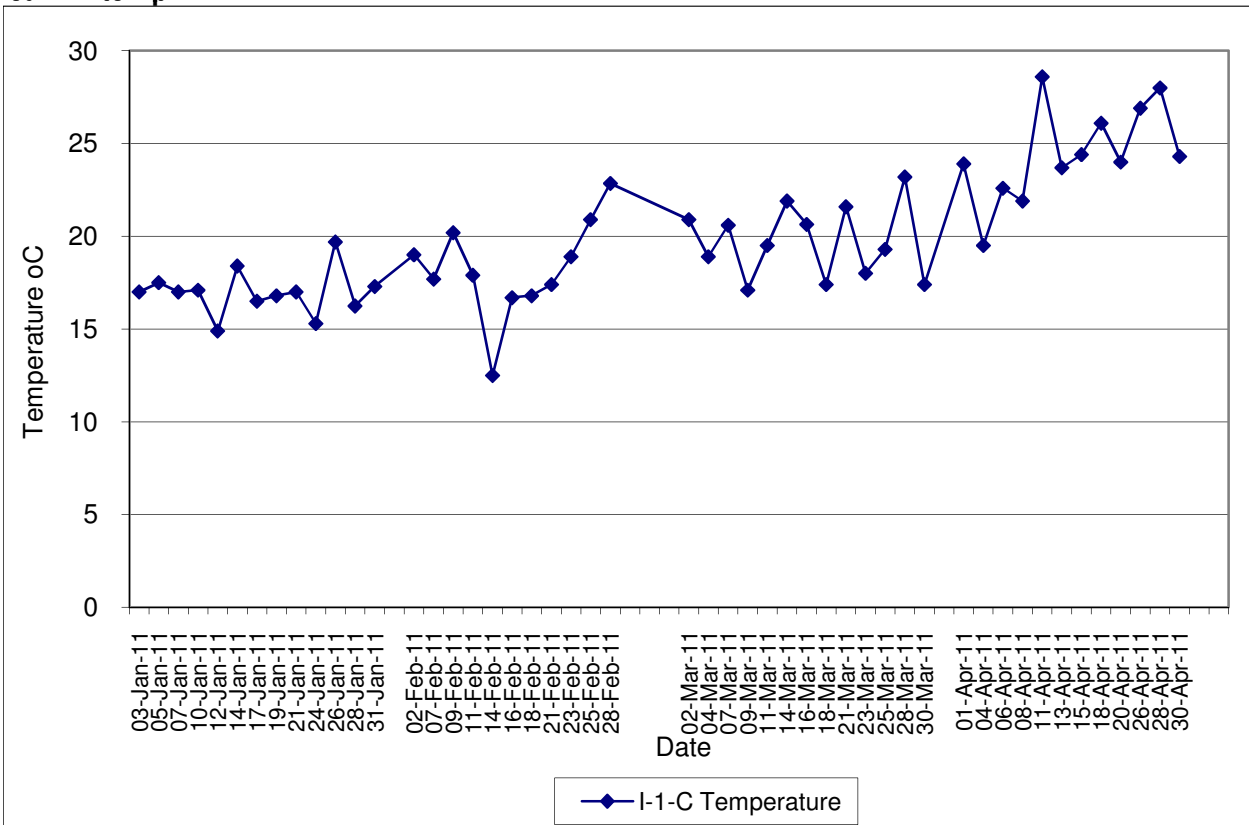




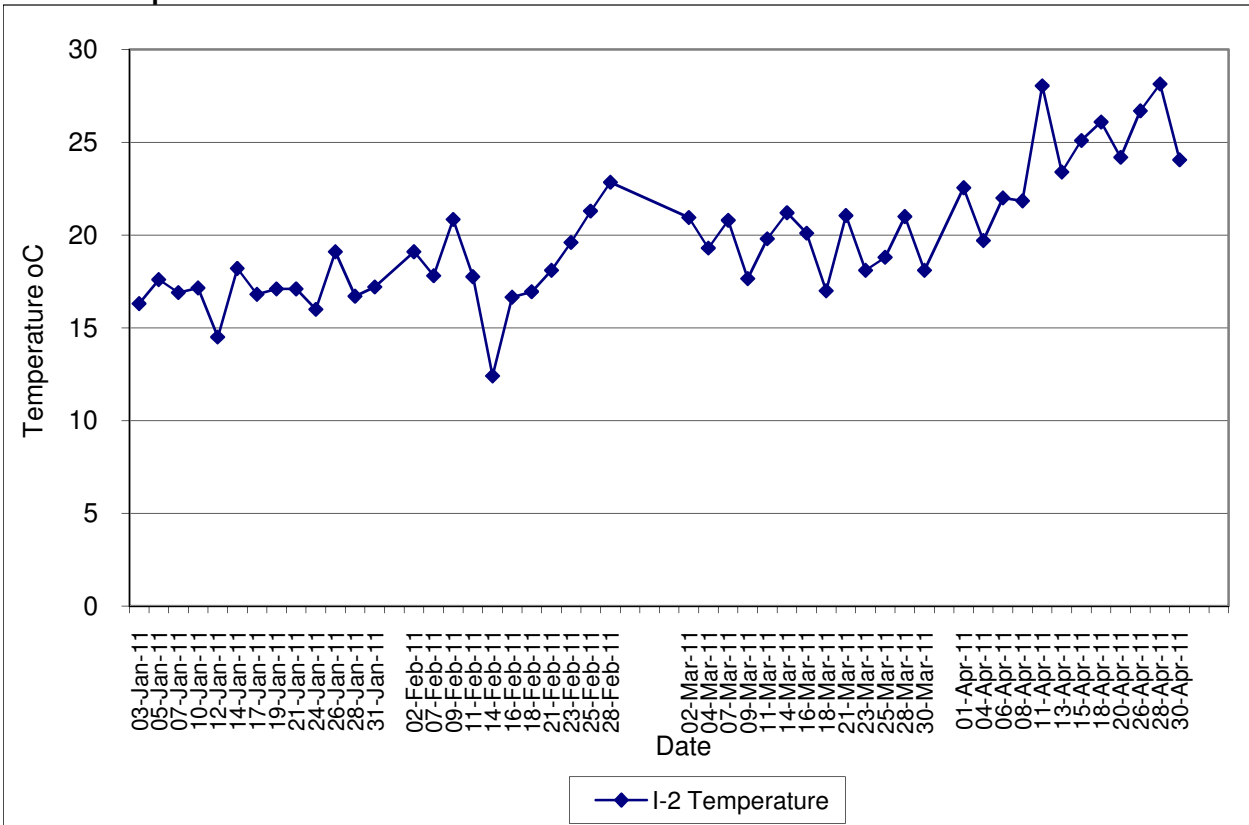
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)**  
**Jan-11 to Apr-11**



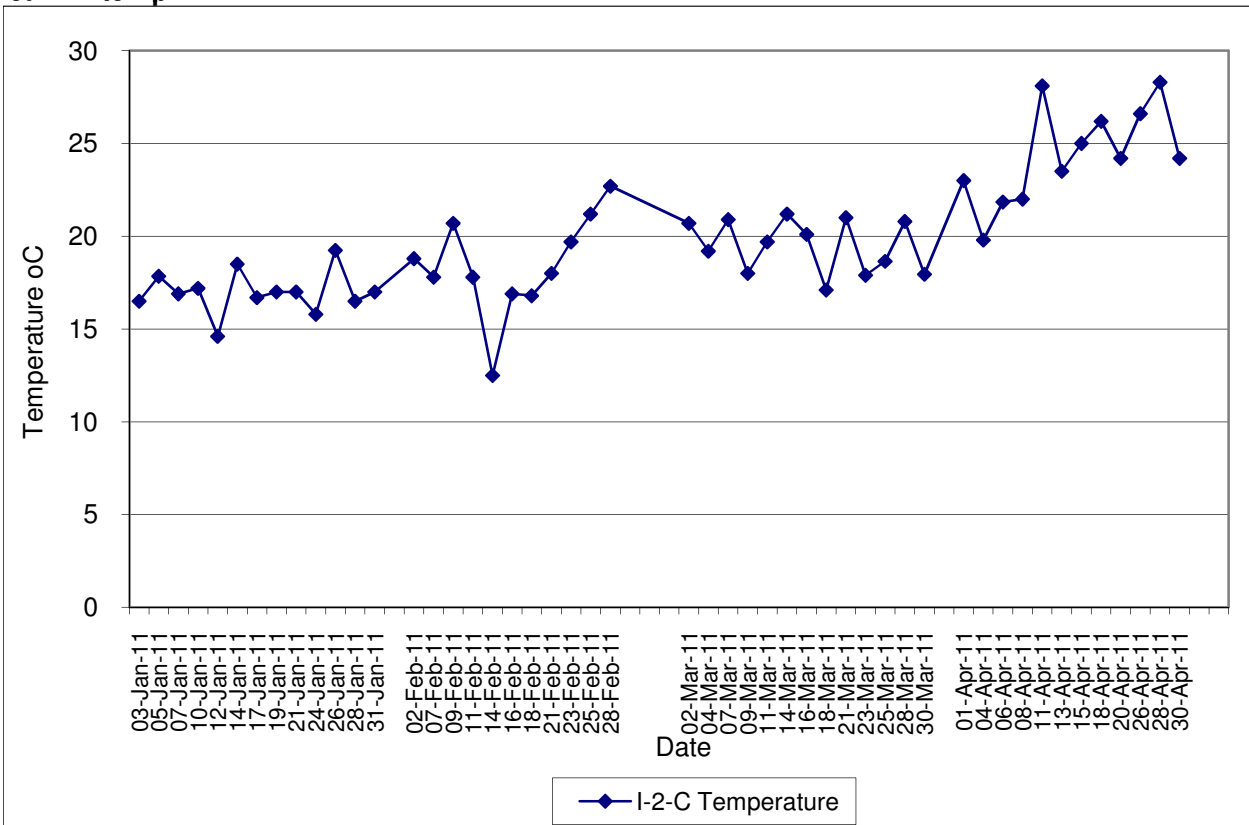
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)**  
**Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2)**  
**Jan-11 to Apr-11**

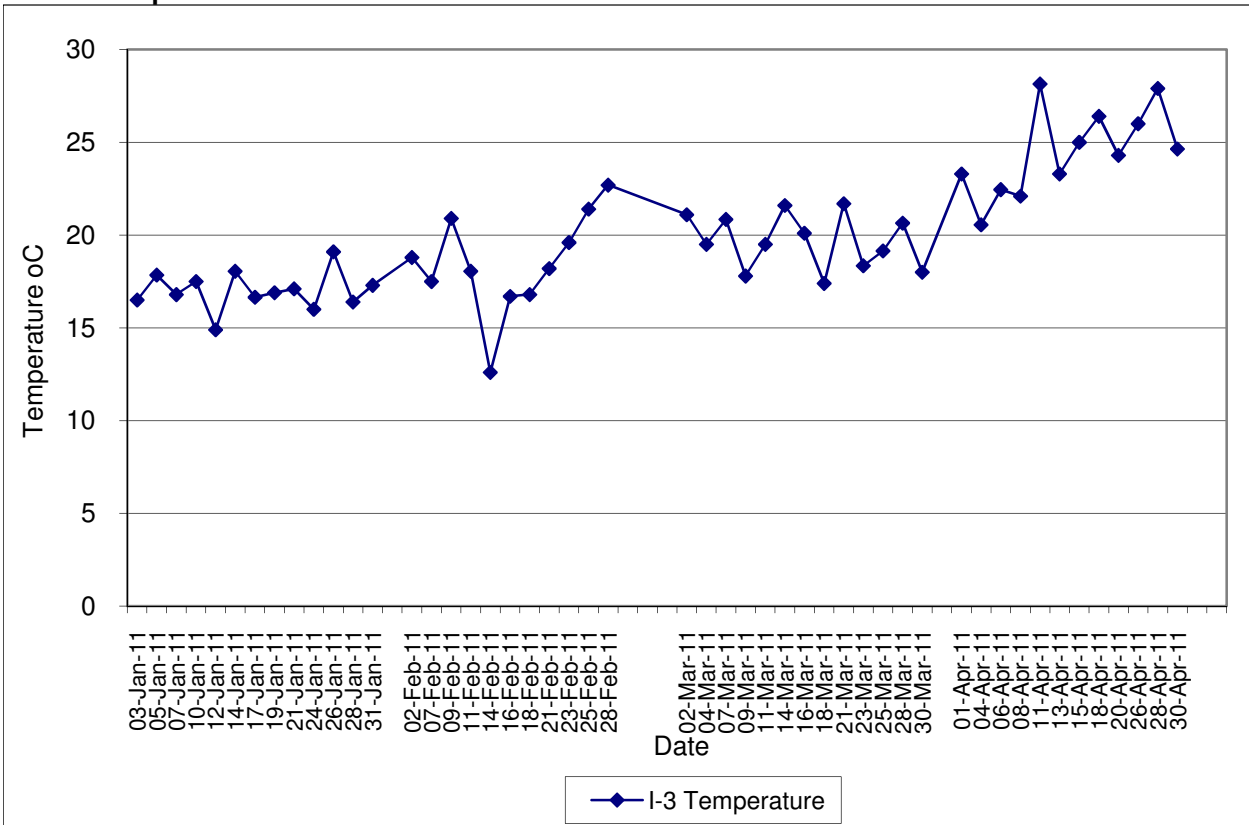


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)**  
**Jan-11 to Apr-11**

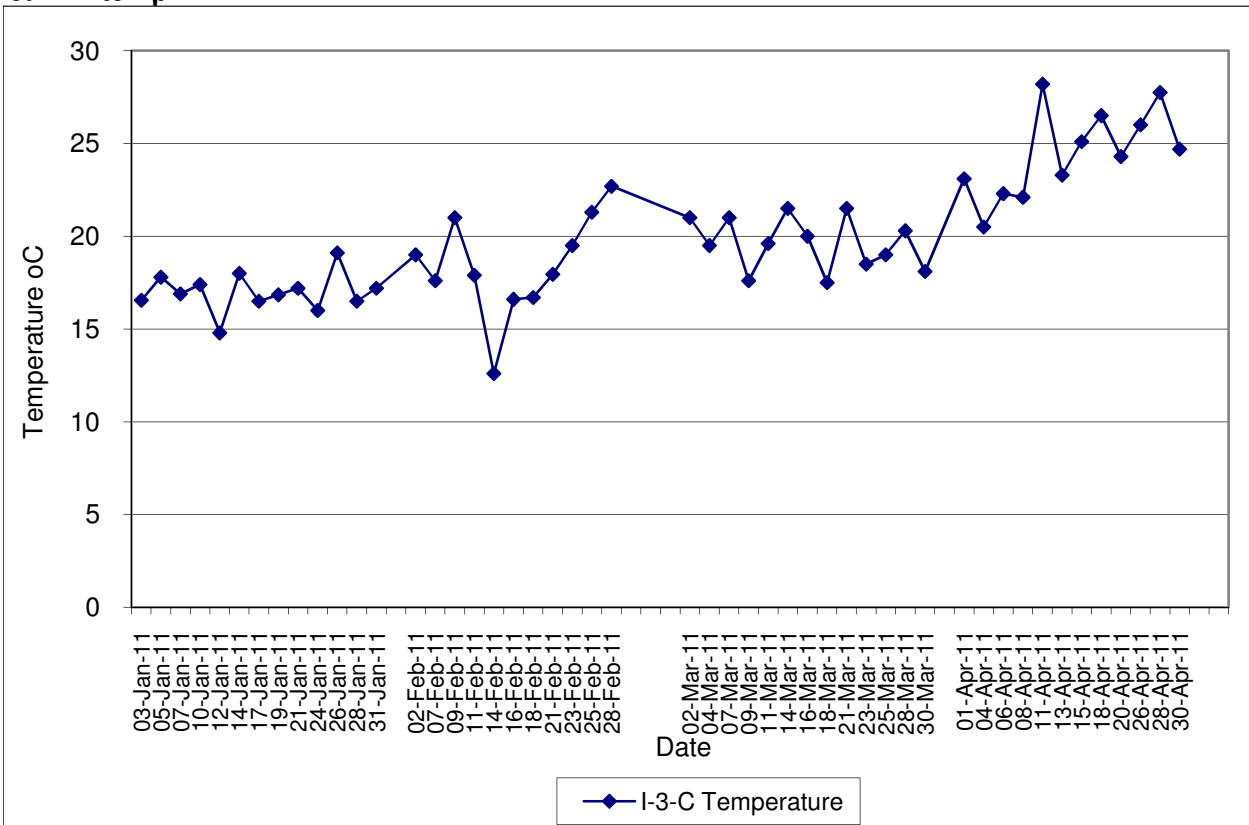




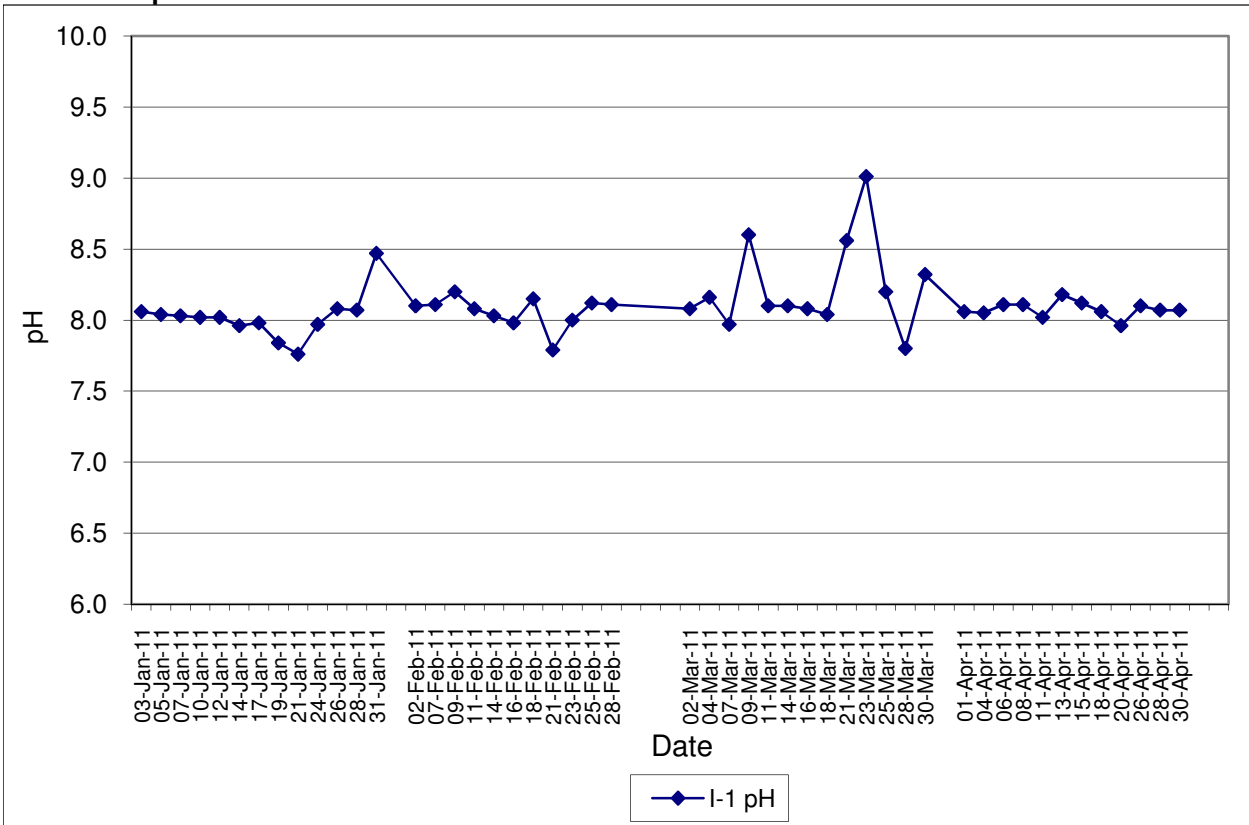
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3)**  
**Jan-11 to Apr-11**



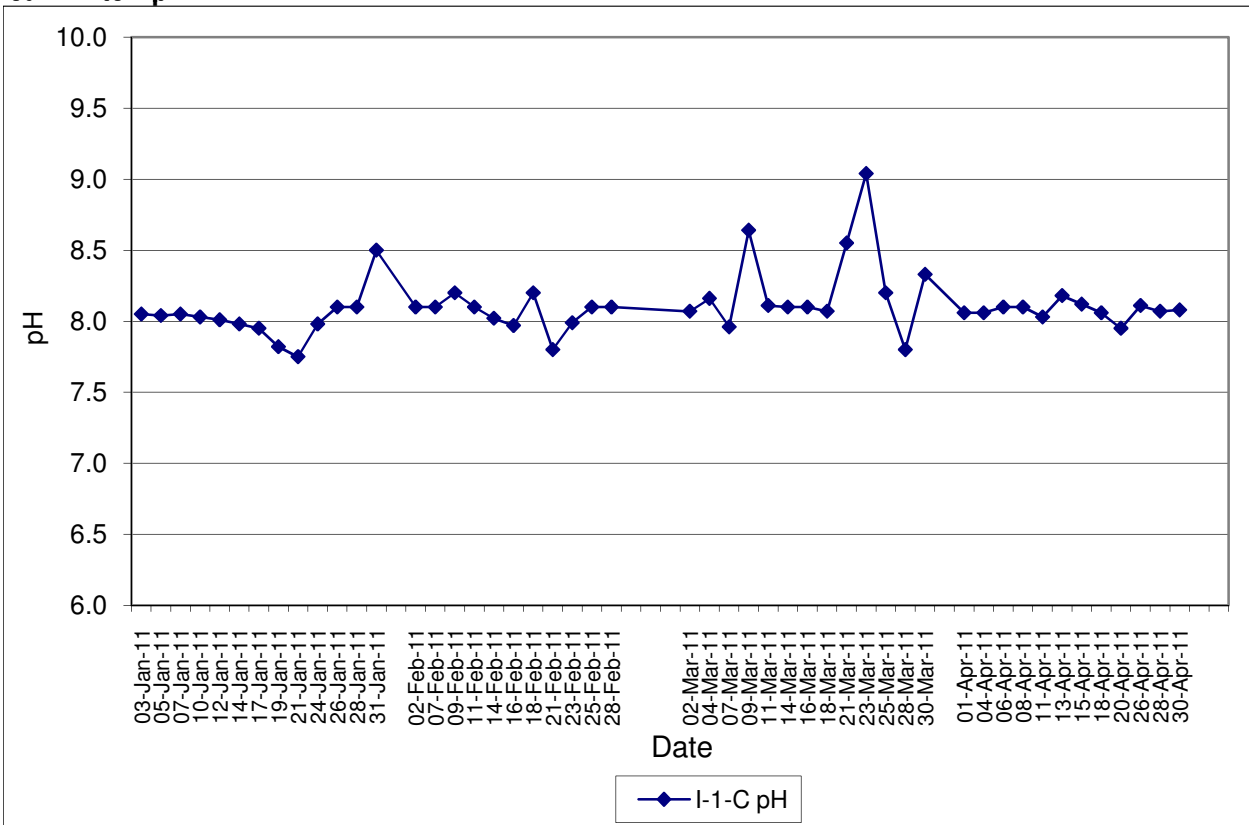
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3-C)**  
**Jan-11 to Apr-11**



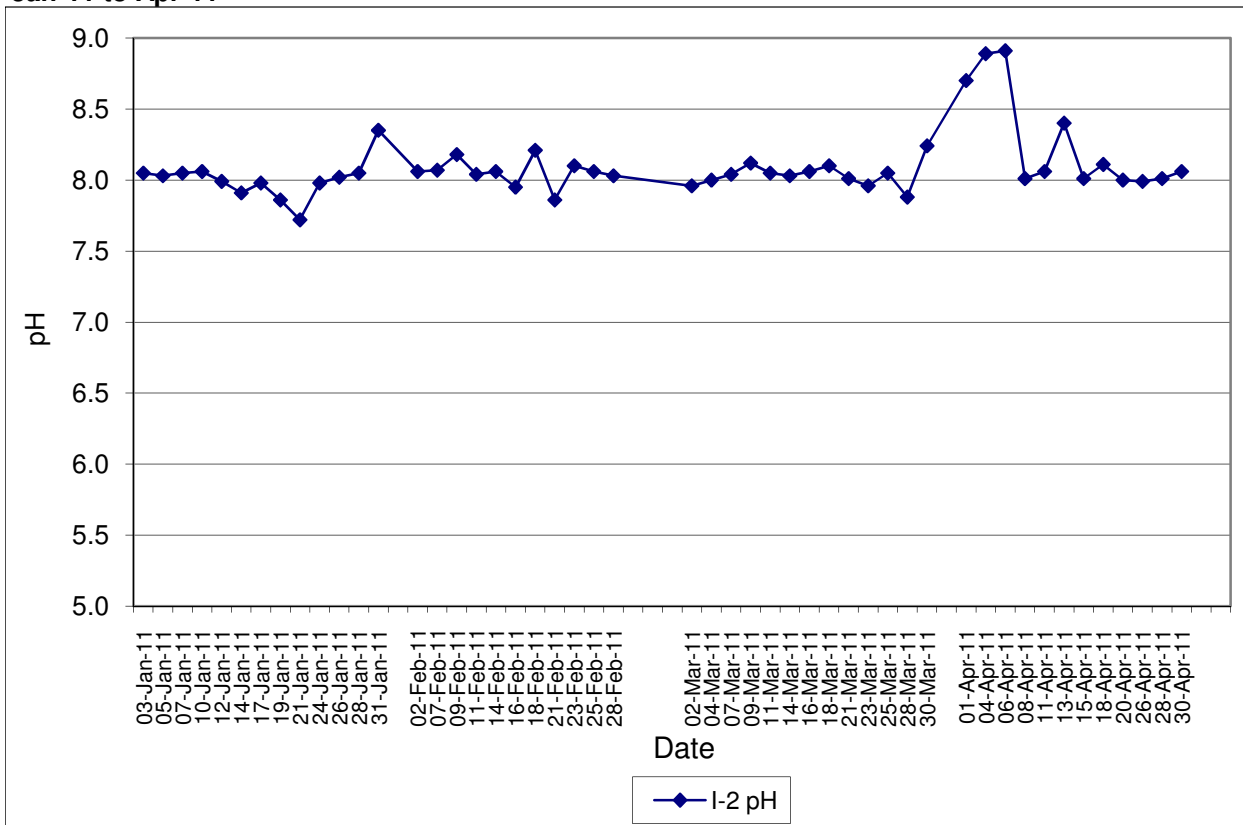
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)  
 Jan-11 to Apr-11**



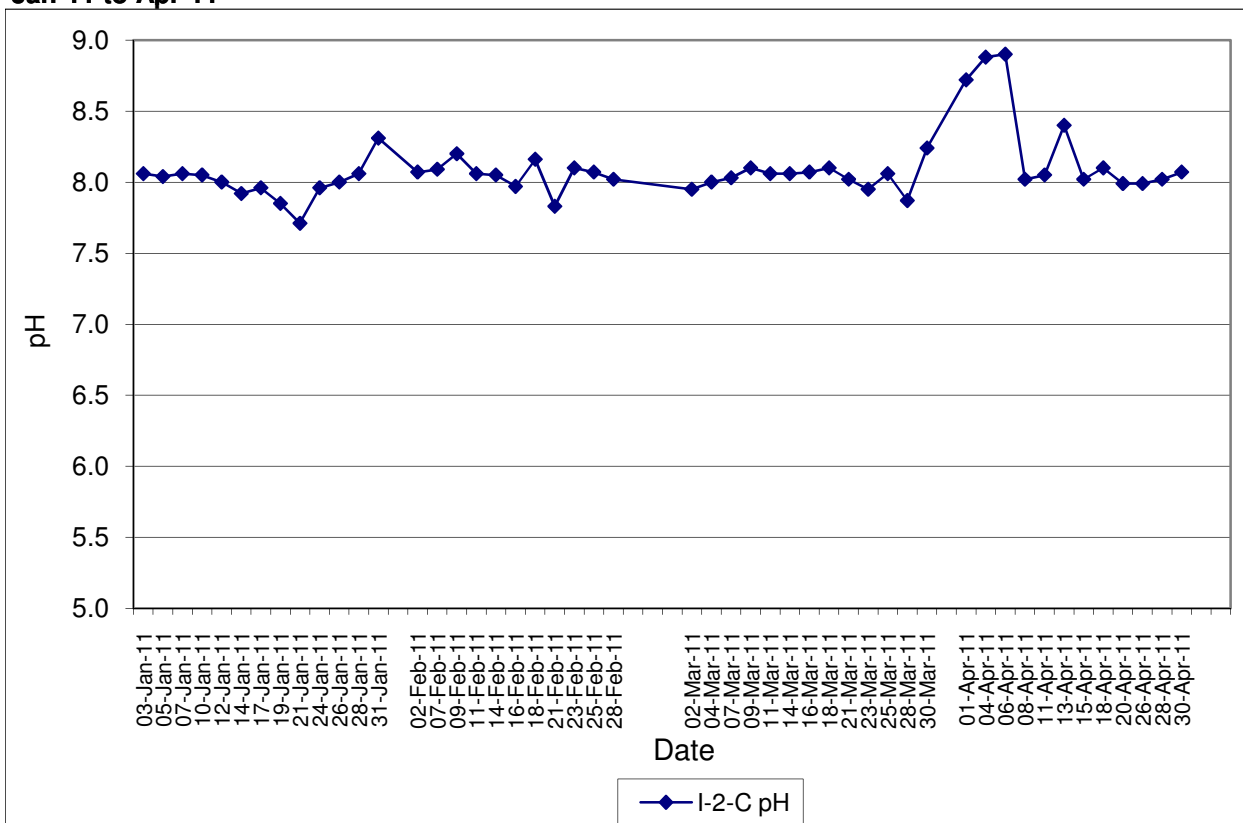
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)  
 Jan-11 to Apr-11**



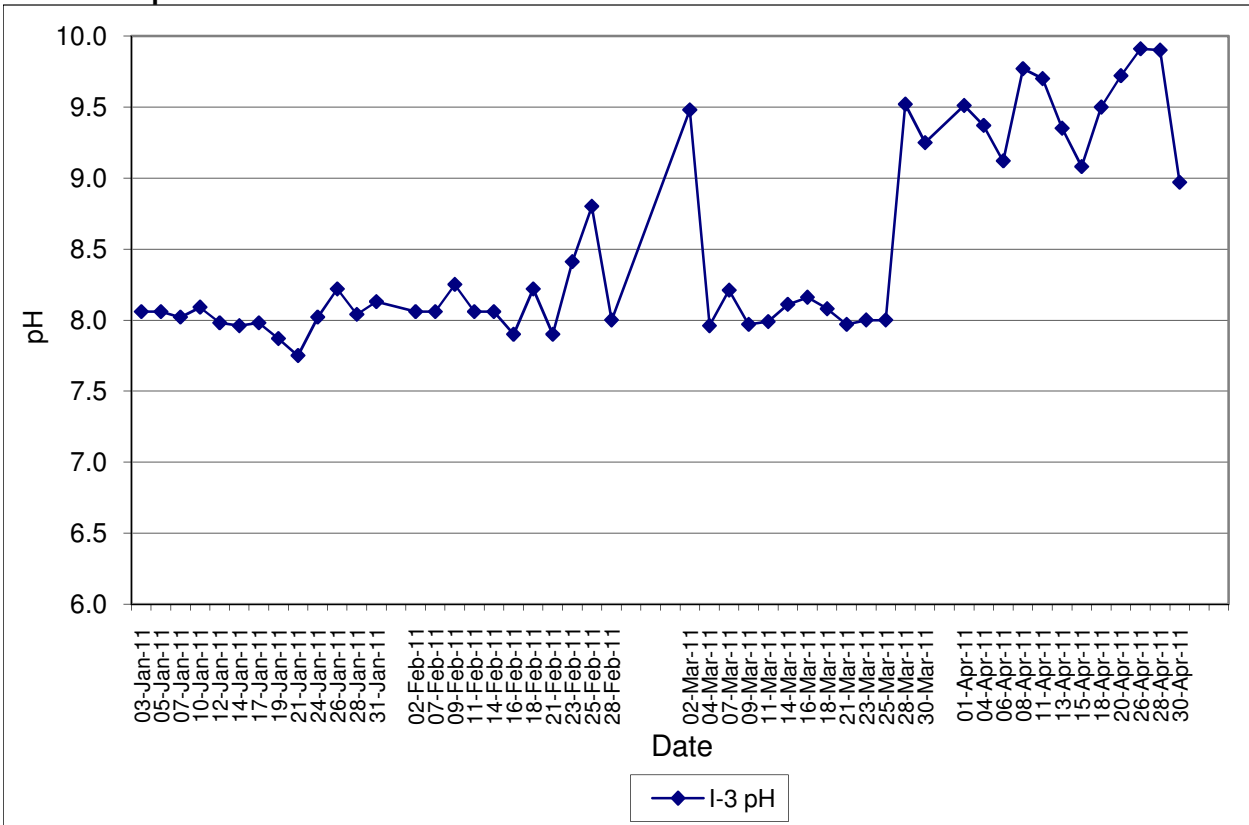
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2)**  
**Jan-11 to Apr-11**



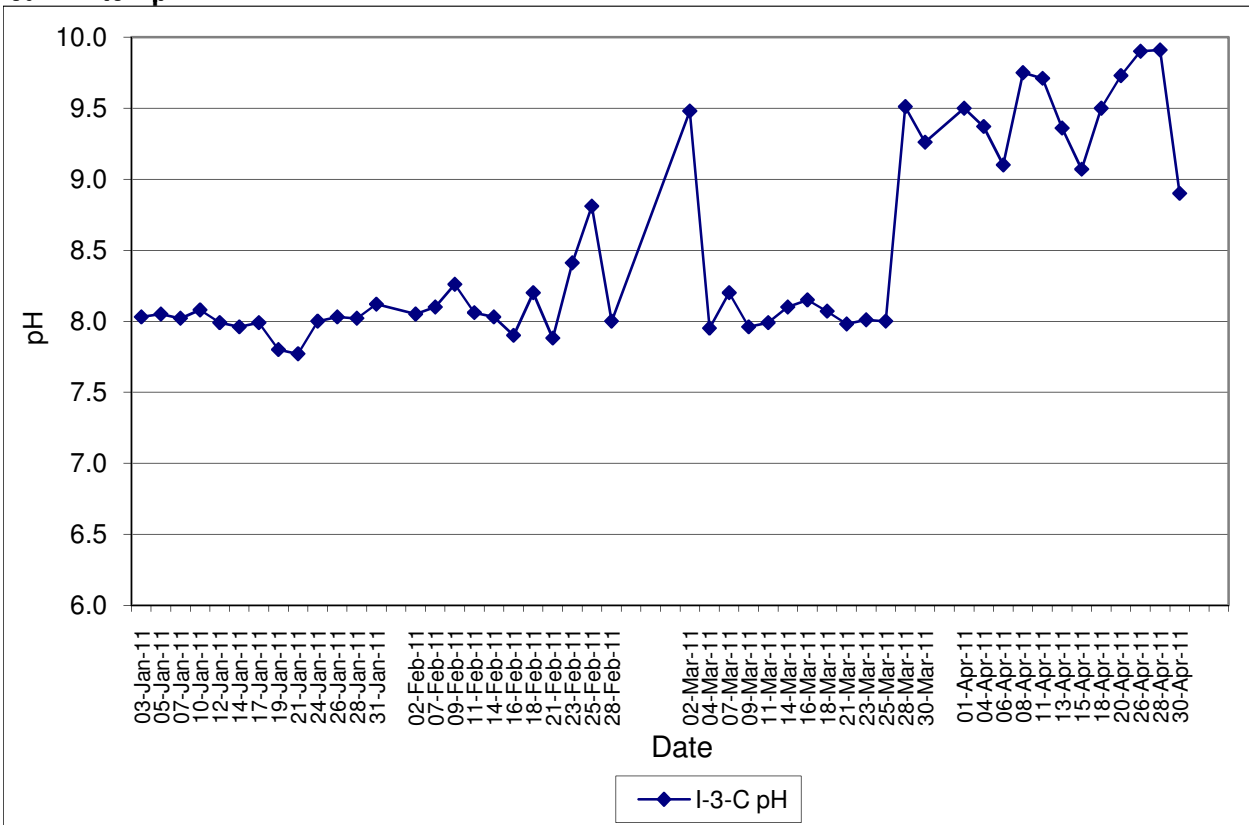
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)**  
**Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3)**  
**Jan-11 to Apr-11**

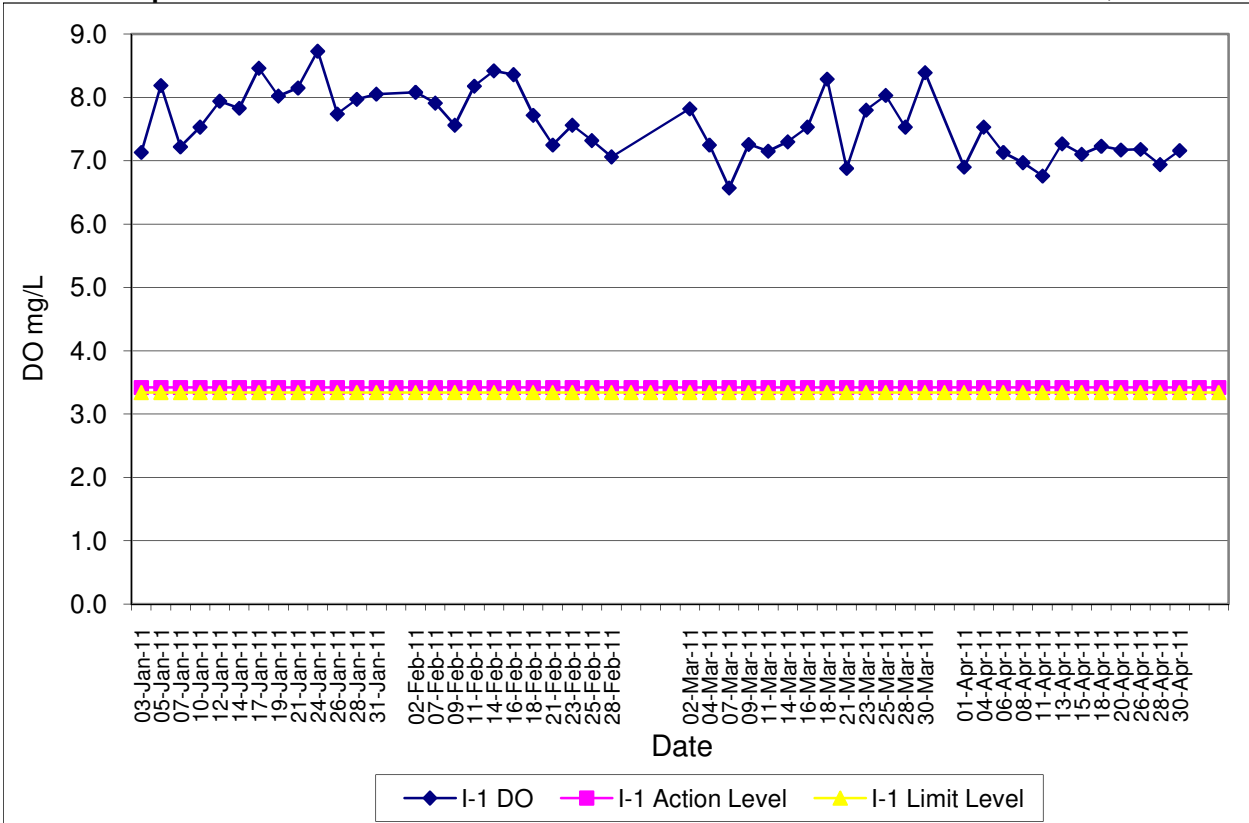


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3-C)**  
**Jan-11 to Apr-11**

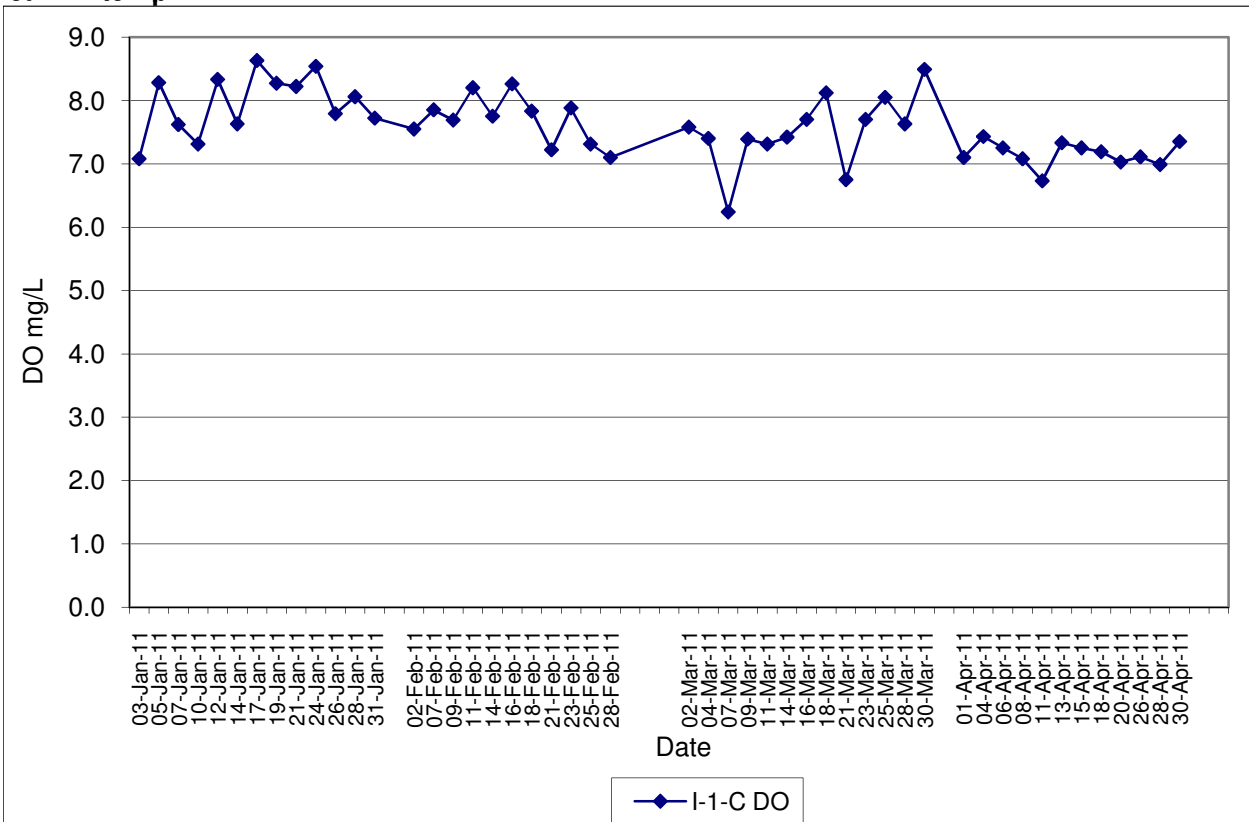


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)**  
**Jan-11 to Apr-11**

Note: Exceedances of Action / Limit Levels occur when the levels of DO are below the respective limit levels.

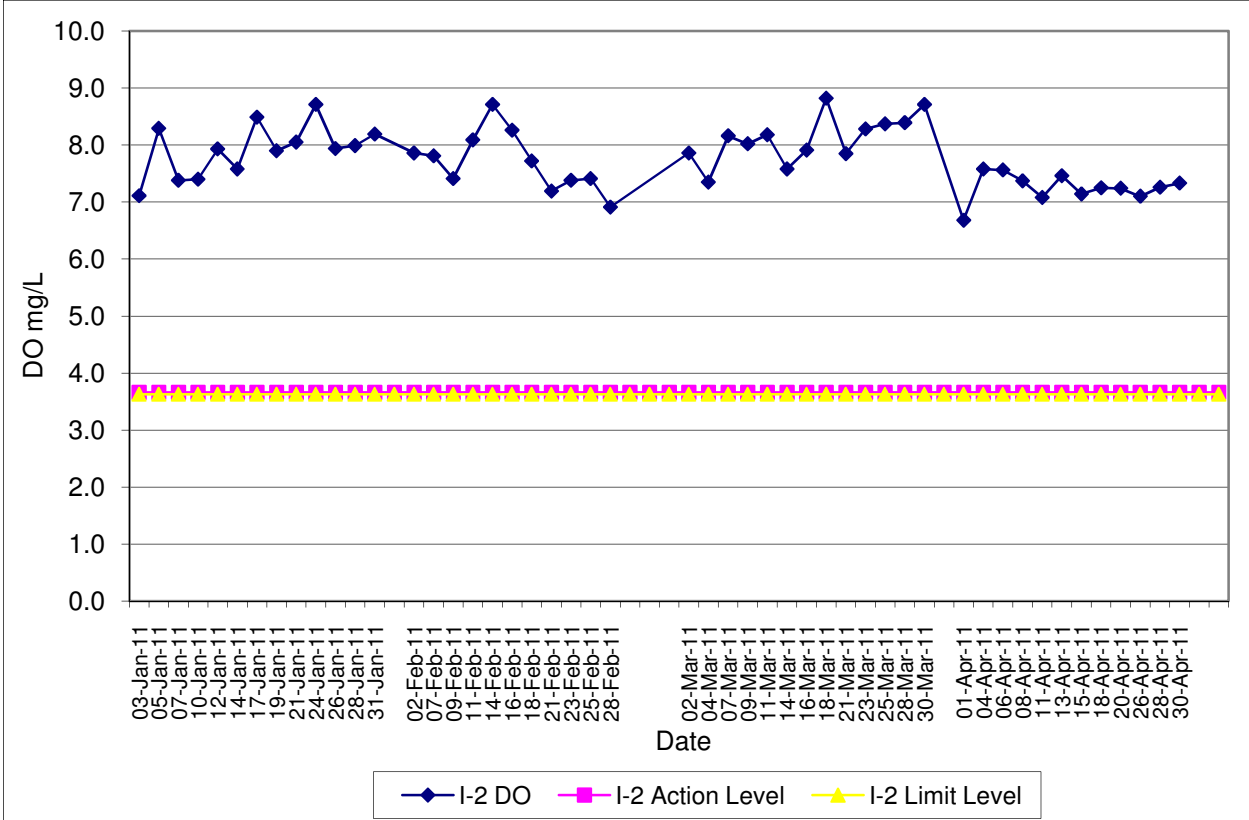


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)**  
**Jan-11 to Apr-11**

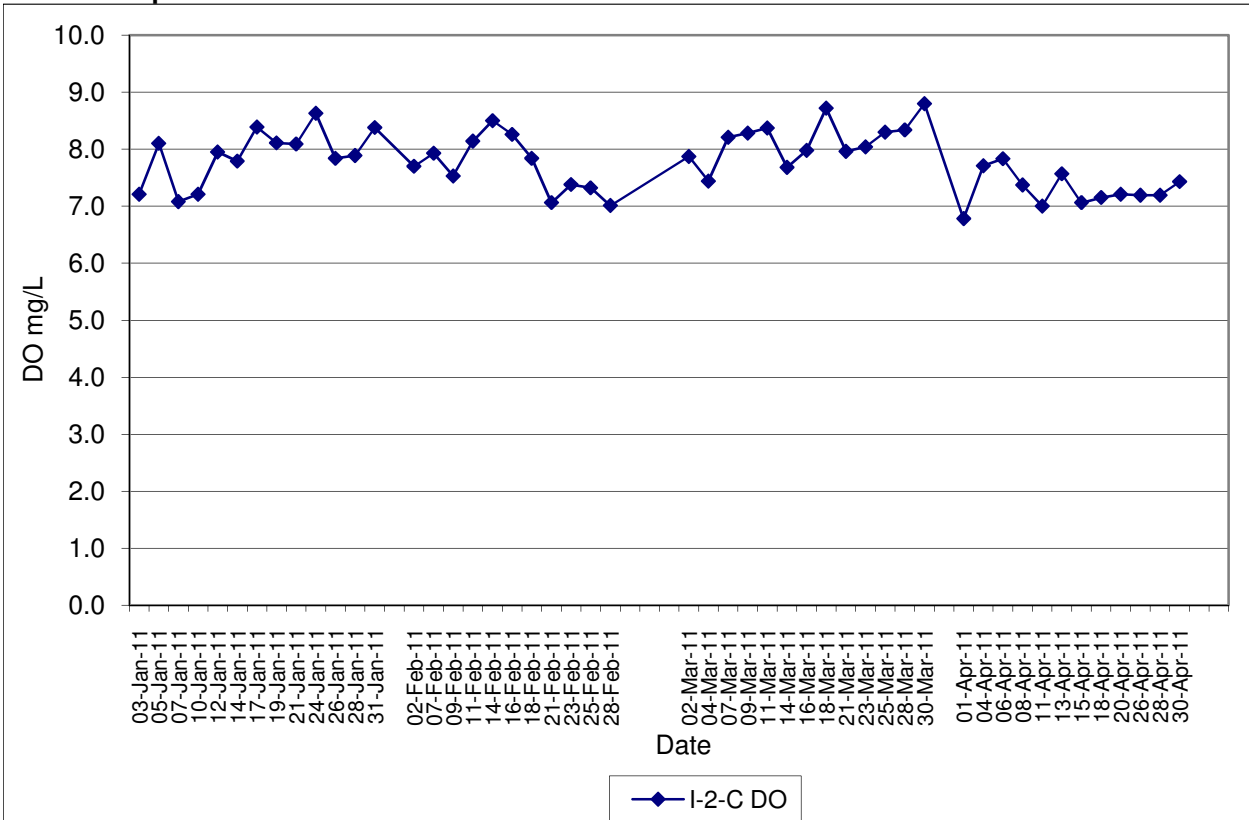


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2)**  
**Jan-11 to Apr-11**

Note: Exceedances of Action / Limit Levels occur when the levels of DO are below the respective limit levels.

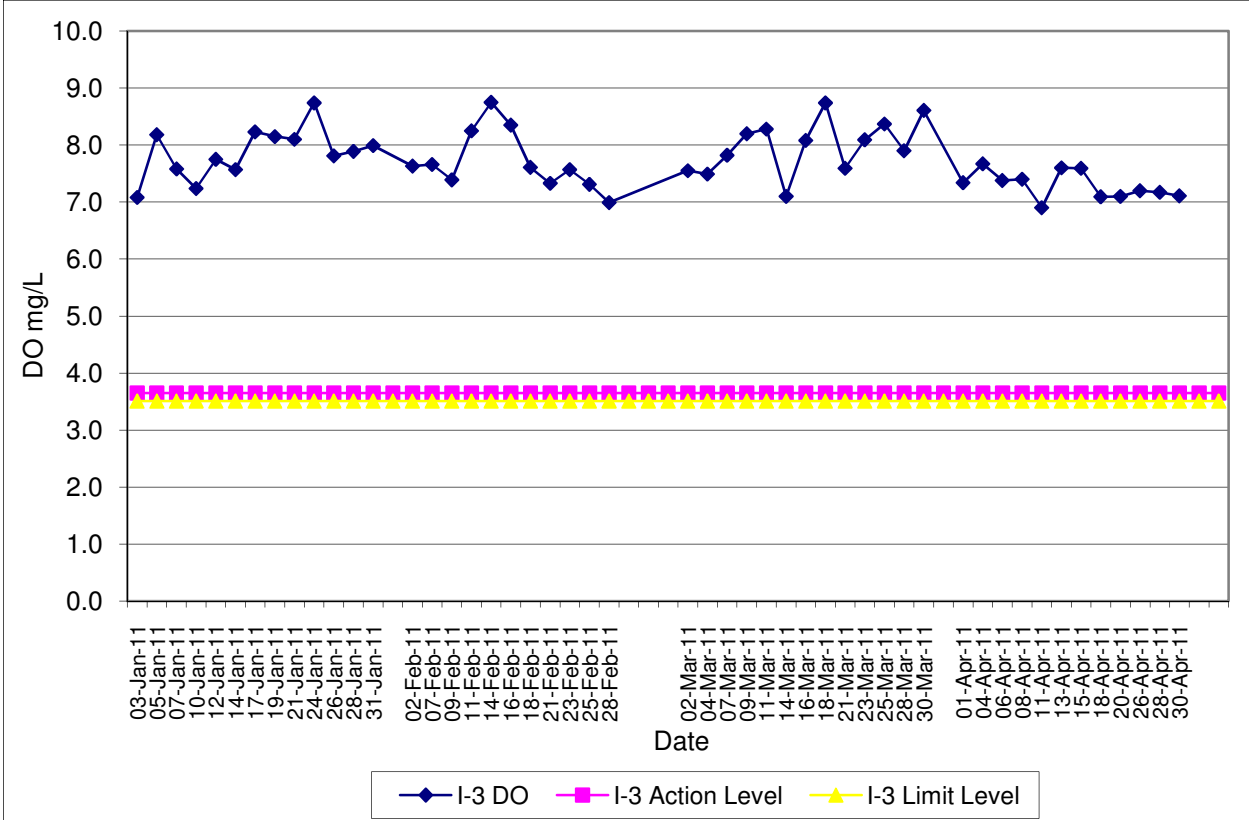


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)**  
**Jan-11 to Apr-11**

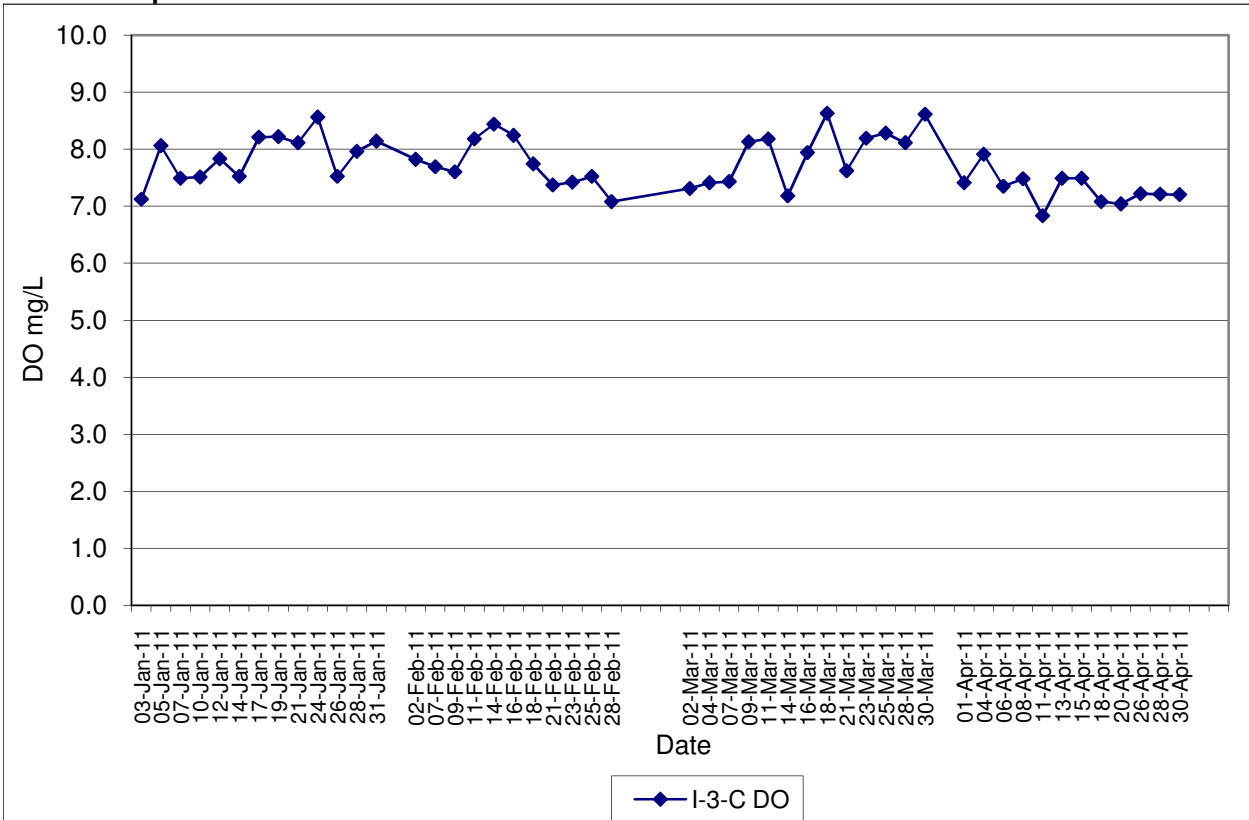


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3)**  
**Jan-11 to Apr-11**

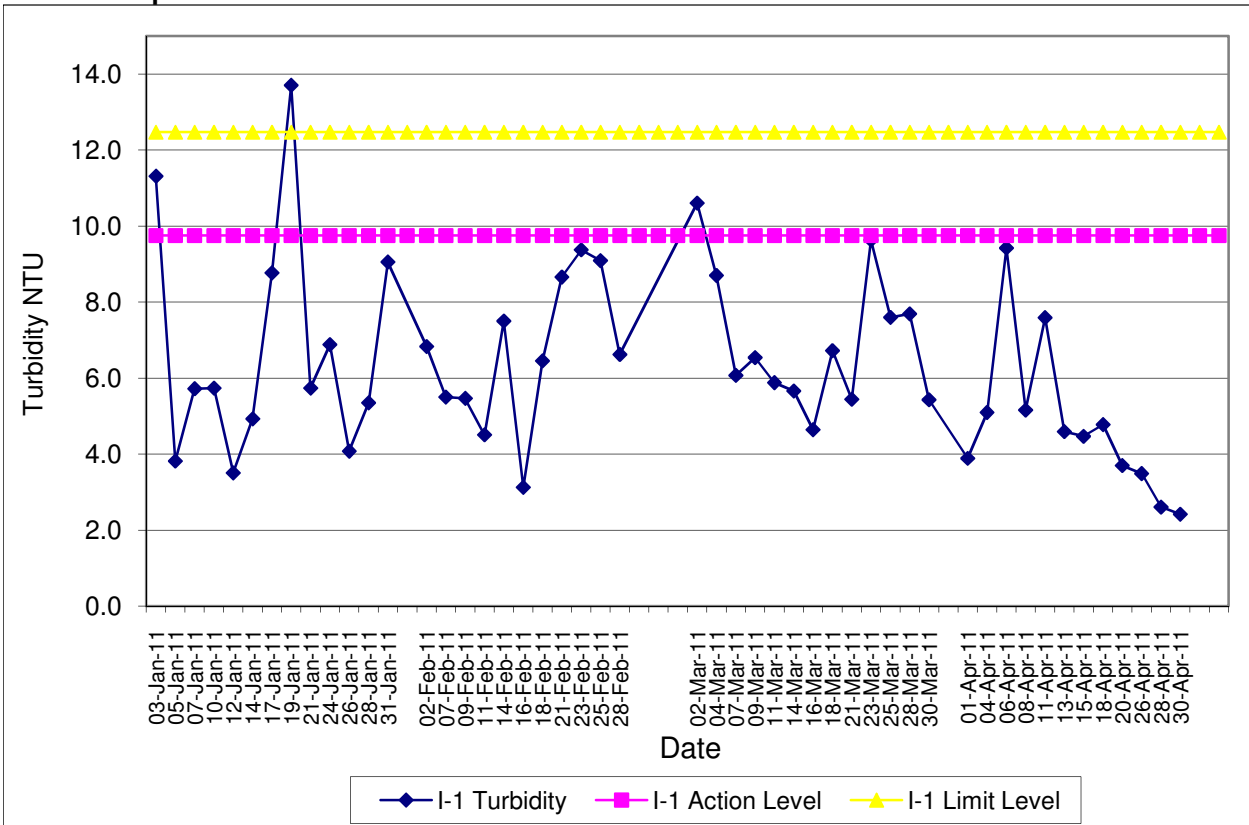
Note: Exceedances of Action / Limit Levels occur when the levels of DO are below the respective limit levels.



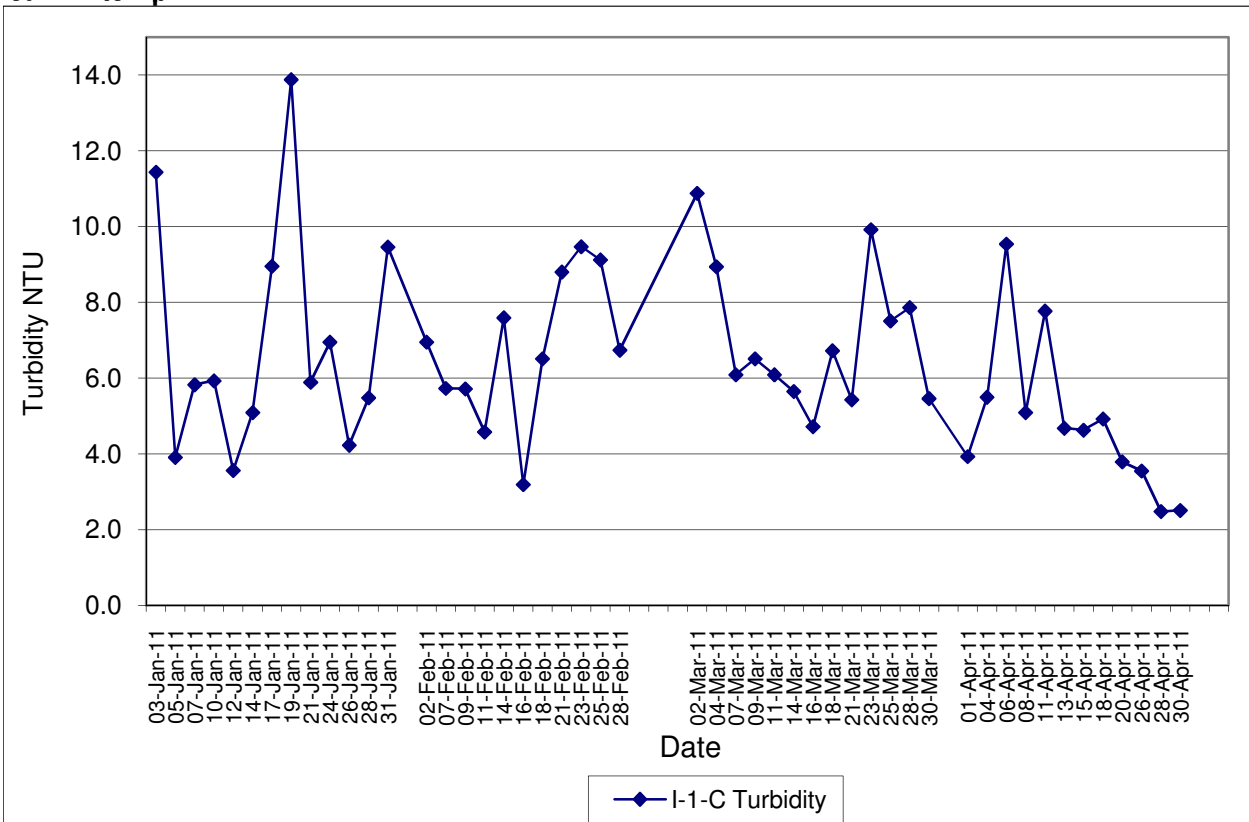
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3-C)**  
**Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)**  
**Jan-11 to Apr-11**

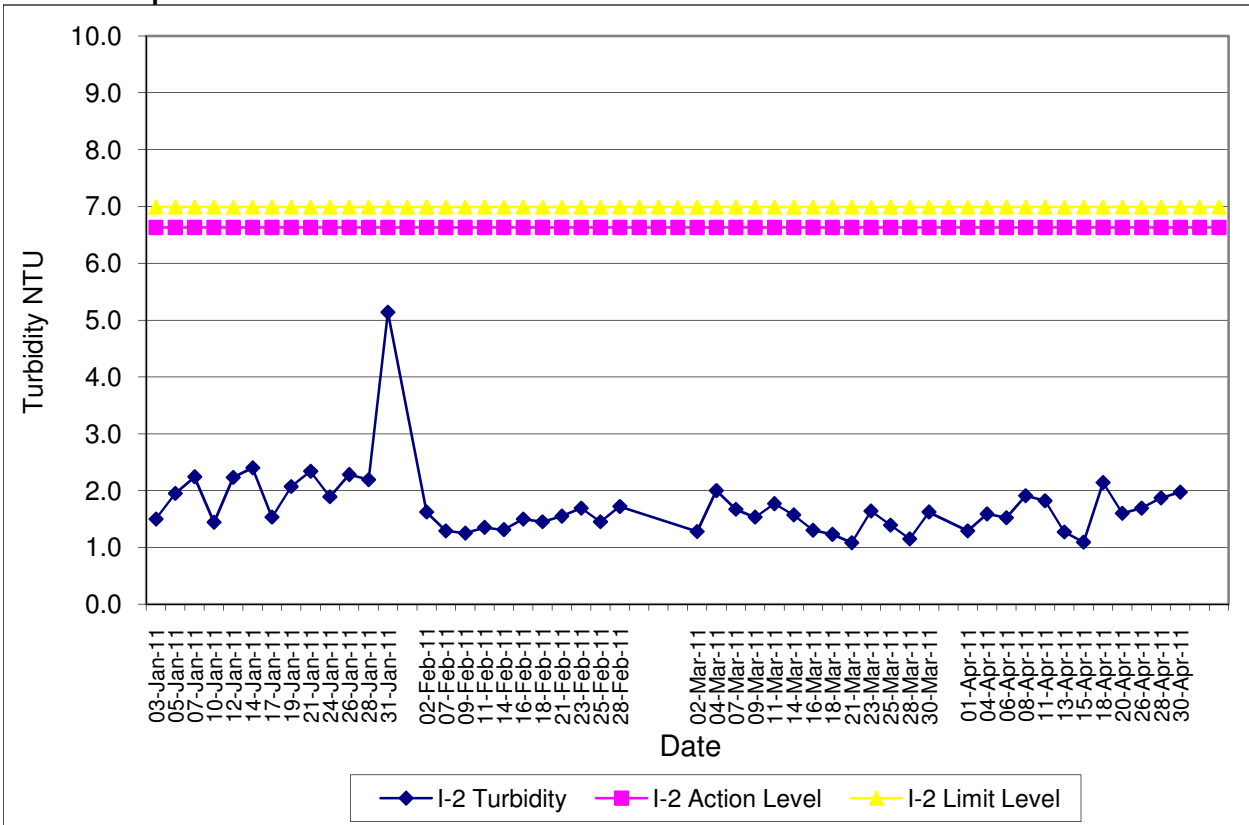


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)**  
**Jan-11 to Apr-11**

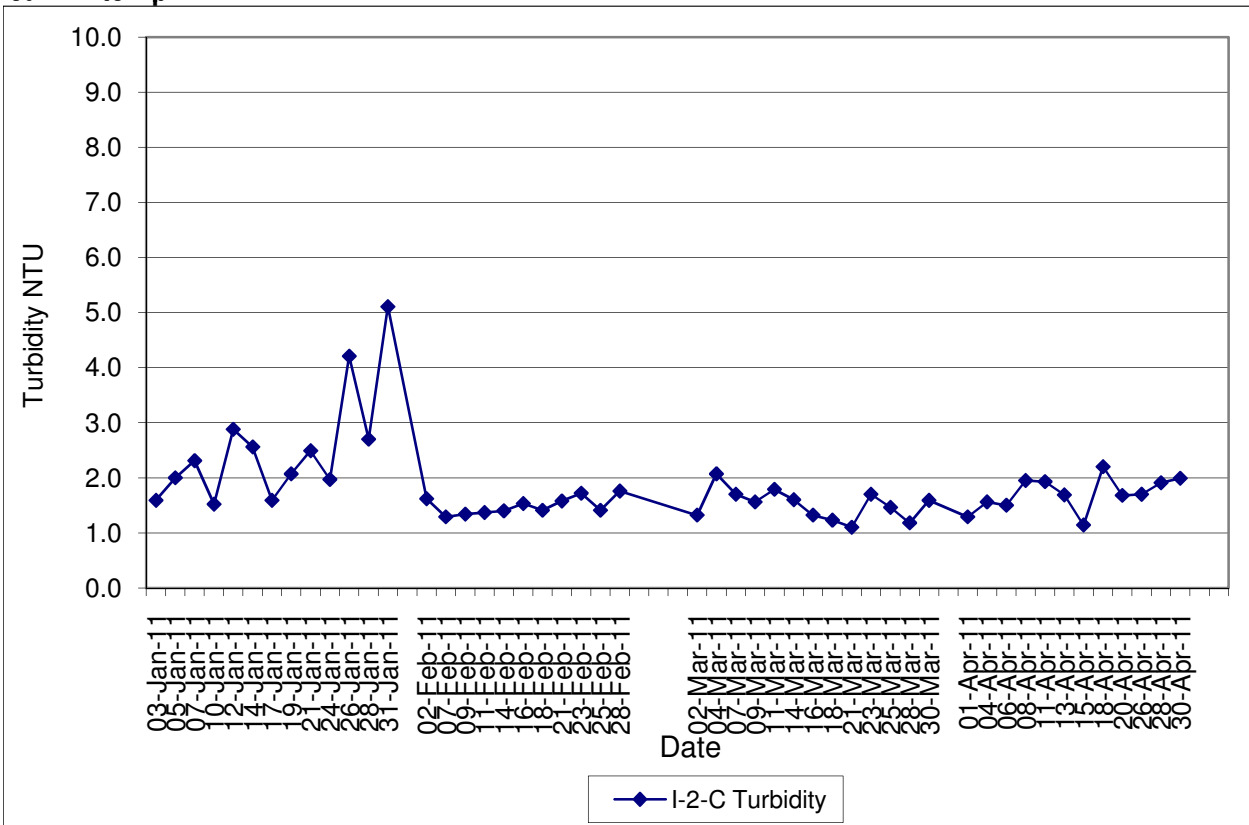




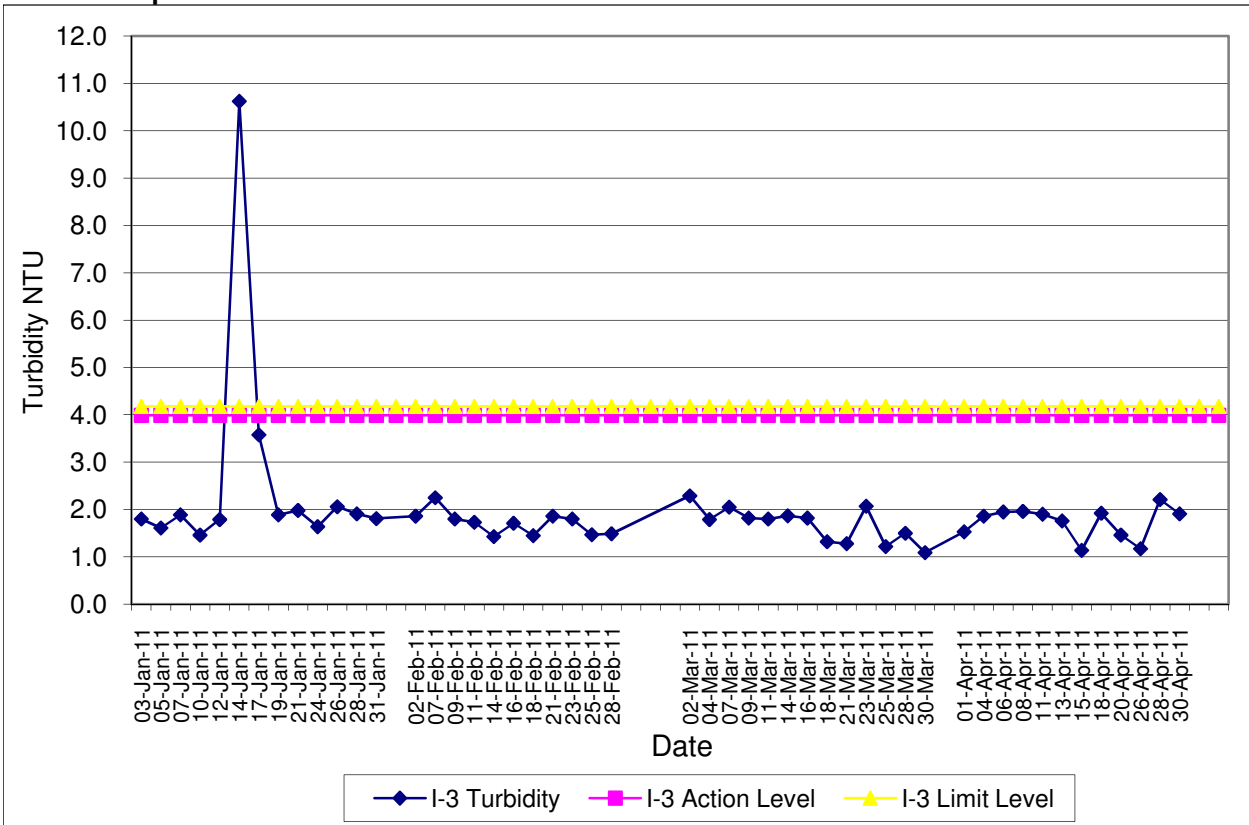
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2)**  
**Jan-11 to Apr-11**



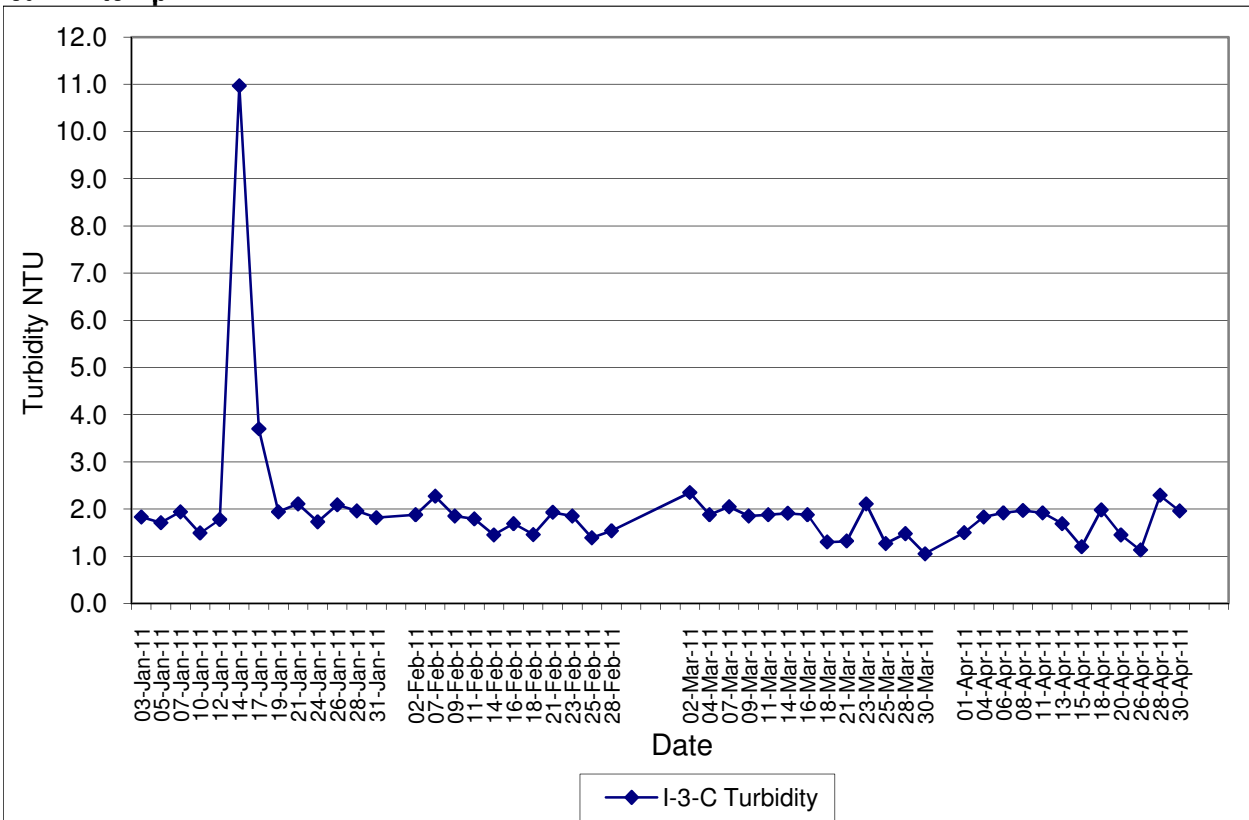
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)**  
**Jan-11 to Apr-11**



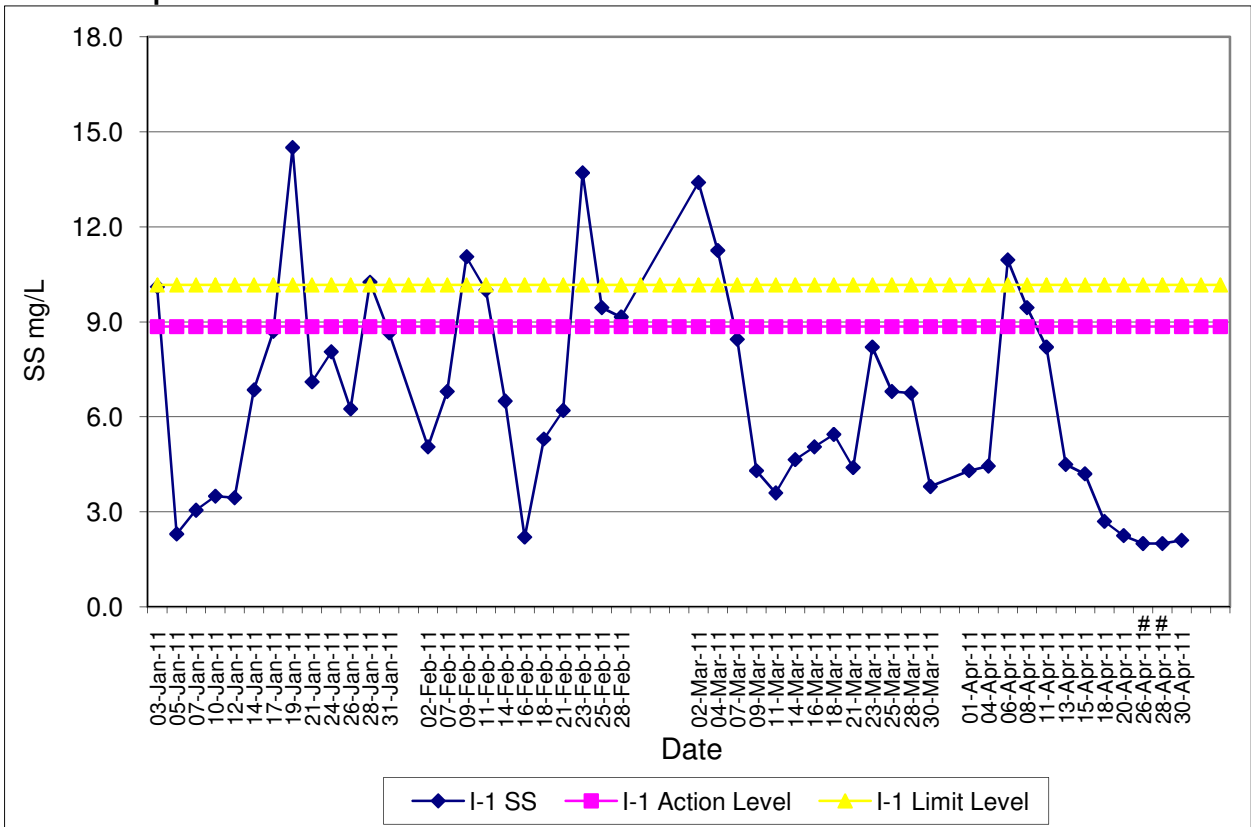
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3)**  
**Jan-11 to Apr-11**



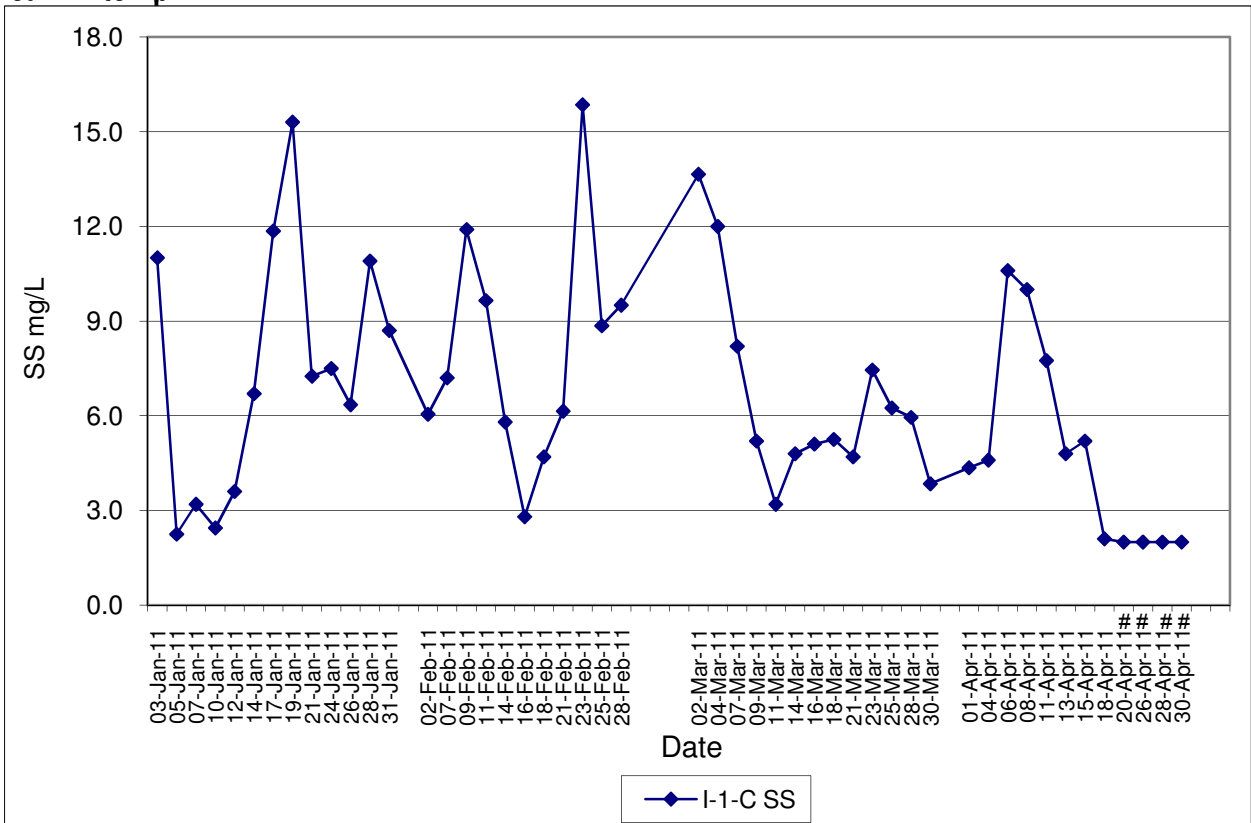
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3-C)**  
**Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)  
Jan-11 to Apr-11**

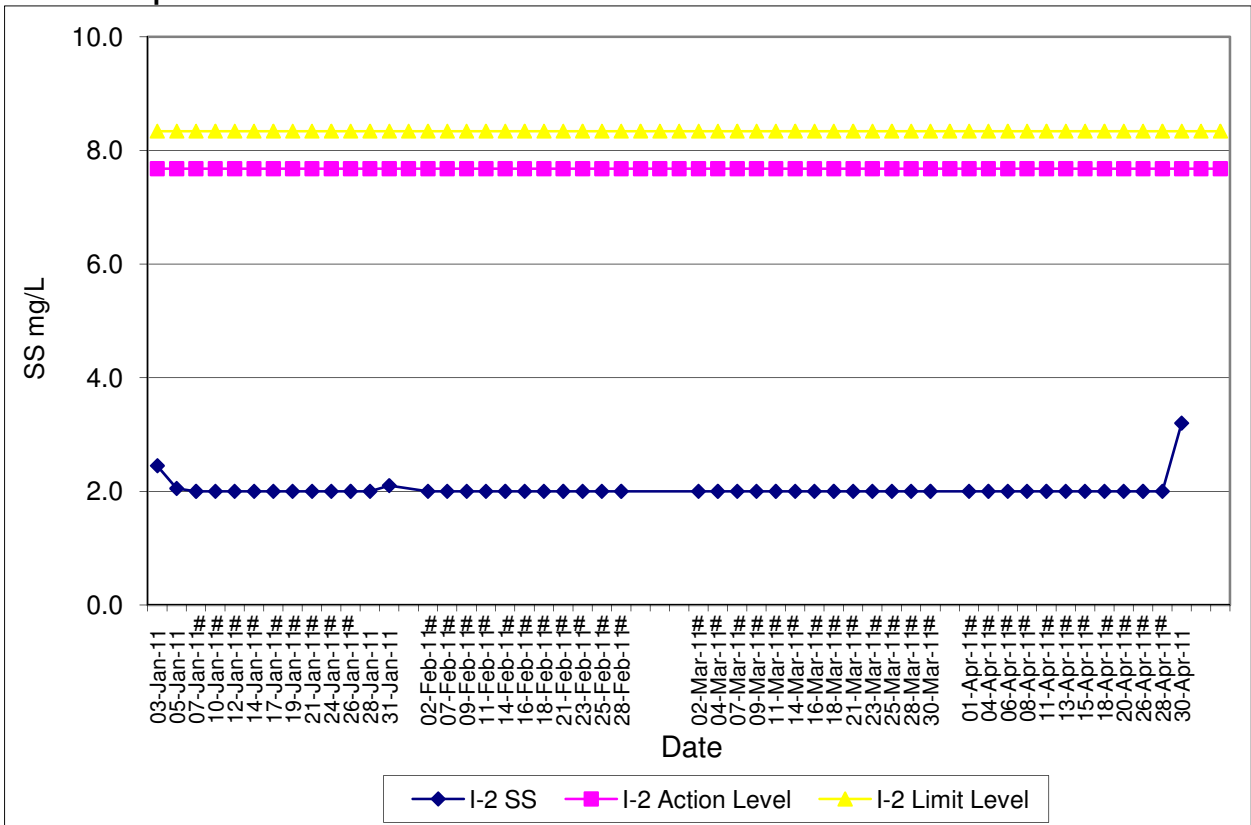


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)  
Jan-11 to Apr-11**

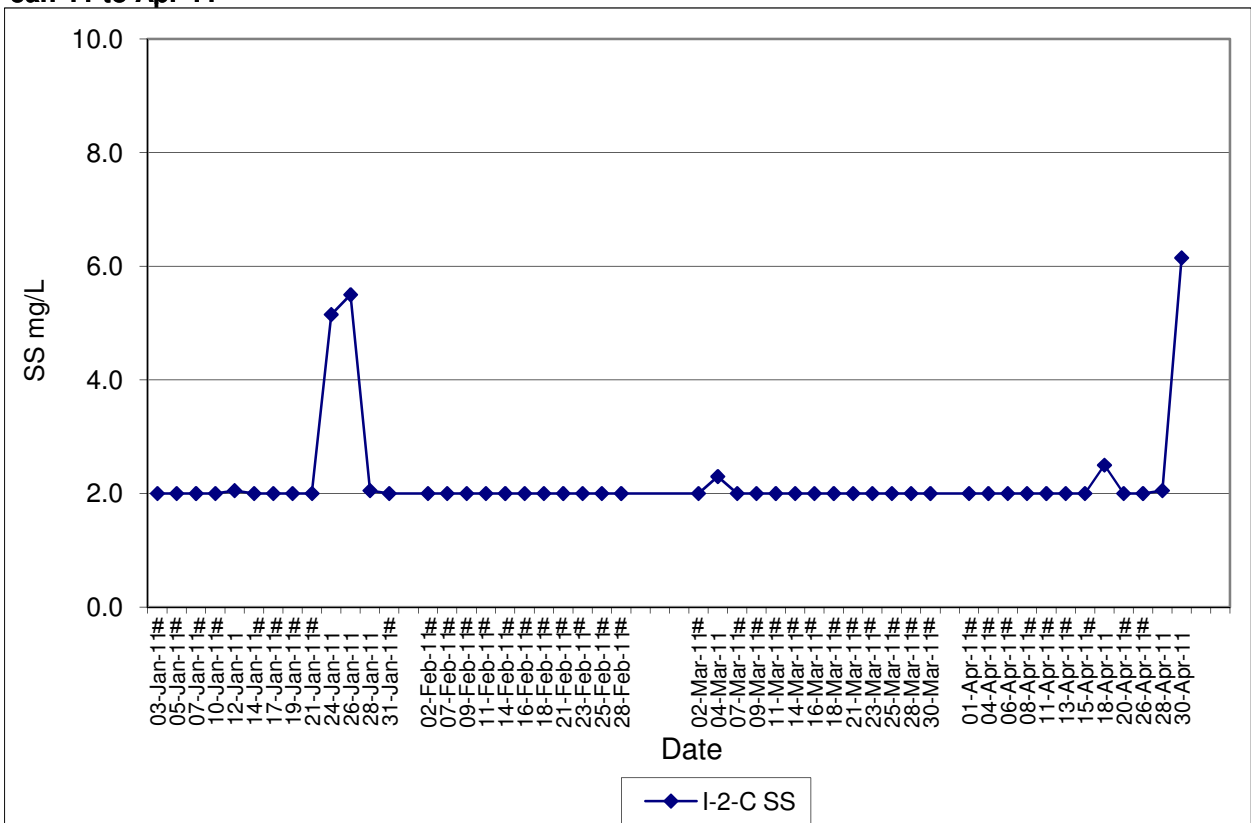


Note: # - For average SS level smaller than 2mg/L, the levels are plotted as 2mg/L in the graphs.

**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2)**  
**Jan-11 to Apr-11**

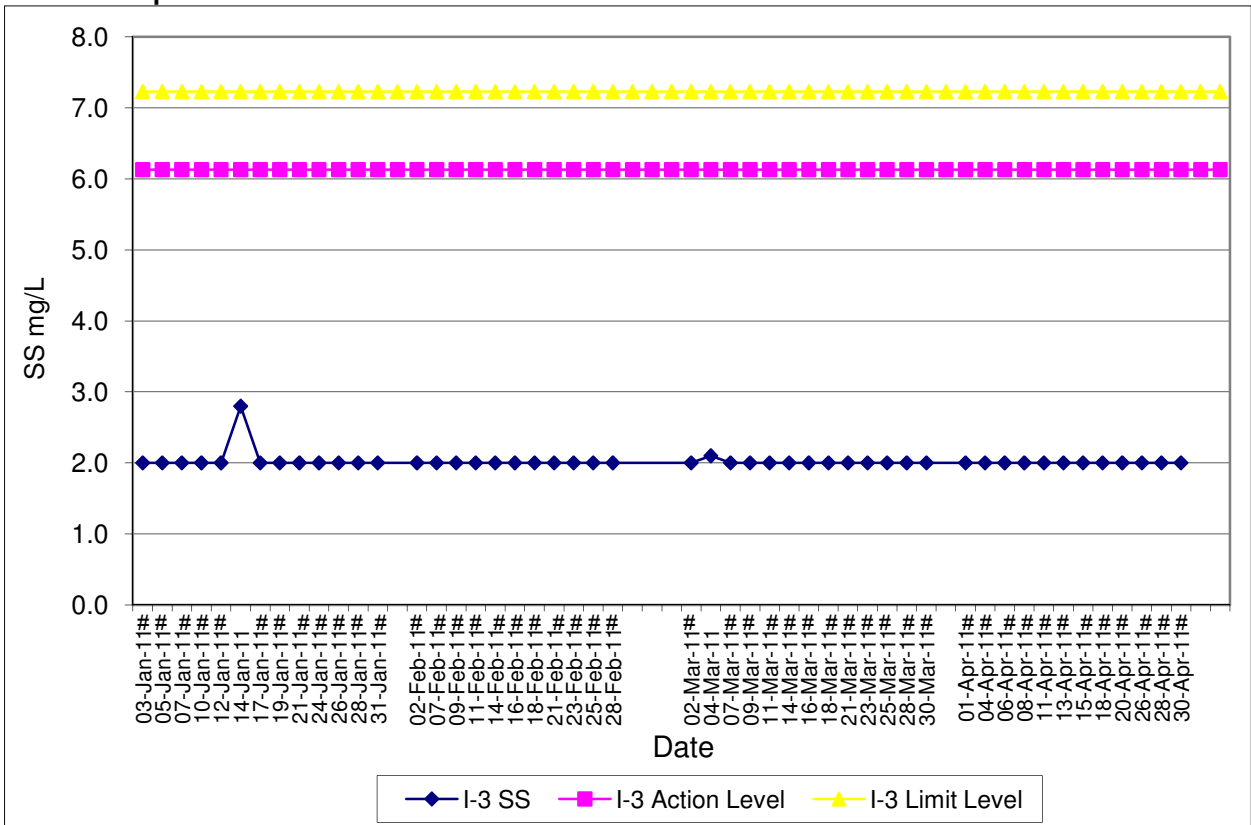


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)**  
**Jan-11 to Apr-11**

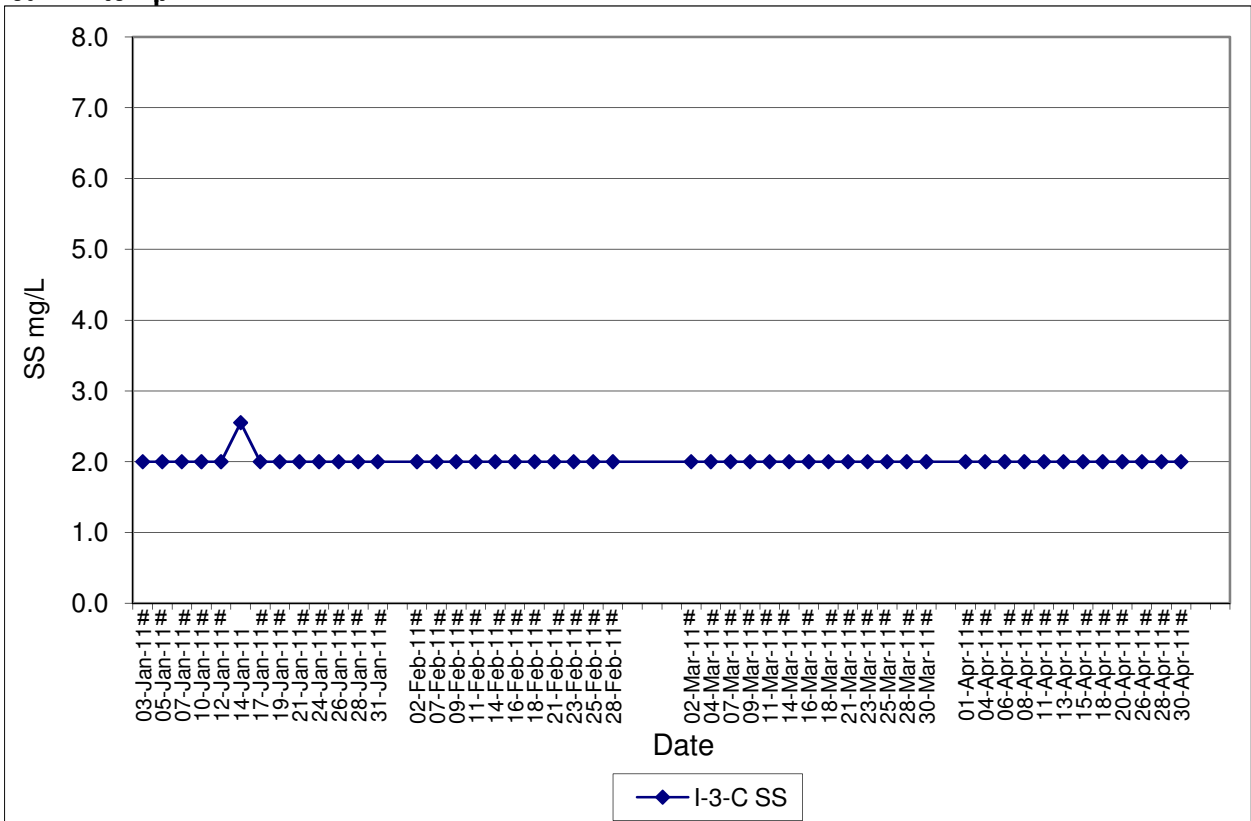


Note: # - For average SS level smaller than 2mg/L, the levels are plotted as 2mg/L in the graphs.

**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3)**  
**Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Squatters (I-3-C)**  
**Jan-11 to Apr-11**



Note: # - For average SS level smaller than 2mg/L, the levels are plotted as 2mg/L in the graphs.

Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel

Marine Water Quality Impact Monitoring Results

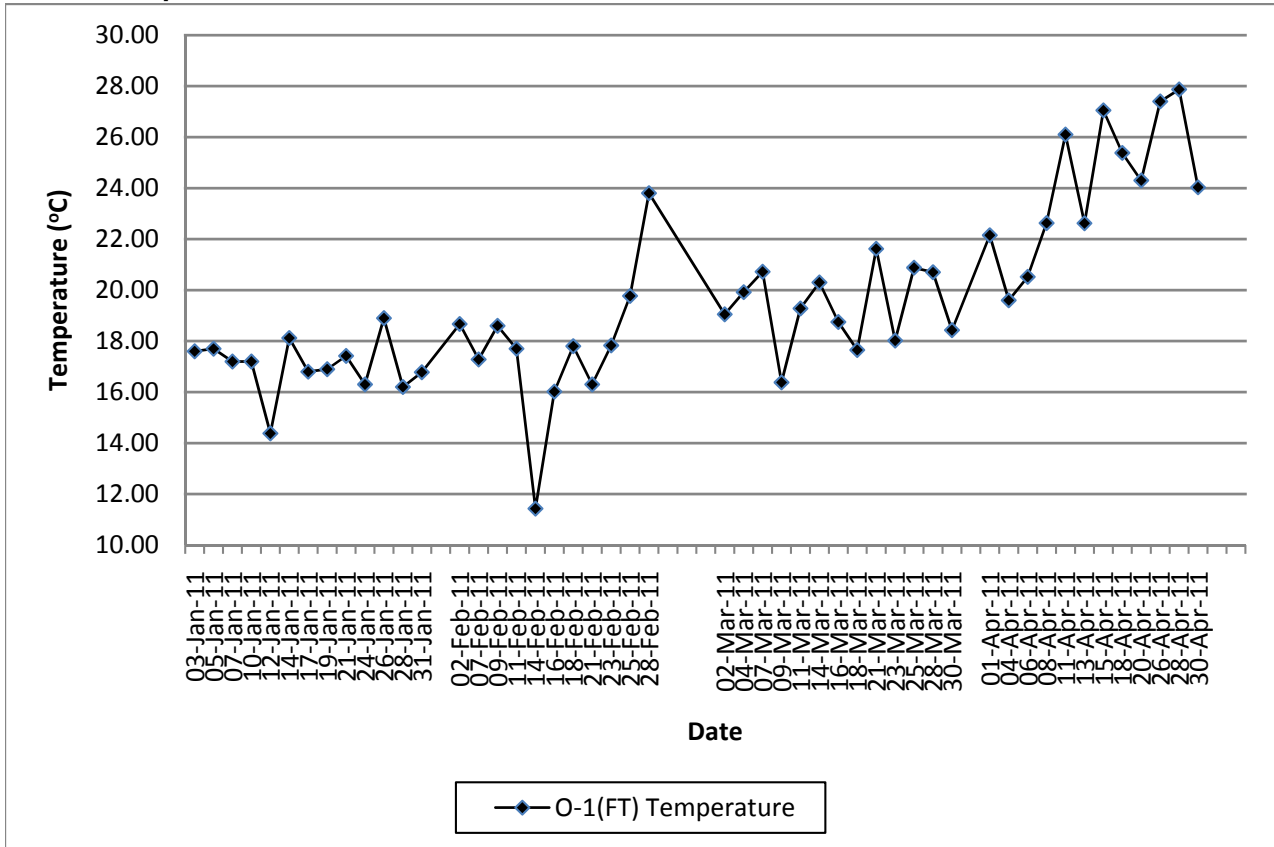
Monitoring Locations	Date	Depth	Start Time	Weather	Water Depth(m)	Temp			DO(mg/L)			pH			Turbidity(NTU)			SS (mg/L)			Remarks:	Action to be taken																			
						1	2	Avg	1	2	Avg	1	2	Avg	1	2	Avg	1	2	Avg																					
Outfall 1 During Flood Tide O-1(FT)	01-Apr-11	Surface	16:30	Sunny	1	22.20	22.10	22.15	7.35	7.42	7.39	6.84 / 6.81	8.31	8.31	8.31	3.50	3.61	3.58	5.00	4.90	5.47	Works in Portion E	Nil																		
		Middle			4.25	22.10	22.20	7.25	7.29	7.27	8.31	8.31	8.31	3.43	3.58	5.10	6.40																								
		Bottom			7.5	22.20	22.10	7.31	7.35	7.33	6.99 / 6.96	8.31	8.31	8.31	3.64	3.73	5.60	5.80																							
	04-Apr-11	Surface	08:30	Cloudy	1	19.60	19.70	19.60	7.73	7.63	7.68	6.84 / 6.81	8.40	8.40	8.41	1.16	1.21	1.13	2.50	2.60	2.55			Works in Portion E	Nil																
		Middle			4.5	19.70	19.60	7.40	7.36	7.38	8.41	8.41	8.41	1.05	1.11	3.50	2.00																								
		Bottom			8	19.50	19.50	7.33	7.45	7.39	6.99 / 6.96	8.41	8.41	8.41	1.10	1.14	2.50	2.20																							
	06-Apr-11	Surface	08:50	Fine	1	20.50	20.50	20.52	7.78	7.82	7.80	6.84 / 6.81	8.43	8.43	8.43	2.41	2.46	2.34	3.40	5.50	4.97					Works in Portion E	Nil														
		Middle			4.75	20.50	20.50	7.77	7.80	7.79	8.43	8.43	8.43	2.30	2.26	5.00	6.40																								
		Bottom			8.5	20.50	20.60	7.91	7.95	7.93	6.99 / 6.96	8.43	8.43	8.43	2.23	2.40	5.60	3.90																							
	08-Apr-11	Surface	09:12	Sunny	1	22.70	22.70	22.63	7.14	7.22	7.18	6.84 / 6.81	8.39	8.39	8.39	1.70	1.72	1.81	5.70	5.20	5.35							Works in Portion E	Nil												
		Middle			4.5	22.60	22.70	7.38	7.41	7.40	8.39	8.39	8.39	1.80	1.83	6.00	4.70																								
		Bottom			8	22.60	22.50	7.33	7.39	7.36	6.99 / 6.96	8.39	8.39	8.39	1.92	1.86	5.60	4.90																							
	11-Apr-11	Surface	10:20	Sunny	1	26.10	26.10	26.10	7.40	7.36	7.38	6.84 / 6.81	8.58	8.58	8.58	2.20	2.16	2.24	5.10	4.90	5.27									Works in Portion E	Nil										
		Middle			4.5	26.10	26.10	7.19	7.23	7.21	8.59	8.58	8.58	2.30	2.34	7.00	5.00																								
		Bottom			8	26.10	26.10	7.48	7.44	7.46	6.99 / 6.96	8.58	8.58	8.58	2.18	2.27	4.60	5.00																							
	13-Apr-11	Surface	14:33	Sunny	1	22.70	22.60	22.62	7.62	7.59	7.61	6.84 / 6.81	8.59	8.59	8.59	1.05	1.08	1.13	4.10	3.20	3.90											Works in Portion E	Nil								
		Middle			4.25	22.60	22.60	7.50	7.52	7.51	8.59	8.59	8.59	1.02	1.16	3.20	4.80																								
		Bottom			7.5	22.60	22.60	7.54	7.61	7.58	6.99 / 6.96	8.59	8.59	8.59	1.21	1.27	5.00	3.10																							
	15-Apr-11	Surface	15:33	Sunny	1	27.00	27.00	27.05	7.52	7.55	7.54	6.84 / 6.81	8.60	8.60	8.61	1.27	1.25	1.25	2.10	<2.00	2.37													Works in Portion E	Nil						
		Middle			4.25	27.10	27.10	7.41	7.46	7.44	6.99 / 6.96	8.61	8.61	8.61	1.25	1.29	2.40	2.30																							
		Bottom			7.5	27.00	27.10	7.49	7.53	7.51	6.99 / 6.96	8.61	8.61	8.61	1.25	1.29	2.40	2.30																							
	18-Apr-11	Surface	17:33	Fine	1	25.40	25.40	25.38	7.16	7.19	7.18	6.84 / 6.81	8.57	8.57	8.57	3.61	3.57	3.63	6.60	4.80	5.38															Works in Portion E	Nil				
		Middle			4.25	25.40	25.40	7.19	7.25	7.22	8.57	8.57	8.57	3.66	3.70	5.30	4.60																								
		Bottom			7.5	25.40	25.30	7.04	7.08	7.06	6.99 / 6.96	8.57	8.57	8.57	3.62	3.60	6.40	4.60																							
	20-Apr-11	Surface	08:45	Fine	1	24.30	24.30	24.30	7.03	7.07	7.05	6.84 / 6.81	8.37	8.37	8.37	3.70	3.65	3.51	4.60	5.50	4.32																	Works in Portion E	Nil		
		Middle			5	24.30	24.30	7.03	7.08	7.06	8.37	8.37	8.37	3.40	3.51	4.00	4.00																								
		Bottom			9	24.30	24.30	7.11	7.21	7.16	6.99 / 6.96	8.37	8.37	8.37	3.40	3.37	4.40	3.40																							
	26-Apr-11	Surface	12:05	Sunny	1	27.50	27.40	27.40	7.38	7.41	7.40	6.84 / 6.81	8.37	8.38	8.37	3.17	3.19	3.35	2.10	2.60	2.57																			Works in Portion E	Nil
		Middle			4.5	27.40	27.40	7.28	7.33	7.31	8.37	8.37	8.37	3.40	3.56	3.40	2.70																								
		Bottom			8	27.30	27.40	7.23	7.21	7.22	6.99 / 6.96	8.37	8.38	8.37	3.38	3.41	2.20	2.40																							
28-Apr-11	Surface	14:35	Cloudy	1	27.90	27.90	27.87	7.26	7.28	7.27	6.84 / 6.81	8.49	8.49	8.49	2.16	2.21	2.17	9.60	8.60	8.10	Works in Portion E	Nil																			
	Middle			4.25	27.90	27.90	7.09	7.11	7.10	8.49	8.49	8.49	2.09	2.11	7.60	8.80																									
	Bottom			7.5	27.80	27.80	7.18	7.21	7.20	6.99 / 6.96	8.49	8.49	8.49	2.20	2.25	8.60	7.40																								
30-Apr-11	Surface	07:45	Rainy	1	24.10	24.10	24.03	7.03	7.08	7.06	6.84 / 6.81	8.39	8.39	8.38	2.05	2.02	2.11	2.30	3.90	4.07			Works in Portion E	Nil																	
	Middle			4.5	24.00	24.00	7.19	7.29	7.24	8.38	8.38	8.38	2.10	2.14	5.50	4.00																									
	Bottom			8	24.00	24.00	7.22	7.26	7.24	6.99 / 6.96	8.38	8.38	8.38	2.18	2.19	5.30	3.40																								
-	Surface	-	-	-	-	-	-	-	-	-	6.84 / 6.81	-	-	-	-	-	-	-	-	-					-																
	Middle			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							-															
	Bottom			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							-															
-	Surface	-	-	-	-	-	-	-	-	-	6.84 / 6.81	-	-	-	-	-	-	-	-							-	-														
	Middle			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									-													
	Bottom			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									-													
-	Surface	-	-	-	-	-	-	-	-	-	6.84 / 6.81	-	-	-	-	-	-	-	-									-	-												
	Middle			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-											-											
	Bottom			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-											-											
Control of Outfall 1 During Flood Tide O-1-C(FT)	01-Apr-11	Surface	16:04	Sunny	1	22.20	22.30	22.30	7.29	7.34	7.32	-	8.30	8.30	8.31	3.74	3.62	3.64	6.20											6.20	6.10	Nil	Nil								
		Middle			6.75	22.30	22.30	7.25	7.27	7.26	8.31	8.31	8.31	3.60	3.57	7.20	6.20																								
		Bottom			12.5	22.40	22.30	7.33	7.38	7.36	8.31	8.31	8.31	3.70	3.61	5.10	5.70																								
	04-Apr-11	Surface	08:10	Cloudy	1	19.80	19.80	19.77	7.68	7.73	7.71	-	8.40	8.40	8.41	1.21	1.15	1.15	3.50											2.60	3.12			Nil	Nil						
		Middle			6.75	19.80	19.70	7.47	7.55	7.51	8.41	8.41	8.41	1.17	1.08	2.20	3.30																								
		Bottom			12.5	19.70	19.80	7.42	7.47	7.45	8.41	8.41	8.41	1.12	1.16	3.80	3.30																								
	06-Apr-11	Surface	08:20	Fine	1	20.50	20.50	20.55	7.64	7.69	7.67	-	8.43	8.43	8.43	2.50	2.44	2.42	4.80											3.90	4.40					Nil	Nil				
		Middle			7	20.60	20.60	7.60	7.63	7.62	8.43	8.42	8.43	2.30	2.37	4.40	4.10																								
		Bottom			13	20.50	20.60	7.86	7.81	7.84	8.42	8.43	8.43	2.40	2.51	4.30	4.90																								
	08-Apr-11	Surface	08:40	Sunny	1	22.80	22.70	22.73	7.54	7.59	7.57	-	8.38	8.39	8.39	1.66	1.72	1.82	3.70											4.00	4.20							Nil	Nil		
		Middle			7	22.70	22.70	7.34	7.37	7.36	8.39	8.39	8.39	1.89	1.81	3.90	4.10																								
		Bottom			13	22.80	22.70	7.48	7.43	7.46	8.40	8.39	8.39	1.94	1.90	4.50	5.00																								
	11-Apr-11	Surface	09:55	Sunny	1	26.00	26.10	26.07	7.38	7.34	7.36	-	8.58	8.58	8.59	2.18	2.15	2.25	4.10											4.40	4.27									Nil	Nil
		Middle			7	26.10	26.10	7.25	7.27	7.26	8.59	8.59	8.59	2.40	2.37	4.50	5.00																								
		Bottom			13	26.10	26.00	7.20	7.24	7.22	8.59	8.59	8.59	2.16	2.24	4.20	3.40																								
	13-Apr-11	Surface	14:05	Sunny	1	22.50	22.50	22.57	7.48	7.53	7.51	-	8.58	8.59	8.59	1.04	1.11	1.15	2.00		3.20	3.03								Nil	Nil										
		Middle			6.75	22.60	22.60	7.74	7.78	7.76	8.60	8.60	8.60	1.15	1.08	4.70	2.80																								
		Bottom			12.5	22.60	22.60	7.68	7.62	7.65	8.59	8.59	8.59	1.31	1.20	2.00	3.50																								
	15-Apr-11	Surface	15:06	Sunny	1	27.00	27.00	26.98	7.55	7.65	7.60	-	8.60	8.61	8.60	1.23	1.20	1.24	2.40		2.20	2.52	Nil	Nil																	
		Middle			6.5	27.00	26.90	7.29	7.33	7.31	8.61	8.60	8.60	1.14	1.20	3.00	2.60																								
		Bottom			12	27.00	27.00	7.49	7.53	7.51	8.60	8.60	8.60	1.31	1.37	2.70	2.20																								
	18-Apr-11	Surface	17:05	Fine	1	25.50	25.40	25.40	7.02	7.08	7.05	-	8.57	8.57	8.57	3.65	3.71	3.63	5.80	4.20	5.02	Nil			Nil																
		Middle			6.5</																																				

Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel

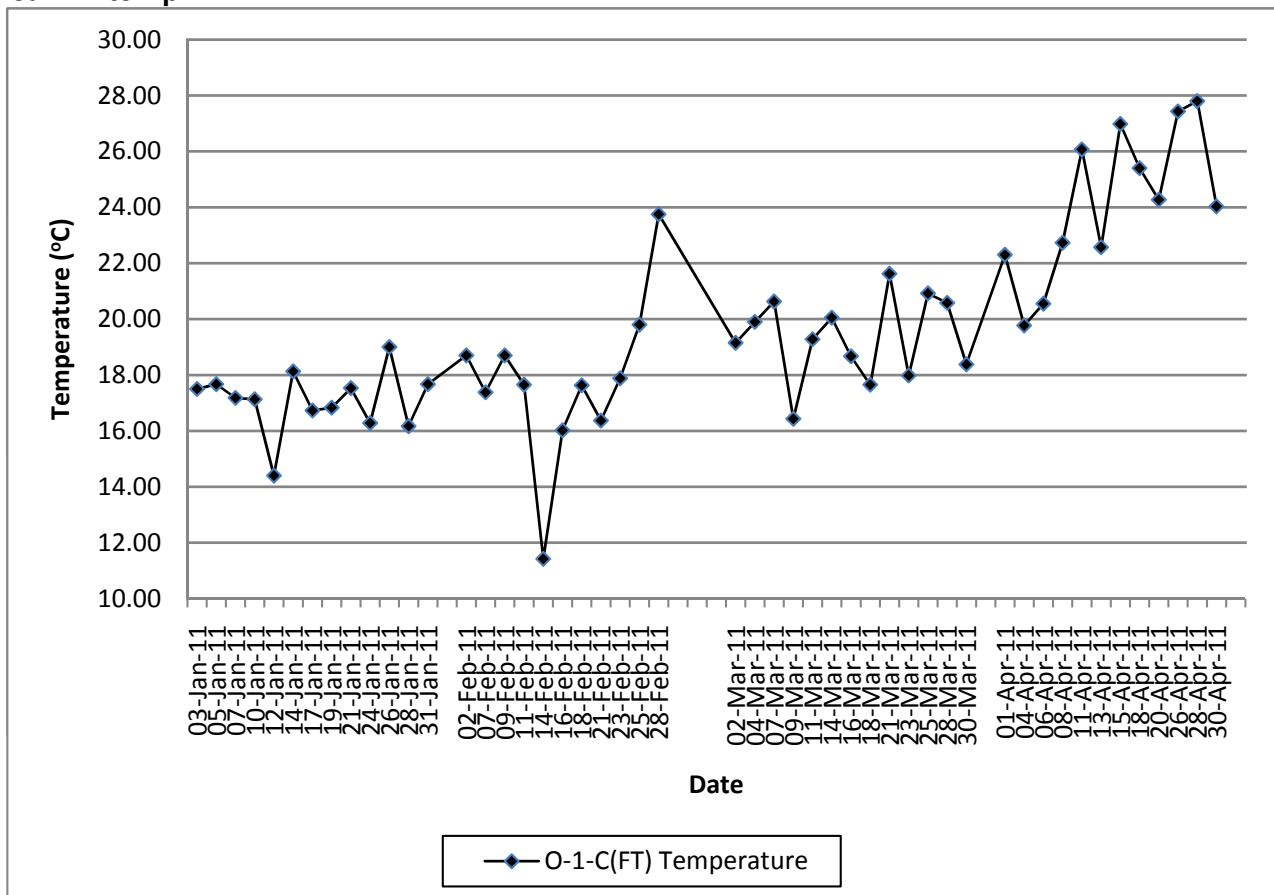
Marine Water Quality Impact Monitoring Results

Monitoring Locations	Date	Depth	Start Time	Weather	Water Depth(m)	Temp			DO(mg/L)			Action/Limit Level of DO(mg/L)	pH			Turbidity(NTU)			Action/Limit Level of Tby	SS (mg/L)			Action/Limit Level of SS(mg/L)	Remarks:	Action to be taken
						1	2	Avg	1	2	Avg		1	2	Avg	1	2	Avg							
						1	2	Avg	1	2	Avg		1	2	Avg	1	2	Avg							
Outfall 1 During Ebb Tide O-1(ET)	01-Apr-11	Surface	11:22	Sunny	1	23.10	23.20	7.34	7.40	7.37	7.02 / 6.94	8.30	8.29	8.29	2.96	3.04	3.01	4.70	5.10	5.38	Works in Portion E	Nil			
		Middle			4.25	23.20	23.20	7.17	7.27	7.22	8.29	8.29	8.29	3.15	3.02	5.80	5.00								
		Bottom			7.5	23.20	23.20	7.31	7.34	7.33	6.7 / 6.48	8.29	8.29	8.29	2.86	3.00	6.50	5.20							
	04-Apr-11	Surface	12:31	Cloudy	1	19.60	19.60	7.66	7.70	7.68	7.02 / 6.94	8.41	8.41	8.41	1.77	1.74	1.65	5.20	5.00	4.62	Works in Portion E	Nil			
		Middle			4.5	19.50	19.50	7.48	7.59	7.54	8.42	8.41	8.41	1.57	1.66	4.50	3.90								
		Bottom			8	19.60	19.50	7.64	7.79	7.72	6.7 / 6.48	8.41	8.42	8.41	1.60	1.57	5.30	3.80							
	06-Apr-11	Surface	14:33	Fine	1	20.70	20.70	7.82	7.86	7.84	7.02 / 6.94	8.45	8.45	8.45	1.35	1.38	1.42	2.70	2.00	2.62	Nil	Nil			
		Middle			4.5	20.80	20.80	7.97	8.00	7.99	8.45	8.45	8.45	1.42	1.46	4.00	2.60								
		Bottom			8	20.80	20.70	7.68	7.73	7.71	6.7 / 6.48	8.45	8.45	8.45	1.44	1.45	2.40	2.00							
	08-Apr-11	Surface	15:36	Sunny	1	22.50	22.60	7.48	7.42	7.45	7.02 / 6.94	8.39	8.39	8.39	2.10	2.05	2.08	2.90	2.20	2.45	Works in Portion E	Nil			
		Middle			4.5	22.50	22.50	7.46	7.49	7.48	8.39	8.39	8.39	2.06	2.11	2.10	2.30								
		Bottom			8	22.50	22.50	7.41	7.38	7.40	6.7 / 6.48	8.39	8.40	8.39	2.03	2.10	2.60	2.60							
	11-Apr-11	Surface	15:33	Sunny	1	26.60	26.20	7.49	7.52	7.51	7.02 / 6.94	8.59	8.59	8.59	2.07	2.09	2.12	5.40	3.50	3.87	Dredging	Nil			
		Middle			4.25	26.60	26.60	7.53	7.58	7.56	8.58	8.58	8.58	2.15	2.04	2.70	3.00								
		Bottom			7.5	26.60	26.60	7.55	7.61	7.58	6.7 / 6.48	8.58	8.59	8.58	2.16	2.19	4.20	4.40							
	13-Apr-11	Surface	09:15	Sunny	1	22.70	22.70	7.63	7.70	7.67	7.02 / 6.94	8.58	8.58	8.58	1.42	1.50	1.48	3.70	2.60	4.73	Works in Portion E	Nil			
		Middle			4.5	22.70	22.70	7.64	7.62	7.63	8.58	8.58	8.58	1.37	1.48	5.10	6.80								
		Bottom			8	22.80	22.80	7.73	7.77	7.75	6.7 / 6.48	8.57	8.57	8.57	1.51	1.57	4.10	6.10							
	15-Apr-11	Surface	10:14	Sunny	1	26.80	26.90	7.43	7.46	7.45	7.02 / 6.94	8.60	8.60	8.60	1.46	1.52	1.53	4.20	3.20	3.70	Works in Portion E	Nil			
		Middle			4.25	26.80	26.90	7.60	7.53	7.57	8.60	8.59	8.60	1.49	1.57	3.60	2.90								
		Bottom			7.5	27.00	26.90	7.27	7.31	7.29	6.7 / 6.48	8.59	8.59	8.59	1.60	1.53	4.60	3.70							
	18-Apr-11	Surface	12:37	Fine	1	25.10	25.20	7.14	7.16	7.15	7.02 / 6.94	8.54	8.54	8.54	3.66	3.73	3.62	4.50	5.00	4.02	Works in Portion E	Nil			
		Middle			4.5	25.20	25.20	7.07	7.17	7.12	8.54	8.54	8.54	3.54	3.63	4.00	3.60								
		Bottom			8	25.20	25.20	7.30	7.27	7.29	6.7 / 6.48	8.54	8.54	8.54	3.51	3.62	4.50	3.50							
20-Apr-11	Surface	15:02	Fine	1	24.50	24.60	7.80	7.11	7.46	7.02 / 6.94	8.37	8.37	8.37	1.98	2.07	2.14	3.20	2.80	3.25	Works in Portion E	Nil				
	Middle			4	24.60	24.60	7.07	7.11	7.09	8.37	8.37	8.37	2.18	2.13	3.60	3.60									
	Bottom			7	24.50	24.50	7.12	7.15	7.14	6.7 / 6.48	8.37	8.37	8.37	2.20	2.26	2.50	3.80								
26-Apr-11	Surface	17:30	Sunny	1	27.00	27.00	7.21	7.24	7.23	7.02 / 6.94	8.37	8.37	8.37	2.18	2.10	2.13	2.00	<2.00	2.48	Works in Portion E	Nil				
	Middle			4.5	27.00	27.10	7.27	7.35	7.31	8.37	8.37	8.37	2.07	2.17	2.10	2.70									
	Bottom			8	27.20	27.10	7.17	7.22	7.20	6.7 / 6.48	8.38	8.38	8.38	2.17	2.09	3.40	2.70								
28-Apr-11	Surface	09:38	Cloudy	1	27.60	27.60	7.18	7.28	7.23	7.02 / 6.94	8.47	8.47	8.47	2.25	2.27	2.22	3.50	2.50	3.00	Works in Portion E	Nil				
	Middle			4.5	27.60	27.60	7.17	7.26	7.22	8.47	8.47	8.47	2.18	2.12	3.50	2.50									
	Bottom			8	27.60	27.50	7.44	7.36	7.40	6.7 / 6.48	8.47	8.47	8.47	2.31	2.20	3.40	2.60								
30-Apr-11	Surface	10:31	Rainy	1	23.70	23.70	7.19	7.16	7.18	7.02 / 6.94	8.40	8.40	8.40	2.21	2.30	2.15	3.40	4.70	3.72	Works in Portion E	Nil				
	Middle			4.5	23.70	23.70	7.11	7.14	7.13	8.40	8.40	8.40	2.06	2.10	3.00	3.30									
	Bottom			8	23.70	23.70	7.25	7.28	7.27	6.7 / 6.48	8.40	8.41	8.40	2.09	2.13	3.20	4.70								
-	Surface	-	-	-	-	-	-	-	-	7.02 / 6.94	-	-	-	-	-	-	-	-	-	-	-				
	Middle			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-			
	Bottom			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-			
-	Surface	-	-	-	-	-	-	-	-	7.02 / 6.94	-	-	-	-	-	-	-	-	-	-	-				
	Middle			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-			
	Bottom			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-			
-	Surface	-	-	-	-	-	-	-	-	7.02 / 6.94	-	-	-	-	-	-	-	-	-	-	-				
	Middle			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-			
	Bottom			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-			
Control of Outfall 1 During Ebb Tide O-1-C(ET)	01-Apr-11	Surface	10:50	Sunny	1	23.70	23.70	7.42	7.44	7.43	8.29	8.29	8.29	3.39	3.46	3.24	4.80	4.10	4.68	Nil	Nil				
		Middle			5.75	23.70	23.60	7.23	7.30	7.27	8.29	8.29	8.29	3.21	3.15	4.10	4.80								
		Bottom			10.5	23.60	23.70	7.24	7.28	7.26	8.30	8.29	8.29	3.07	3.14	5.70	4.60								
04-Apr-11	Surface	12:08	Cloudy	1	19.50	19.50	7.57	7.61	7.59	8.42	8.41	8.42	1.71	1.68	1.61	7.00	5.50	6.60	Nil	Nil					
	Middle			5.75	19.40	19.40	7.52	7.60	7.56	8.41	8.41	8.41	1.44	1.53	6.50	6.20									
	Bottom			10.5	19.40	19.40	7.51	7.56	7.54	8.42	8.42	8.42	1.62	1.69	7.70	6.70									
06-Apr-11	Surface	14:05	Fine	1	20.70	20.70	7.44	7.53	7.49	8.44	8.44	8.44	1.28	1.36	1.38	2.70	2.00	2.55	Nil	Nil					
	Middle			5.75	20.70	20.80	7.63	7.68	7.66	8.44	8.45	8.44	1.41	1.50	<2.00	<2.00									
	Bottom			10.5	20.70	20.70	7.53	7.55	7.54	8.44	8.44	8.44	1.42	1.31	2.60	4.00									
08-Apr-11	Surface	15:10	Sunny	1	22.50	22.50	7.35	7.40	7.38	8.40	8.40	8.40	2.03	2.12	2.09	2.90	3.70	3.03	Nil	Nil					
	Middle			6	22.50	22.60	7.48	7.51	7.50	8.40	8.40	8.40	2.04	2.07	3.60	3.10									
	Bottom			11	22.50	22.40	7.50	7.55	7.53	8.39	8.39	8.39	2.13	2.17	2.30	2.60									
11-Apr-11	Surface	15:06	Sunny	1	26.50	26.50	7.40	7.43	7.42	8.58	8.58	8.58	2.20	2.17	2.25	4.50	3.00	3.65	Nil	Nil					
	Middle			5.75	26.50	26.50	7.47	7.54	7.51	8.58	8.58	8.58	2.34	2.31	3.90	3.30									
	Bottom			10.5	26.60	26.60	7.66	7.62	7.64	8.58	8.59	8.58	2.26	2.21	3.60	3.60									
13-Apr-11	Surface	08:50	Sunny	1	22.80	22.80	7.82	7.86	7.84	8.57	8.57	8.57	1.53	1.63	1.55	3.00	5.10	4.05	Nil	Nil					
	Middle			6	22.90	22.80	7.63	7.59	7.61	8.58	8.57	8.57	1.50	1.47	5.20	2.90									
	Bottom			11	22.90	22.90	7.66	7.72	7.69	8.57	8.57	8.57	1.58	1.61	3.50	4.60									
15-Apr-11	Surface	09:45	Sunny	1	26.90	26.80	7.40	7.44	7.42	8.60	8.61	8.61	1.40	1.51	1.53	3.50	3.50	3.92	Nil	Nil					
	Middle			5.5	26.90	26.90	7.51	7.53	7.52	8.61	8.61	8.61	1.60	1.57	5.00	4.00									
	Bottom			10	26.80	26.90	7.34	7.37	7.36	8.61	8.60	8.61	1.52	1.57	3.80	3.70									
18-Apr-11	Surface	12:10	Fine	1	25.30	25.30	7.19	7.23	7.21	8.54	8.54	8.54	3.80	3.71	3.66	6.30	4.50	4.15	Nil	Nil					
	Middle			5.75	25.30	25.30	7.22	7.27	7.25	8.54	8.54	8.54	3.54	3.63	2.80	4.60									
	Bottom			10.5	25.20	25.20	7.20	7.17	7.19	8.54	8.54	8													

**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Outfall 1 During Flood Tide (O-1(FT))  
Jan-11 to Apr-11**

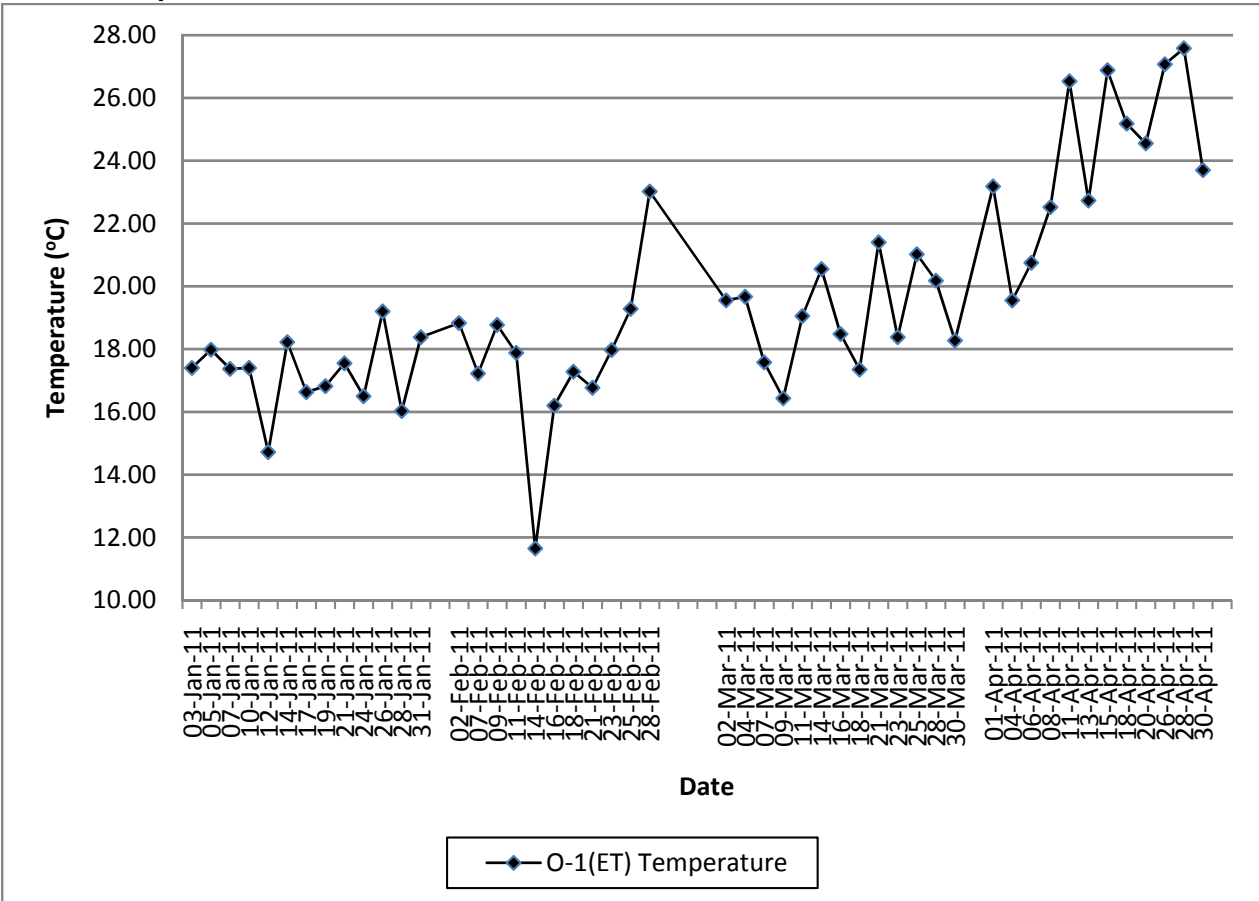


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Control of Outfall 1 During Flood Tide (O-1-C(FT))  
Jan-11 to Apr-11**

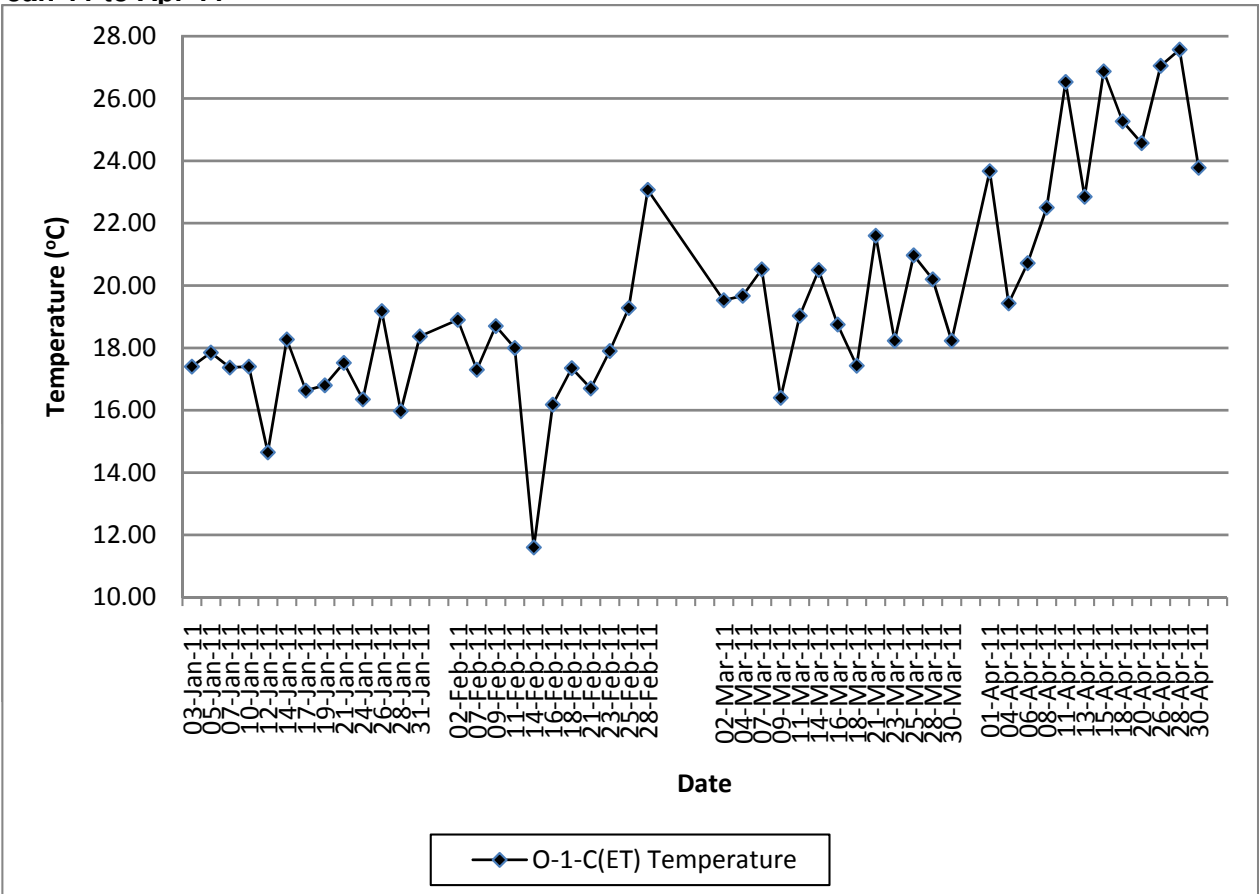




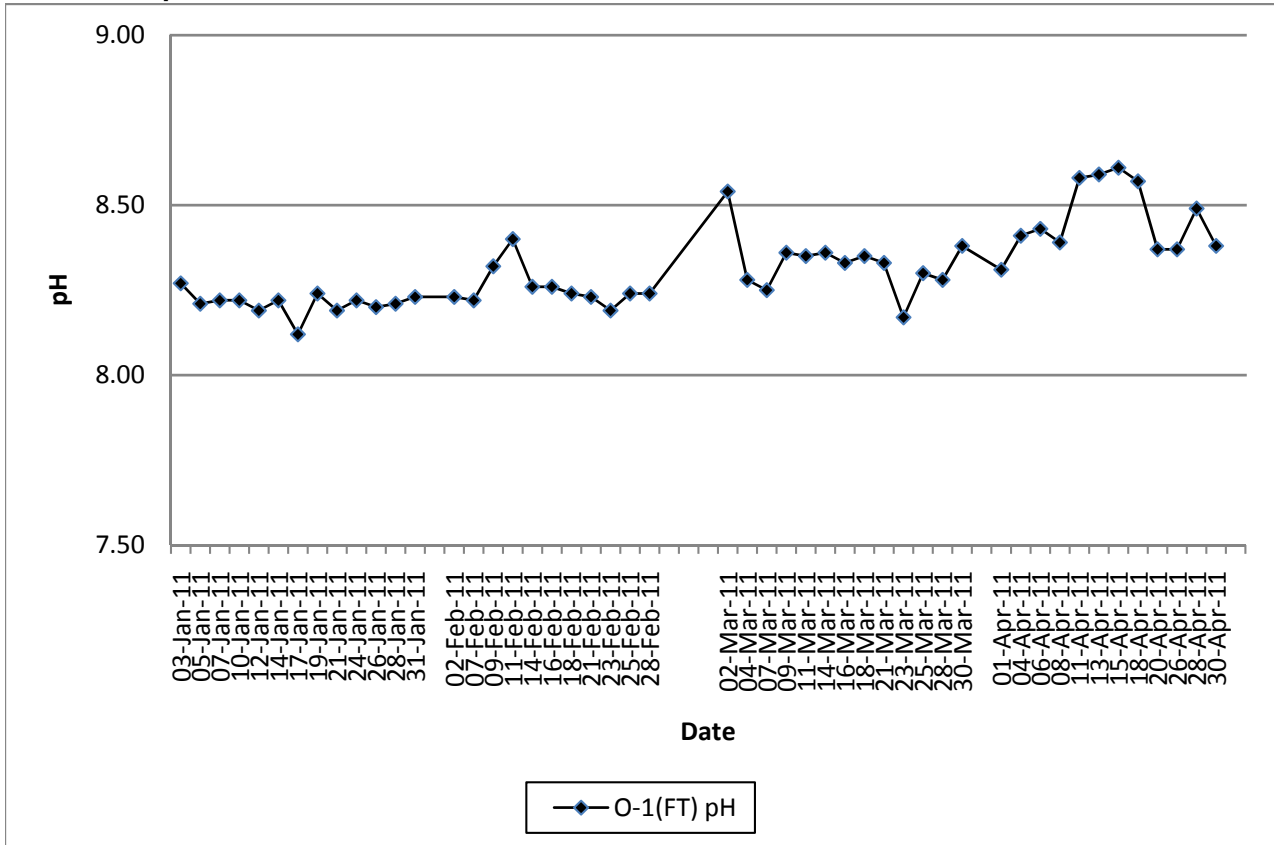
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Outfall 1 During Ebb Tide (O-1(ET))  
Jan-11 to Apr-11**



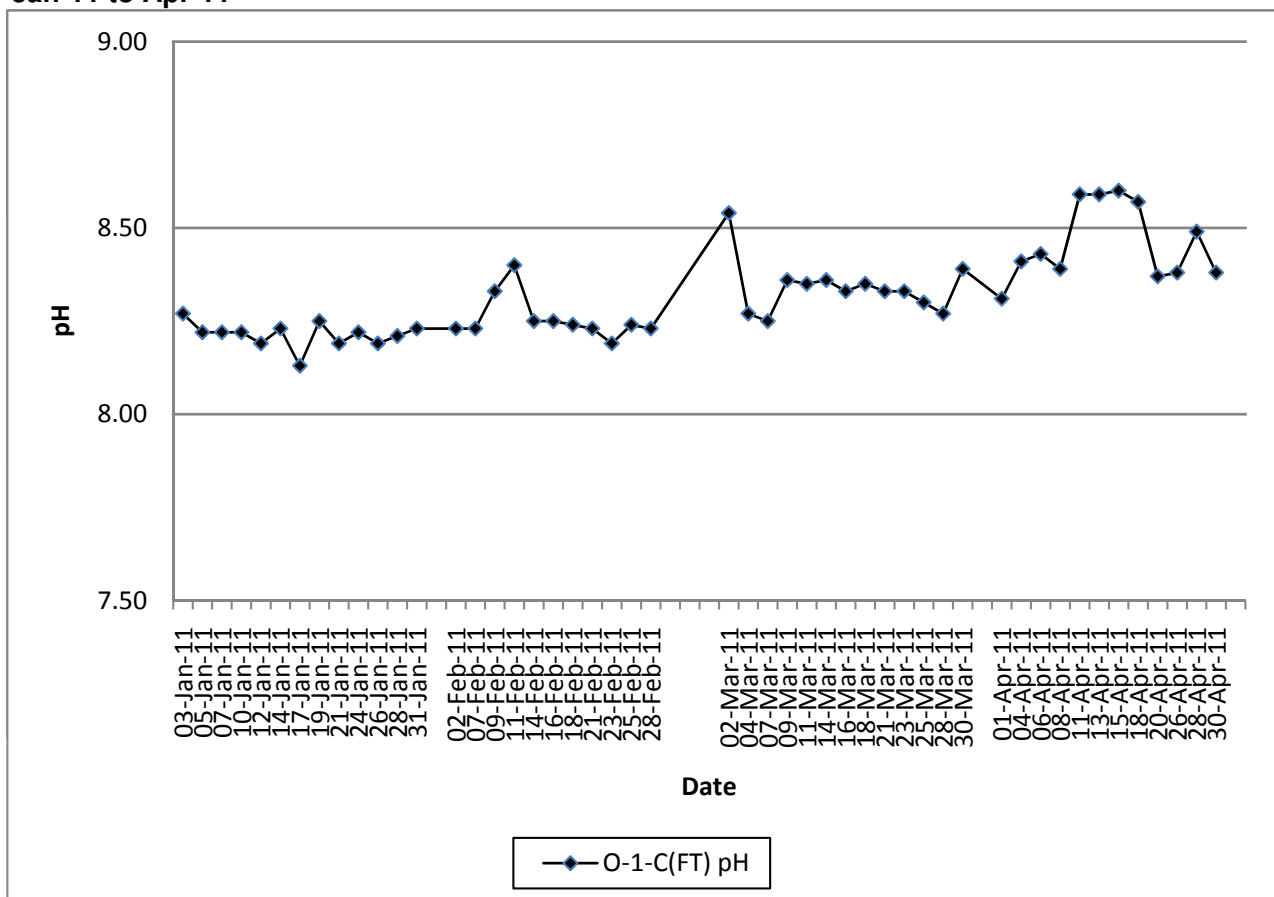
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Control of Outfall 1 During Ebb Tide (O-1-C(ET))  
Jan-11 to Apr-11**



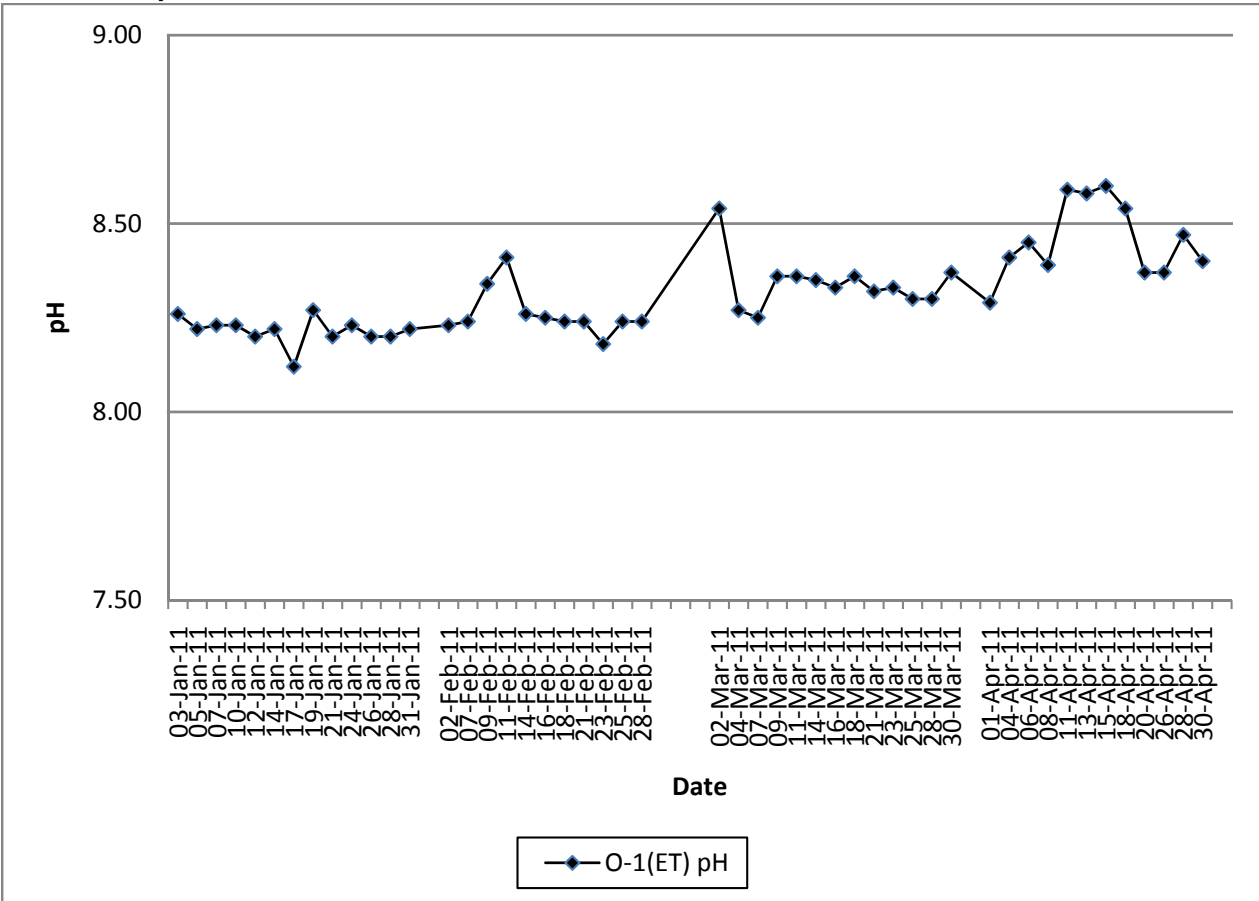
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Outfall 1 During Flood Tide (O-1(FT))  
Jan-11 to Apr-11**



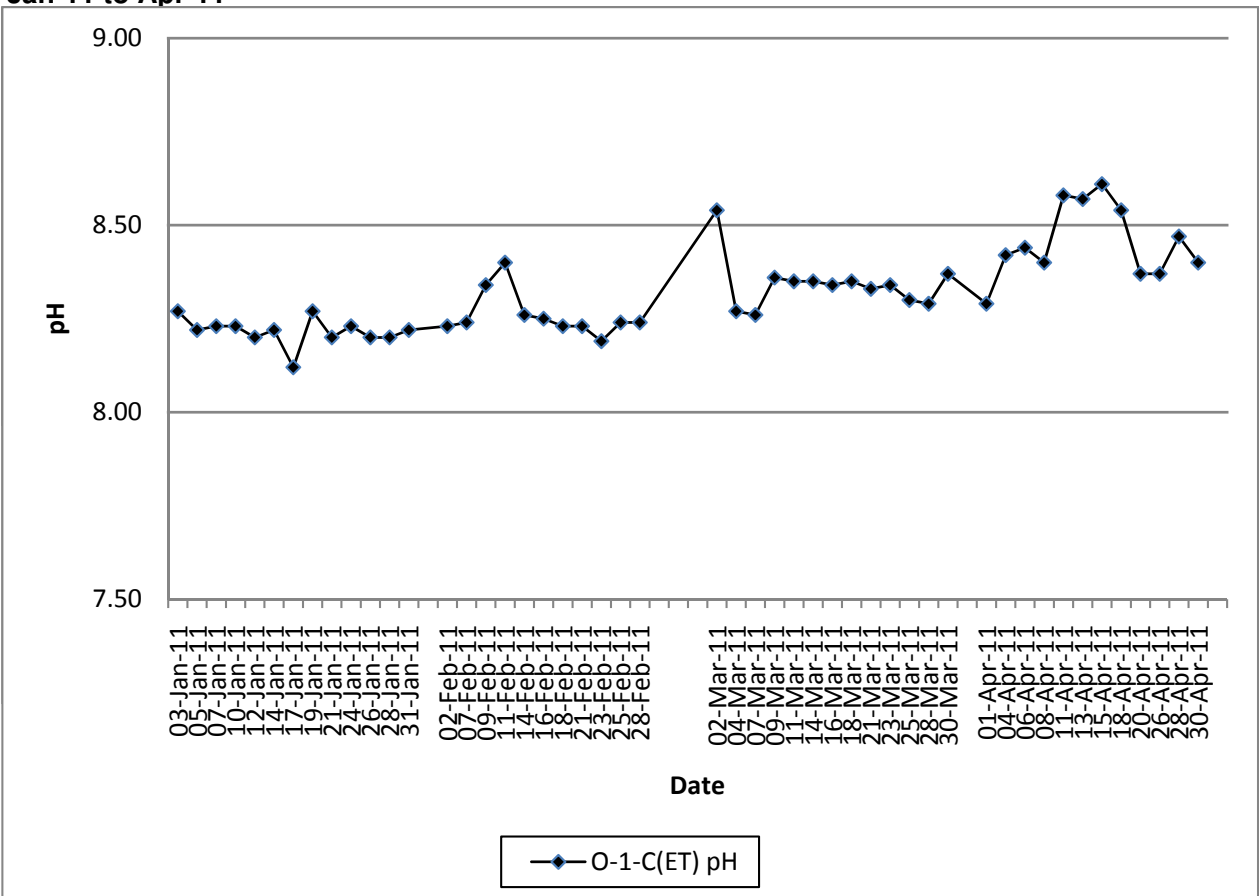
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Control of Outfall 1 During Flood Tide (O-1-C(FT))  
Jan-11 to Apr-11**



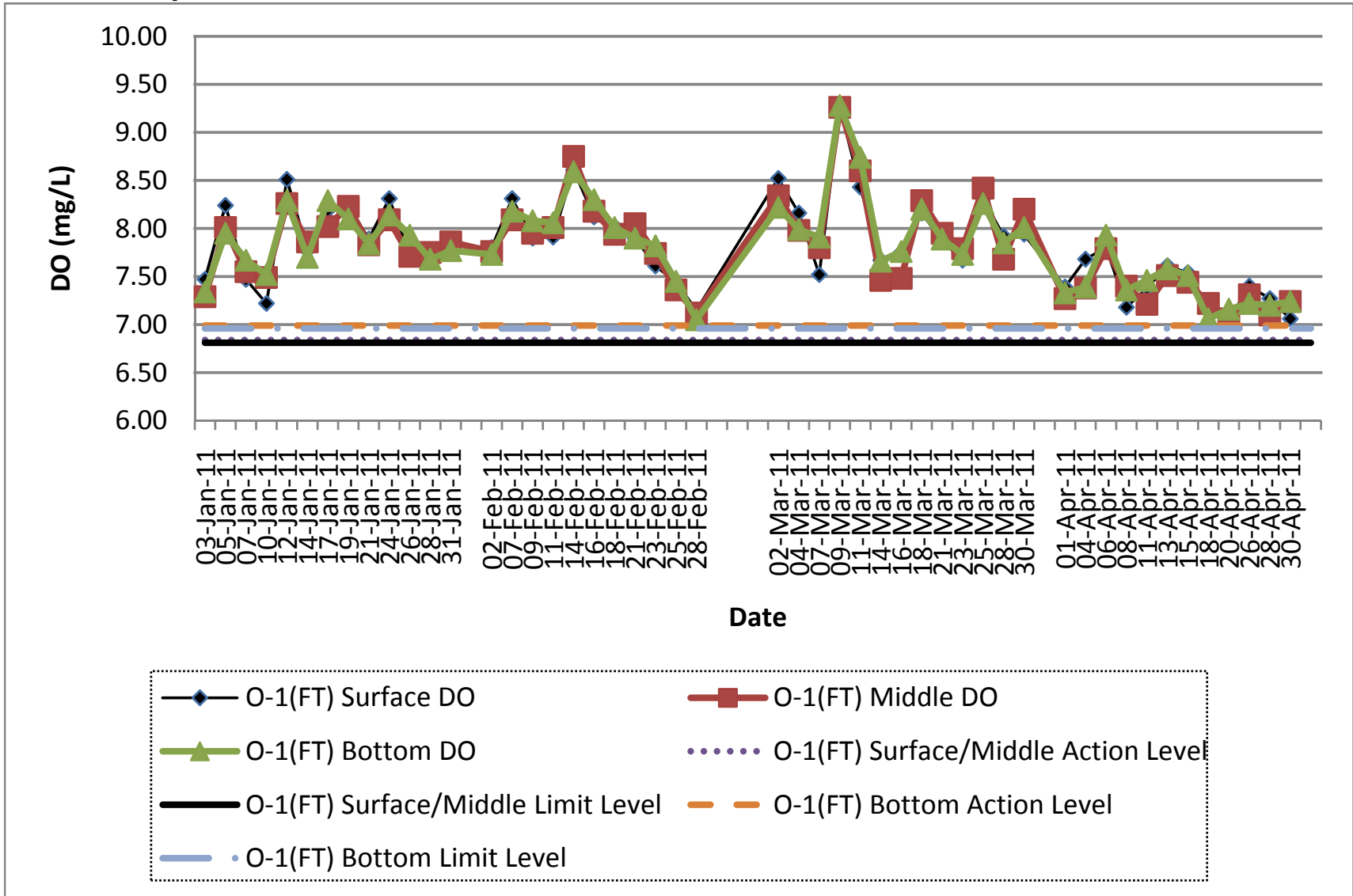
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Outfall 1 During Ebb Tide (O-1(ET))  
Jan-11 to Apr-11**



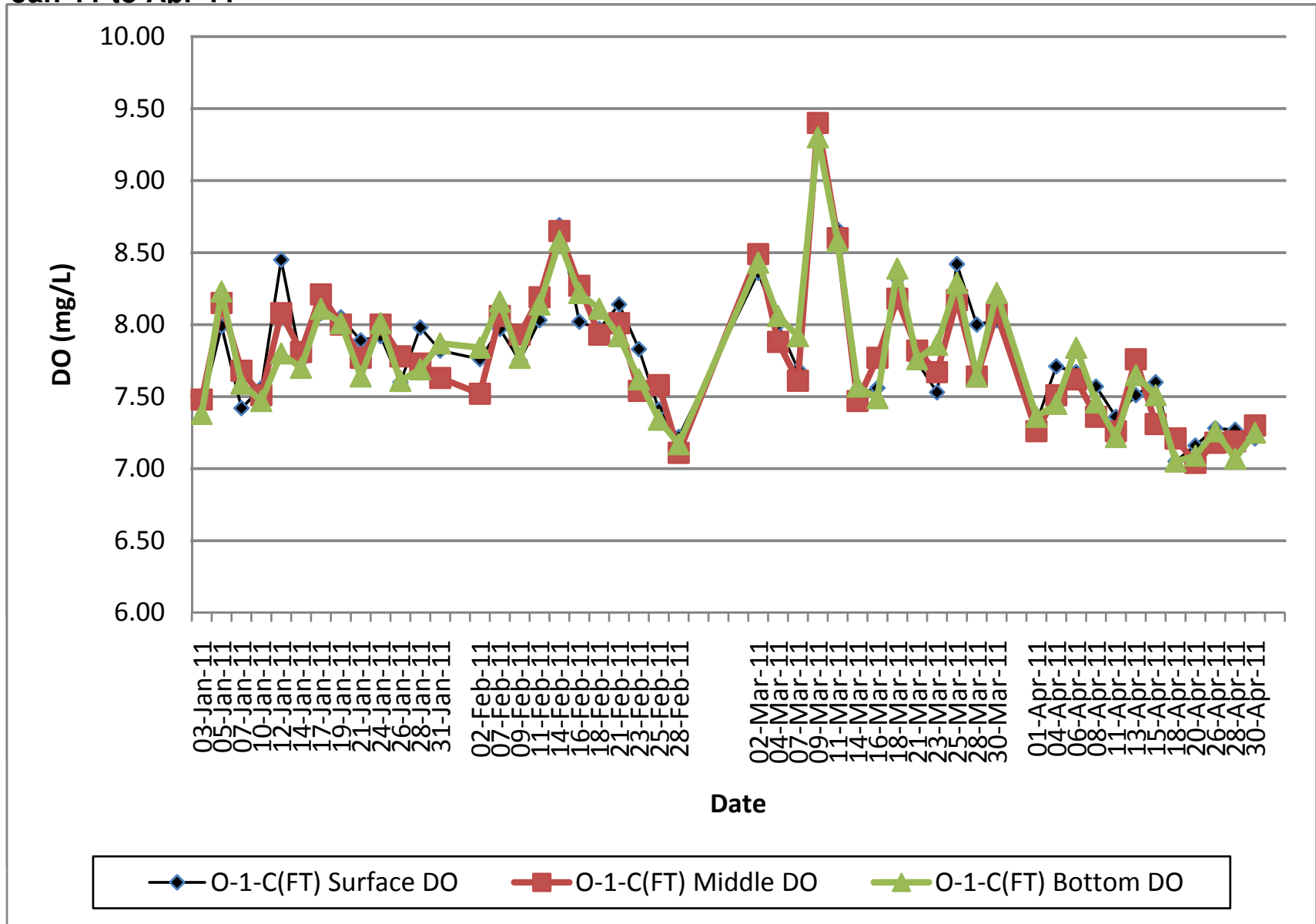
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Control of Outfall 1 During Ebb Tide (O-1-C(ET))  
Jan-11 to Apr-11**



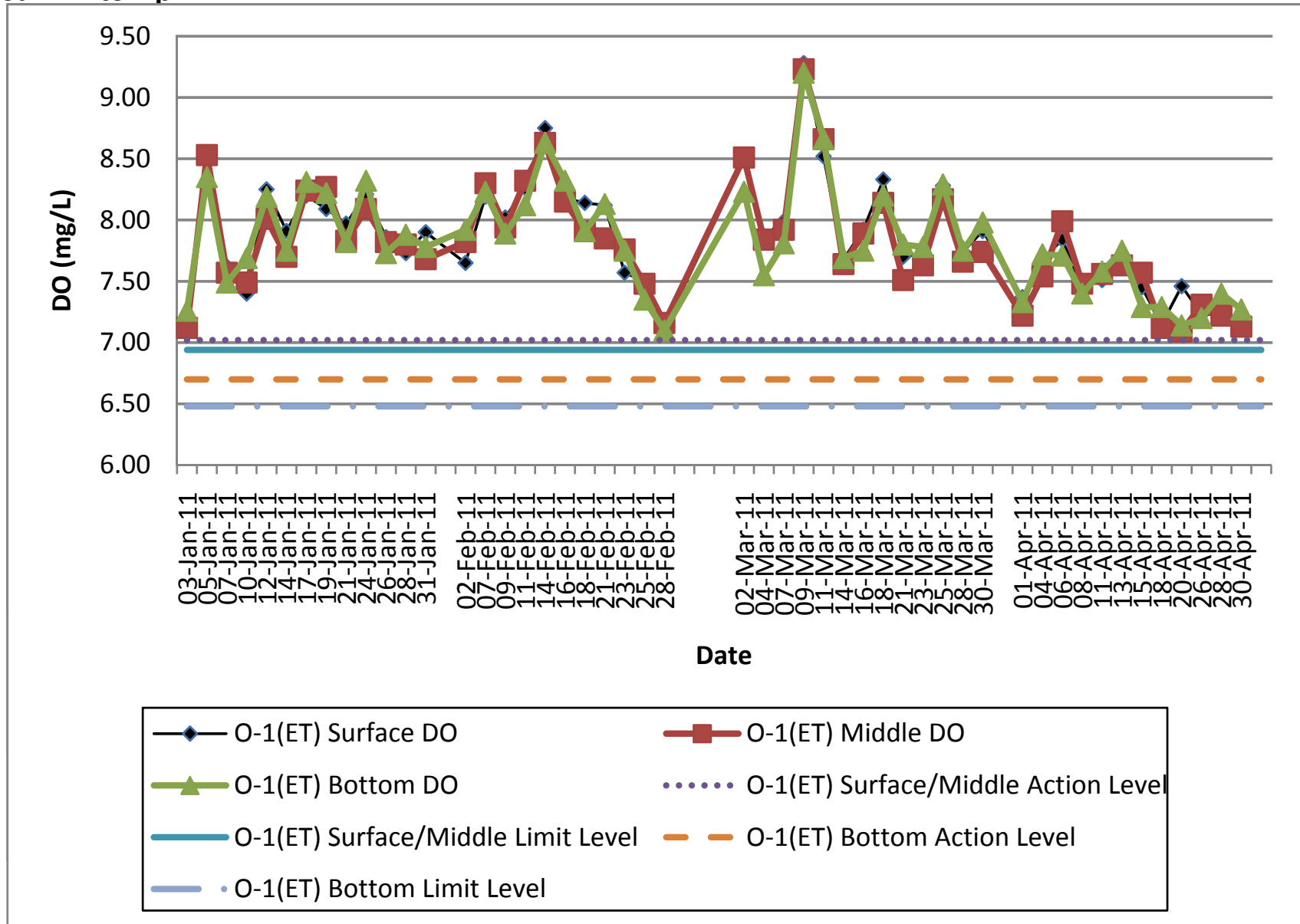
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
 Water Quality Results at Outfall 1 During Flood Tide (O-1(FT))  
 Jan-11 to Apr-11**



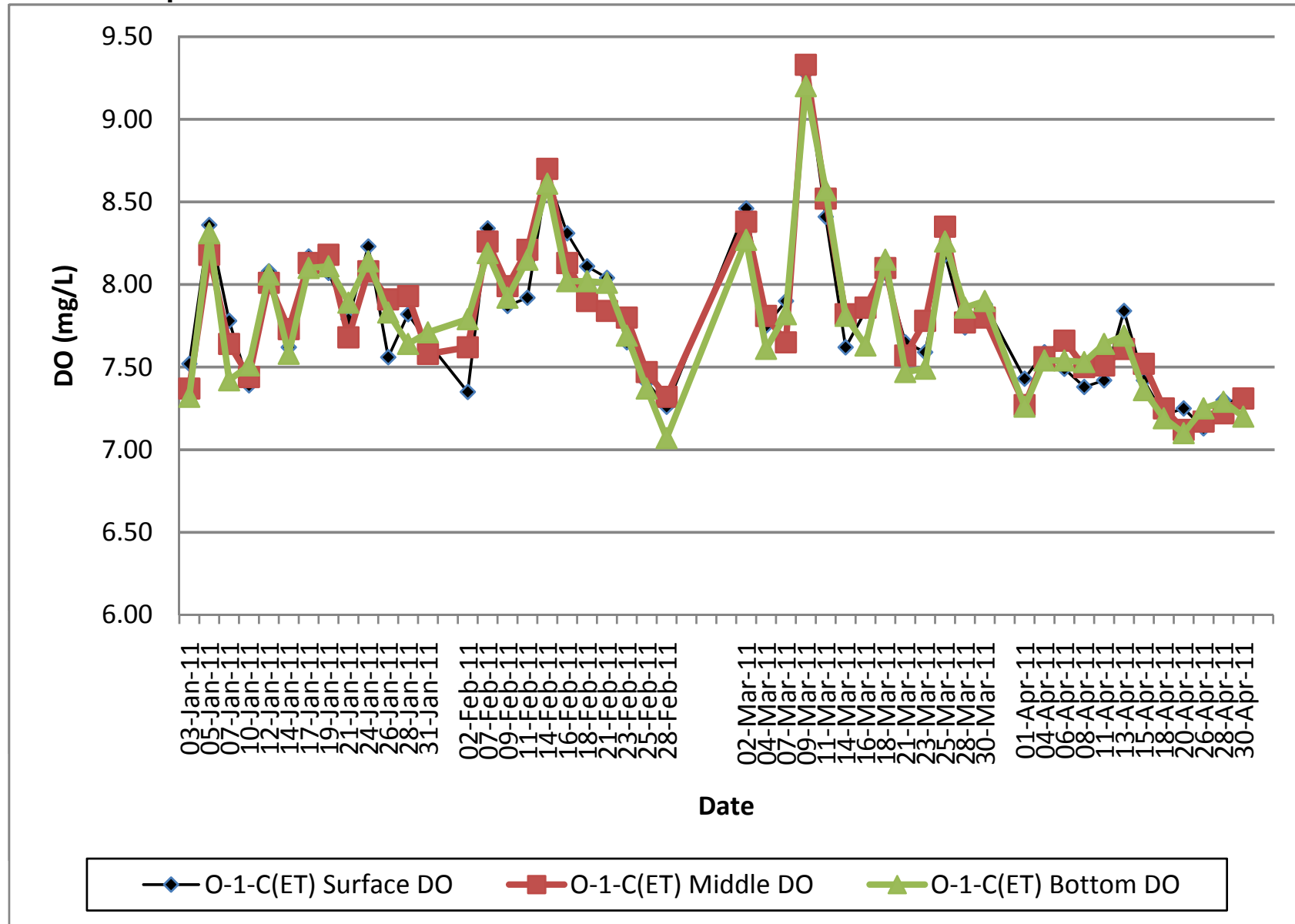
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 Water Quality Results at Control of Outfall 1 During Flood Tide (O-1-C(FT))  
 Jan-11 to Apr-11**



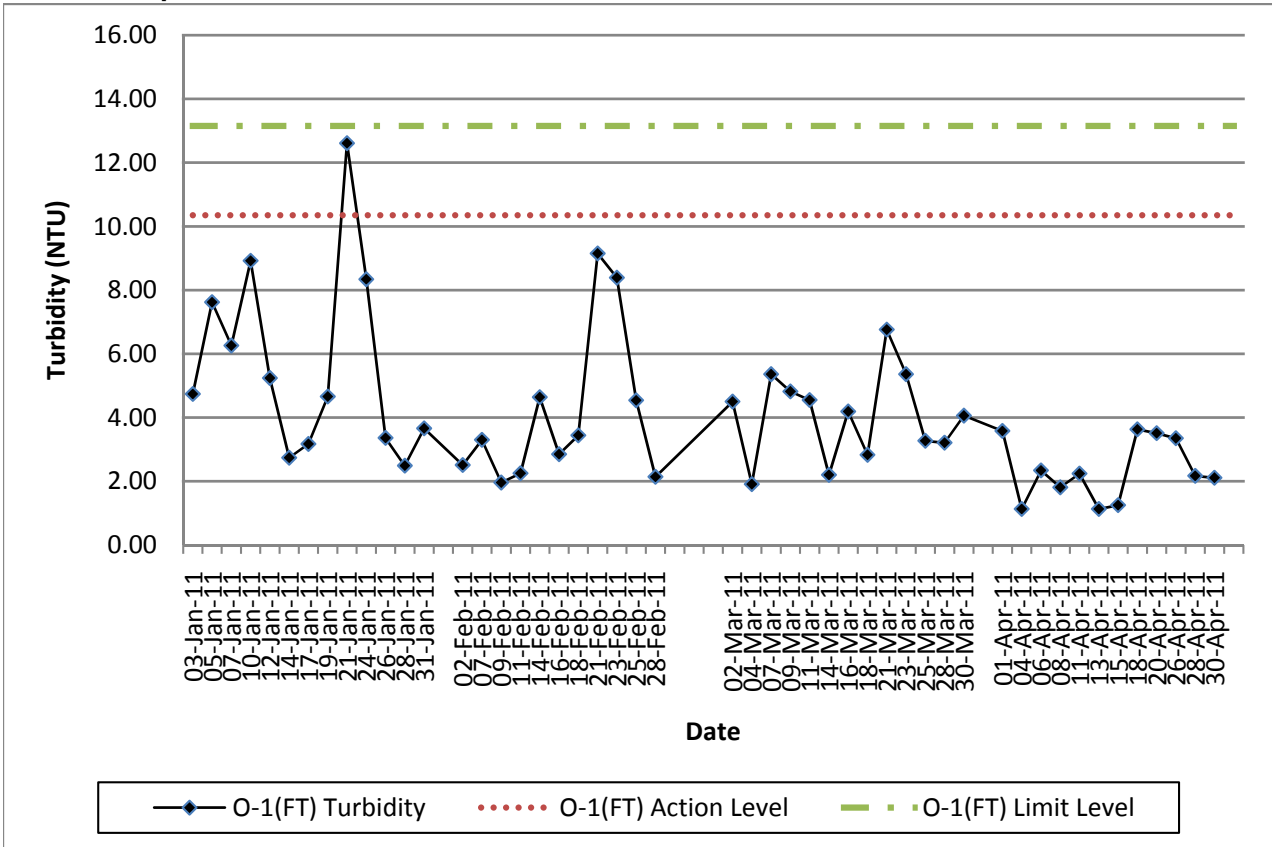
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel**  
**Water Quality Results at Outfall 1 During Ebb Tide (O-1(ET))**  
**Jan-11 to Apr-11**



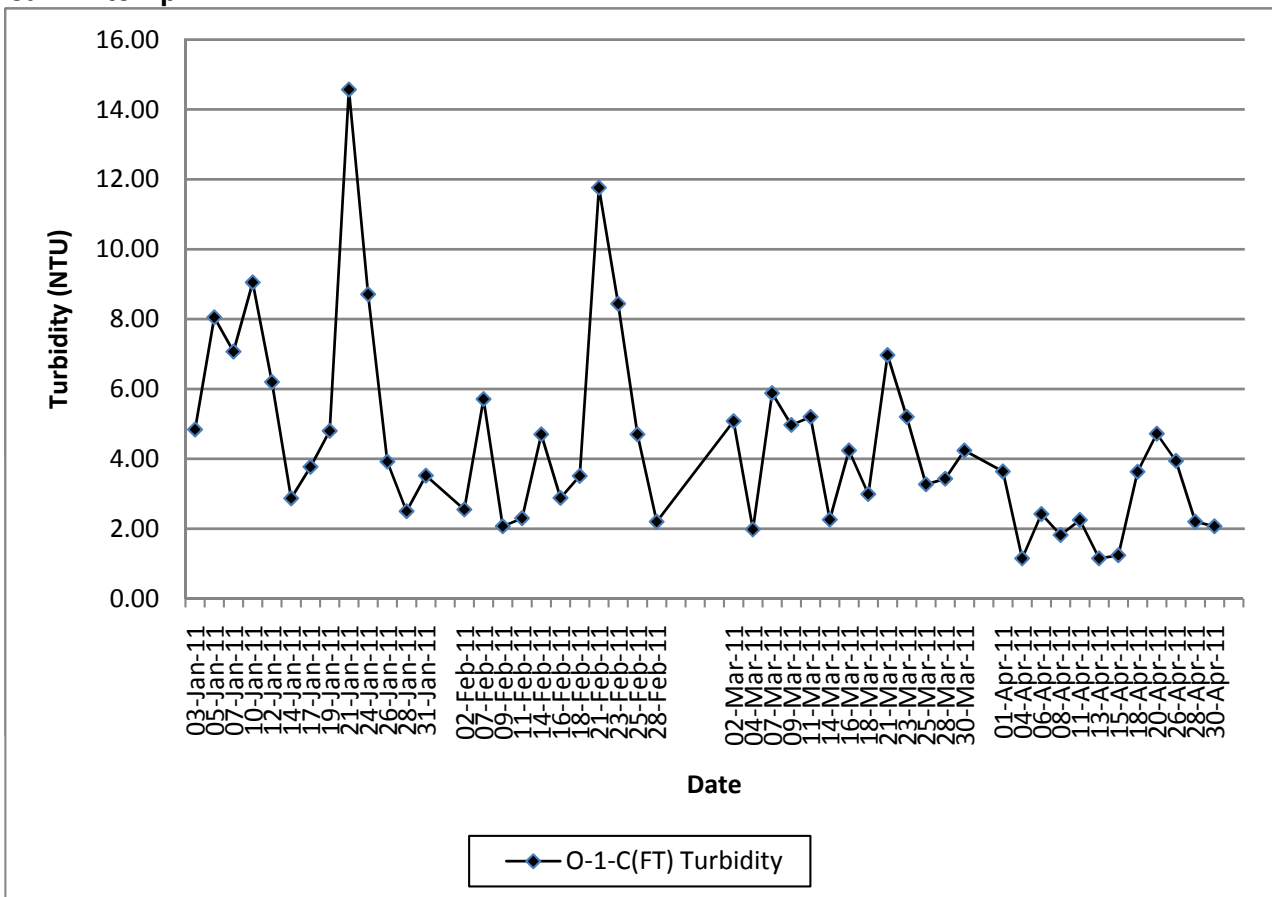
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 Water Quality Results at Control of Outfall 1 During Ebb Tide (O-1-C(ET))  
 Jan-11 to Apr-11**



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Water Quality Results at Outfall 1 During Flood Tide (O-1(FT))  
Jan-11 to Apr-11**

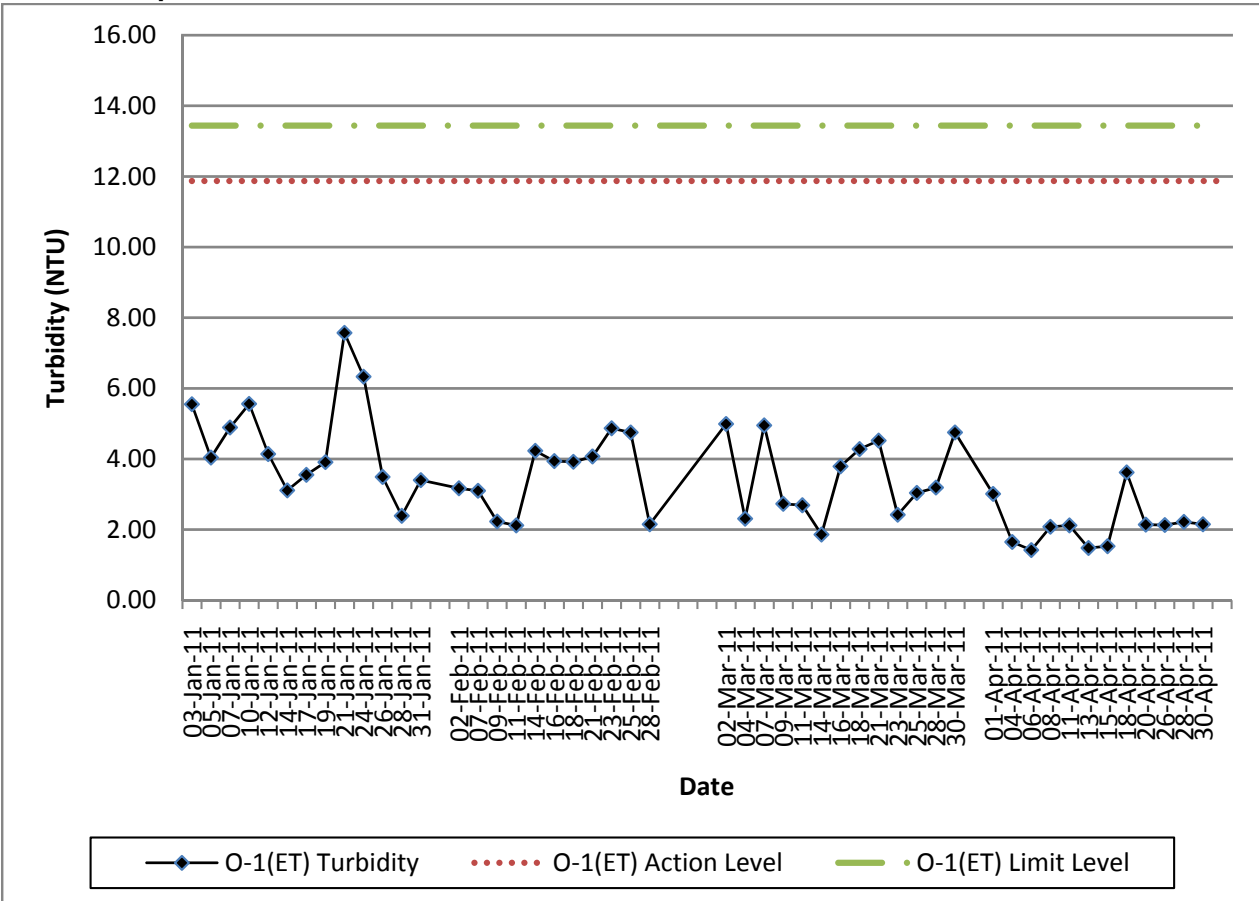


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Water Quality Results at Control of Outfall 1 During Flood Tide (O-1-C(FT))  
Jan-11 to Apr-11**

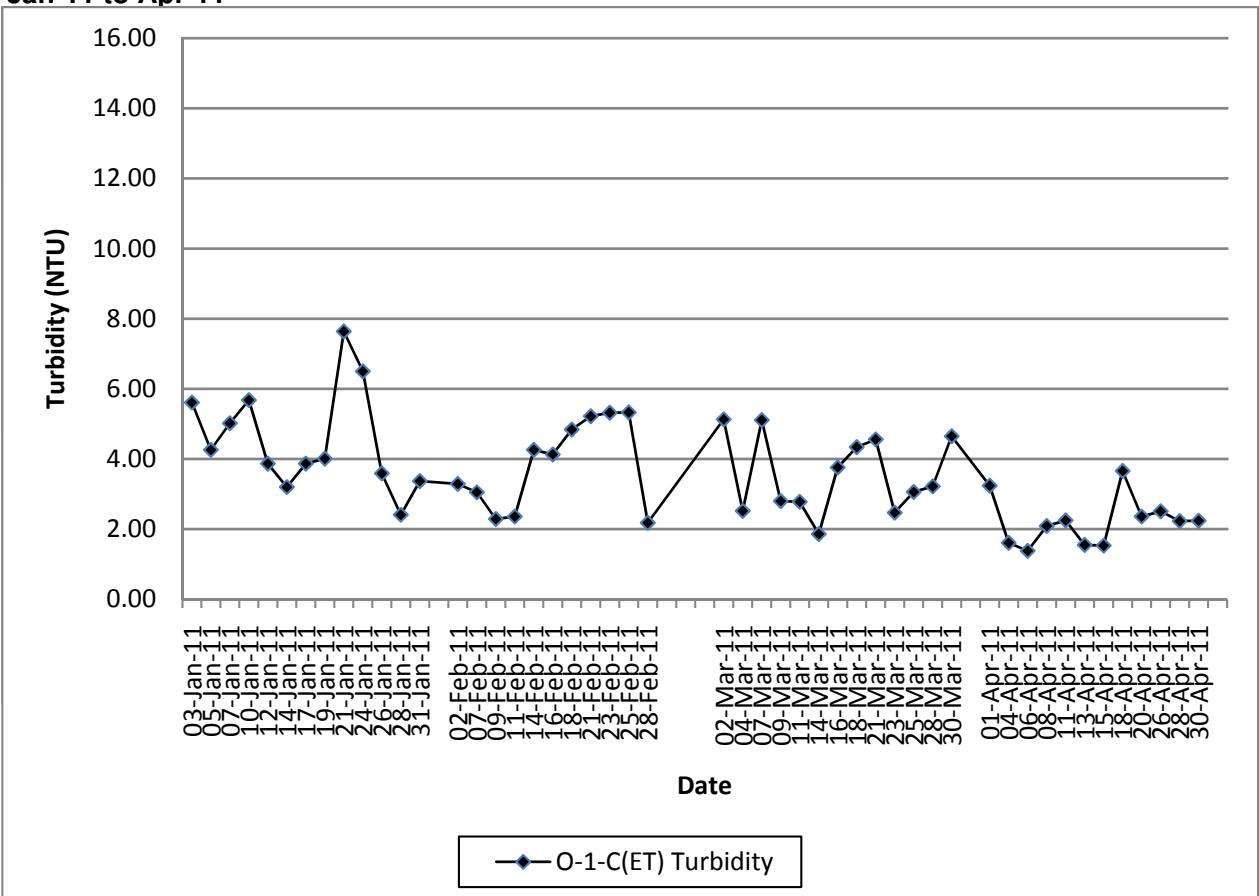




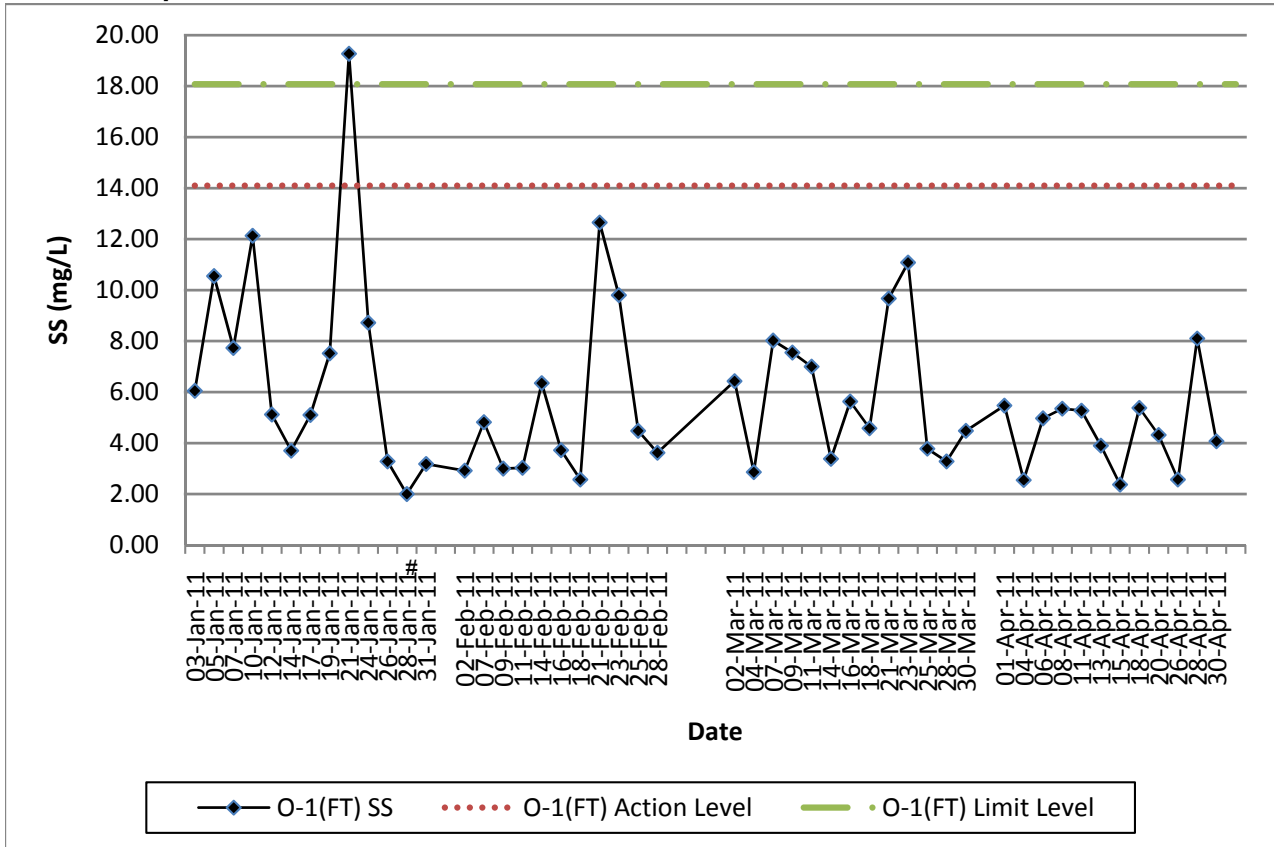
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Outfall 1 During Ebb Tide (O-1(ET))  
Jan-11 to Apr-11**



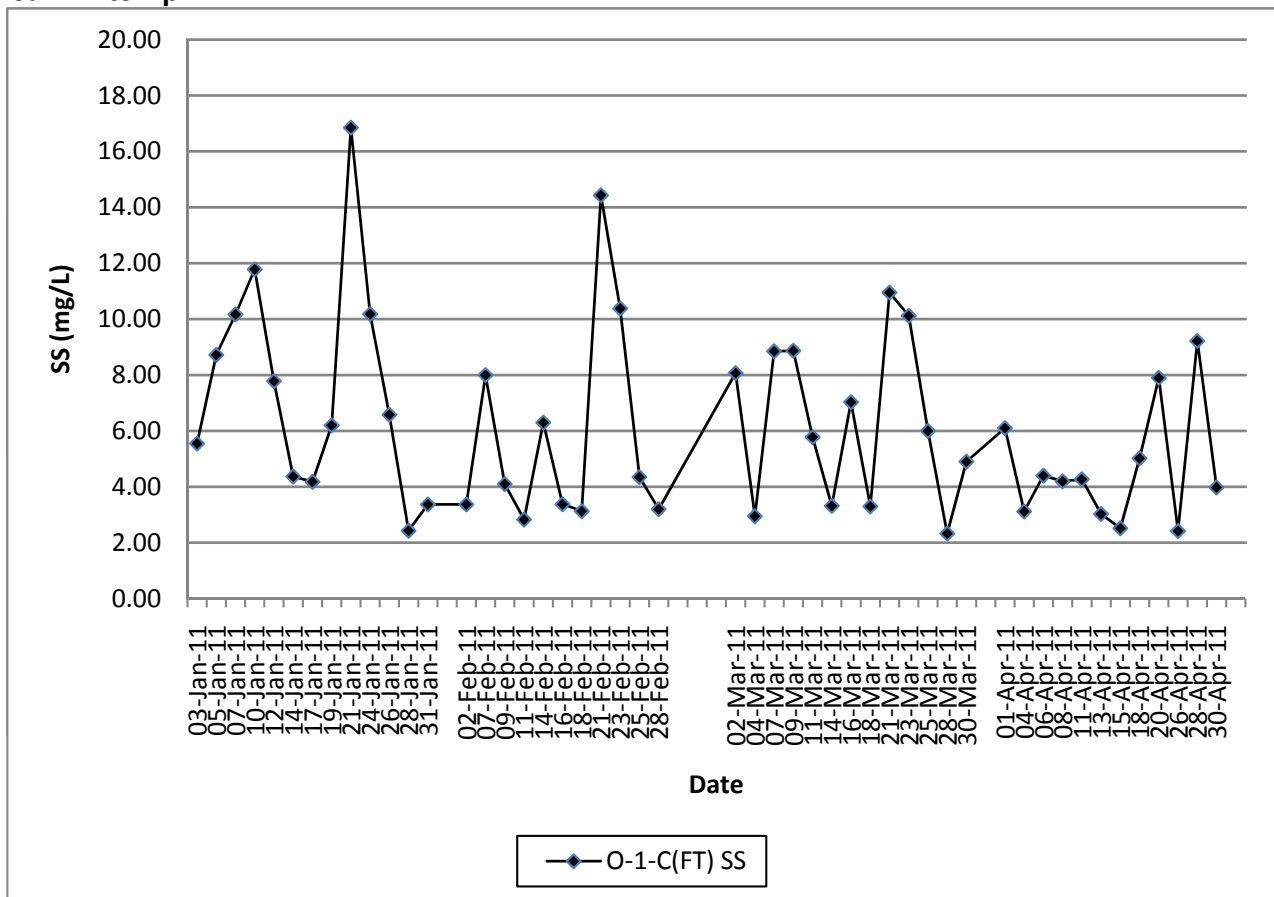
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 Water Quality Results at Outfall 1 During Flood Tide (O-1(FT))  
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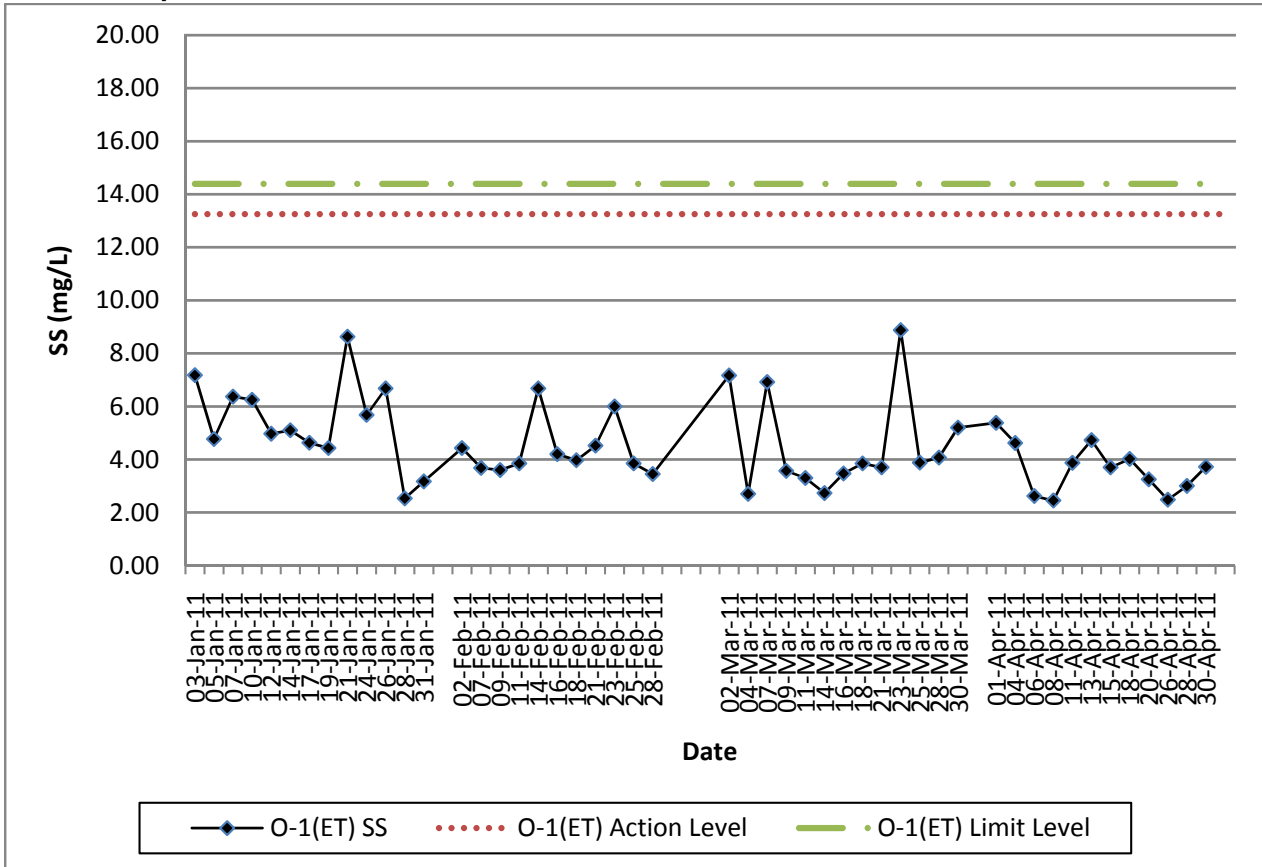


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 Water Quality Results at Control of Outfall 1 During Flood Tide (O-1-C(FT))  
 Jan-11 to Apr-11**

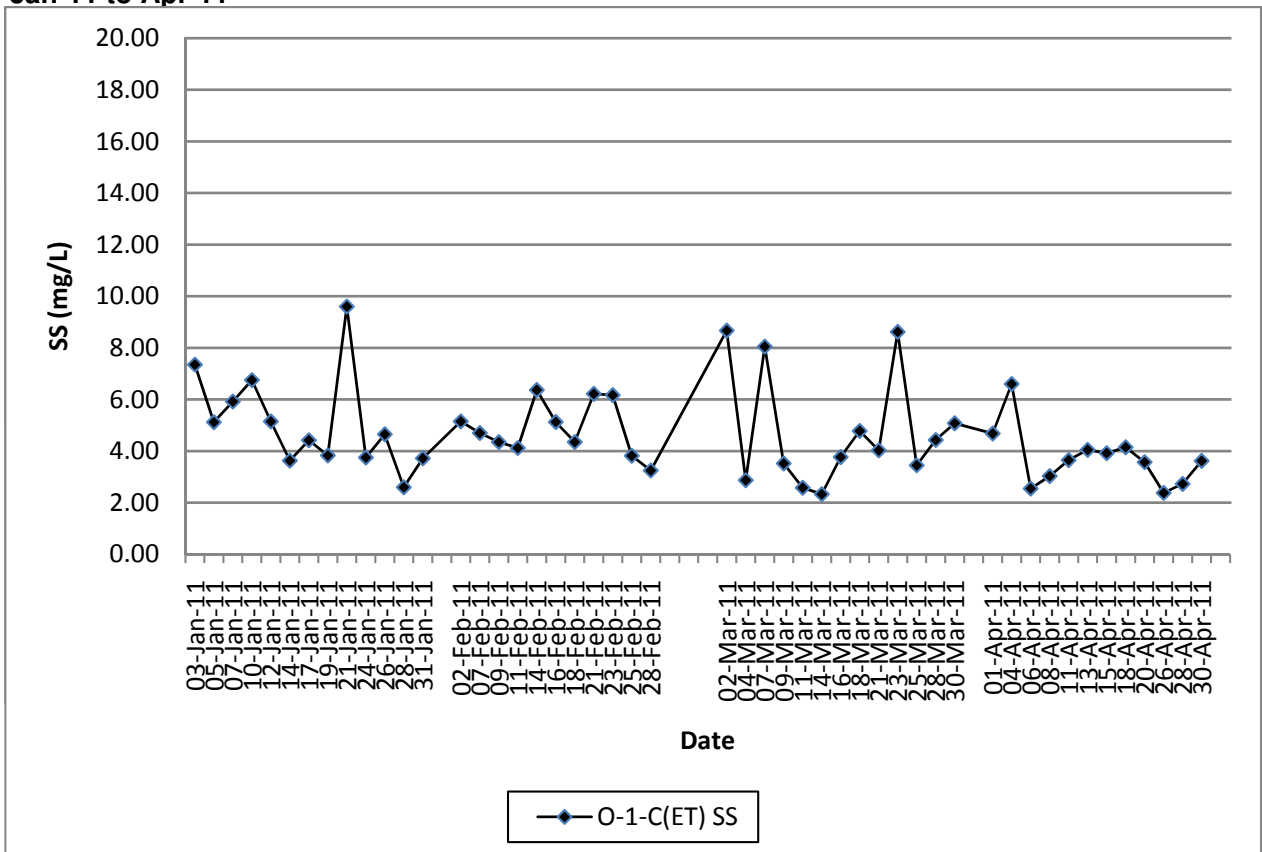


Note: # - For average SS level smaller than 2mg/L, the levels are plotted as 2mg/L in the graphs.

**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Outfall 1 During Ebb Tide (O-1(ET))  
Jan-11 to Apr-11**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel  
Water Quality Results at Control of Outfall 1 During Ebb Tide (O-1-C(ET))  
Jan-11 to Apr-11**



Note: # - For average SS level smaller than 2mg/L, the levels are plotted as 2mg/L in the graphs.

## Appendix J

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# Interim Notifications of Environmental Quality Limits Exceedances

**Interim Notification of Environmental Quality Limit Exceedance**

Incident Report on Limit Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	06-Apr-11
Time	10:25 AM
Monitoring Location	Sik Sik Yuen Ho Fung College (I-1)
Parameter	Suspended Solids
Action & Limit Levels (mg/L)	8.85 / 10.17
Measured Level (mg/L)	10.95
Possible reason for Action or Limit Level Non-compliance	A high SS level of 10.60 mg/L was recorded at Control Station (I-1-C)
Actions taken / to be taken	The measured SS level was above the baseline limit level, but lower than 120% of SS level of the control station (I-1-C). General site cleaning, rebar fixing at cascade bay 1, dismantling of formwork at vehicle access, removal of hoarding and masonry wall and geotechnical instrumentation monitoring were undertaken during the measurement. No direct disturbance was observed from the site. Thus, the exceedance was considered to be contributed by high SS level at upstream location and natural variation. Therefore, no action was required.
Remarks	Following mitigation measures were provided: (1) Waste water was collected and diverted to on-site waste water treatment plant for treatment before discharge; and (2) Nullah and site area were separated by sealed concrete block.

Prepared by: Fan Cheong Tsang  
 Designation: Environmental Team Leader

Signature: 

Date: 12-Apr-11

**Photographic record for exceedance of Suspended Solids recorded at Sik Sik Yuen Ho Fung College (I-1) on 06-Apr-11**



Site photo



Photo taken at I-1



Photo taken at I-1-C

**Interim Notification of Environmental Quality Limit Exceedance**

Incident Report on Action Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	08-Apr-11
Time	2:37 PM
Monitoring Location	Sik Sik Yuen Ho Fung College (I-1)
Parameter	Suspended Solids
Action & Limit Levels (mg/L)	8.85 / 10.17
Measured Level (mg/L)	9.45
Possible reason for Action or Limit Level Non-compliance	A high SS level of 10.00 mg/L was recorded at Control Station (I-1-C)
Actions taken / to be taken	The measured SS level was above the baseline action level, but lower than the SS level of the control station (I-1-C). General site cleaning, rebar fixing at cascade bay 3, formwork prepaing, removal of masonry wall, pipe roof corning drilling and geotechnical instrumentation monitoring were undertaken during the measurement. No direct disturbance was observed from the site. Thus, the exceedance was considered to be contributed by high SS level of the upstream location and natural variation. Therefore, no action was required.
Remarks	The following mitigation measures were provided: (1) Waste water was collected and diverted to waste water treatment plant for treatment before discharge; (2) Nullah and site area were separated by sealed concrete block.

Prepared by: Fan Cheong Tsang

Designation: Environmental Team Leader

Signature:



Date: 18-Apr-11

**Photographic record for exceedance of Suspended Solids recorded at Sik Sik Yuen Ho Fung College (I-1) on 08-Apr-11**



Site photo



Photo taken at I-1



Photo taken at I-1-C



**Interim Notification of Environmental Quality Limit Exceedance**

Incident Report on Action Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	08-Apr-11
Time	9:12 AM
Monitoring Location	O-1(FT)
Parameter	Suspended Solids (SS)
Action & Limit Levels (mg/L)	14.10 / 18.08 (derived from the baseline monitoring data)
Measured Level (depth-averaged) at Monitoring Location (mg/L)	5.35
Control Station	O-1-C(FT)
Measured Level (depth averaged) at Control Station (mg/L)	4.20
Possible reason for Action or Limit Level Non-compliance	The measured SS level (depth-averaged) at O-1(FT) was below the baseline action/limit level but was higher than 120% of the control station's SS level (O-1-C(FT)) at the same tide of the same day. Only laying non-woven geo-textile and backfilling grade 200 rockfill behind installed seawall blocks were undertaken and there was no other marine works during monitoring. Silt curtain was deployed along the Portion E boundary line and extended from seawater level to seabed. Floating type silt curtain was also employed at the inner side. As such, the exceedance was considered to be contributed by natural variation and no further action was required.
Actions taken / to be taken	(1) Silt curtain had been provided along the Portion E boundary line and extended from seawater level to the bottom of seabed; (2) Floating type silt curtain had been employed at the inner side; (3) Sufficient slack of silt curtain was allowed to cope with the wave and tidal action to ensure the curtains (outer and inner) were rested on seabed; (4) condition of silt curtain was checked by the supervisor daily; (5) and seawall blocks installation was undertaken within the inner silt curtain area only.
Remarks	None

Prepared by: F. C. Tsang  
 Designation: Environmental Team Leader  
 Signature:



Date: 18-Apr-11

**Photographic record for exceedance of Suspended Solids (SS) recorded at O-1(FT) on 08-Apr-11**



Site photo

**Interim Notification of Environmental Quality Limit Exceedance**

Incident Report on Action Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	11-Apr-11
Time	10:20 AM
Monitoring Location	O-1(FT)
Parameter	Suspended Solids (SS)
Action & Limit Levels (mg/L)	14.10 / 18.08 (derived from the baseline monitoring data)
Measured Level (depth-averaged) at Monitoring Location (mg/L)	5.27
Control Station	O-1-C(FT)
Measured Level (depth averaged) at Control Station (mg/L)	4.27
Possible reason for Action or Limit Level Non-compliance	The measured SS level (depth-averaged) at O-1(FT) was below the baseline action/limit level but was higher than 120% of the control station's SS level (O-1-C(FT)) at the same tide of the same day. Only installation of temporary concrete blocks and placing leveling stone were undertaken and there was no other marine works during monitoring. Silt curtain was deployed along the Portion E boundary line and extended from seawater level to seabed. Floating type silt curtain was also employed at the inner side. As such, the exceedance was considered to be contributed by natural variation and no further action was required.
Actions taken / to be taken	(1) Silt curtain had been provided along the Portion E boundary line and extended from seawater level to the bottom of seabed; (2) Floating type silt curtain had been employed at the inner side; (3) Sufficient slack of silt curtain was allowed to cope with the wave and tidal action to ensure the curtains (outer and inner) were rested on seabed; (4) condition of silt curtain was checked by the supervisor daily; (5) and seawall blocks installation was undertaken within the inner silt curtain area only.
Remarks	None

Prepared by: F. C. Tsang  
 Designation: Environmental Team Leader

Signature:



Date: 18-Apr-11

**Photographic record for exceedance of Suspended Solids (SS) recorded at O-1(FT) on 11-Apr-11**



Site photo

**Interim Notification of Environmental Quality Limit Exceedance**

Incident Report on Action Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	13-Apr-11
Time	2:33 PM
Monitoring Location	O-1(FT)
Parameter	Suspended Solids (SS)
Action & Limit Levels (mg/L)	14.10 / 18.08 (derived from the baseline monitoring data)
Measured Level (depth-averaged) at Monitoring Location (mg/L)	3.90
Control Station	O-1-C(FT)
Measured Level (depth averaged) at Control Station (mg/L)	3.03
Possible reason for Action or Limit Level Non-compliance	The measured SS level (depth-averaged) at O-1(FT) was below the baseline action/limit level but was higher than 120% of the control station's SS level (O-1-C(FT)) at the same tide of the same day. Only installation of bagged concrete for seawall formation was undertaken and there was no other marine works during monitoring. Silt curtain was deployed along the Portion E boundary line and extended from seawater level to seabed. Floating type silt curtain was also employed at the inner side. As such, the exceedance was considered to be contributed by natural variation and no further action was required.
Actions taken / to be taken	(1) Silt curtain had been provided along the Portion E boundary line and extended from seawater level to the bottom of seabed; (2) floating type silt curtain had been employed at the inner side; (3) sufficient slack of silt curtain was allowed to cope with the wave and tidal action to ensure the curtains (outer and inner) were rested on seabed; (4) condition of silt curtain was checked by the supervisor daily; (5) and seawall blocks installation was undertaken within the inner silt curtain area only.
Remarks	None

Prepared by: F. C. Tsang  
 Designation: Environmental Team Leader

Signature:



Date: 20-Apr-11

**Photographic record for exceedance of Suspended Solids (SS) recorded at O-1(FT) on 13-Apr-11**



Site photo

**Interim Notification of Environmental Quality Limit Exceedance**

Incident Report on Action Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	18-Apr-11
Time	9:20 AM
Monitoring Location	Sik Sik Yuen Ho Fung College (I-1)
Parameter	Suspended Solids
Action & Limit Levels (mg/L)	8.85 / 10.17
Measured Level (mg/L)	2.70
Possible reason for Action or Limit Level Non-compliance	A low SS level of 2.10 mg/L was recorded at Control Station (I-1-C)
Actions taken / to be taken	The measured SS level was below the baseline action level, but higher than 120% of SS level of the control station (I-1-C). General site cleaning, formwork at Cascade Bay 3 and 4, construction of H-pile platform, pipe roof drilling and geotechnical instrumentation monitoring were undertaken during the measurement. No direct disturbance was observed from the site. Thus, the exceedance was considered to be contributed by natural variation and no action was required.
Remarks	The following mitigation measures were provided: (1) Waste water was collected and diverted to waste water treatment plant for treatment before discharge; (2) Nullah and site area were separated by sealed concrete block.

Prepared by: Fan Cheong Tsang

Designation: Environmental Team Leader

Signature:



Date: 29-Apr-11

**Photographic record for exceedance of Suspended Solids recorded at Sik Sik Yuen Ho Fung College (I-1) on 18-Apr-11**



Site photo



Photo taken at I-1



Photo taken at I-1-C



## Appendix K

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### Complaint Log

COMPLAINT LOG

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
1	CIR-001	9 March 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/04846-09) regarding to muddy effluent discharged from the outfall of the construction site from a public on 9 March 2009. Site investigation was also carried out by EPD with the Contractor on the same day.	<p><u>Findings/ Observations</u></p> <p>In the afternoon on 9 March 2009, the Contractor was carrying out regular maintenance for removing silt accumulated in the wastewater treatment plant. During the maintenance works, some residual silt inside the plant was accidentally leaked out to the outfall discharge outlet. The reason was that a flexible pipe for disposing silt was found connecting to the concrete platform of the outfall discharge outlet.</p> <p><u>Conclusion/Remedial Action</u></p> <p>The complaint was valid and it was due to maintenance works at the wastewater treatment plant at the outfall area. The contractor had cleaned up the silt at discharge outlet and the channel at the outfall area on 12 March 2009 as shown in the attached photo. The ET will closely inspect the discharge outlet and the channel during the routine site inspections and provide advice to the Contractor. The Contractor was also advised to provide mitigation measures during any occasion of the maintenance work on the wastewater treatment plant.</p> <p>The discharge pipe of the treatment plant should be plugged and ensure not functioned when carrying out maintenance works on the wastewater treatment plant in order to prevent the discharge of silt or muddy water to the outlet.</p> <p>Flexible pipe for discharge of sludge should not be placed on the concrete platform under the outfall discharge outlet. For disposal of slit or sludge in the</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					wastewater treatment plant, tanker should be used.	
2	CIR-002	8 May 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/09755-09) regarding to construction dust from the outfall construction site on 8 May 2009. Site investigation was also carried out by EPD with the Contractor on 14 May 2009.	<p><u>Findings/ Observations</u></p> <p>Regular 1-hour TSP monitoring, in accordance with EM&amp;A Manual, is performed by Environmental Team. The monitoring station concerned is ASR9 (i.e. at the podium level of Greenview Terrace facing to the construction site).</p> <p>The closest date for the 1-hour TSP concentration monitoring was on 6 May 2009 and 12 May 2009 at Greenview Terrace, ASR9. Soil nailing works and loading &amp; unloading excavated materials were observed during monitoring. In accordance with the EM&amp;A Manual and the Baseline Monitoring Report, all 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels. No exceedance was recorded on 6 and 12 May 2009.</p> <p>The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. It was confirmed that the air quality mitigation measures as recommended in EIA have been provided by the Contractor. The mitigation measures are as follows:</p> <ul style="list-style-type: none"> <li>• Water spraying was provided to the exposed surface.</li> <li>• Several automatic sprinklers were provided at the outfall construction site for water spraying of the haul road.</li> <li>• Water spraying was provided during dust generating works (e.g. rock breaking and soil nailing works).</li> </ul> <p><u>Conclusion/Remedial Action</u></p> <p>Based on the site inspection and monitoring results, the complaint is considered not justifiable since no</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>action &amp; limit level exceedance on construction dust are identified. Air quality mitigation measures as recommended in EIA have been implemented in order to control and minimise the air quality impact and nuisance arising from the construction activities. Nevertheless, in view of the recent dry and sunny weather, the haul road and the exposed area would be dry very quickly. The Contractor was recommended to provide more frequent water spraying especially in the dry and sunny weather.</p>	
3	CIR-003	14 May 2009 at Outfall	Public through EPD	<p>EPD has received a complaint (EPD ref: EP/RW/080206) regarding to daytime construction rock breaking at 7:15 am and dusty at the outfall construction site on 14 May 2009.</p>	<p>The closest date to the complaint for the 1-hour TSP monitoring &amp; daytime construction noise monitoring was on 12, 18 and 27 May 2009 at Greenview Terrace, ASR9 and NSR9. Soil nailing, excavation, rock breaking, loading and unloading the materials were observed during monitoring period. The measured noise levels complied with the limit level in accordance with the EIAO-TM. All 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels. No 1-hour TSP exceedance was recorded.</p> <p>The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. Air quality mitigation measures as recommended in EIA have been implemented by the Contractor. However, noise mitigation measures could be further improved.</p> <p>Based on our site inspection and monitoring results, the complaint for dust is considered not justifiable since no action &amp; limit level exceedance on construction dust is identified. Air quality mitigation measures as recommended in EIA have also been implemented in order to control and minimise the air</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>quality impact arising from the construction activities. In view of the recent dry and sunny weather, the haul road and the exposed area would be dry very quickly. The Contractor was recommended to enhance water spraying especially in the dry and sunny weather. On the other hand, the complaint for noise is considered due to works and the Contractor was agreed to improve the on-site noise mitigation measures such as the following measures. ET's site inspection and the joint inspection with relevant parties was conducted on 29 May 2009 and 4 June 2009 respectively to confirm all the below measures have been implemented.</p> <ul style="list-style-type: none"> <li>• For the idling plant, it should be switched off to reduce noise level generated.</li> <li>• The sound insulation sheets and noise insulation materials should be placed to enclose the breaking tip tightly and also aside or surrounding the breaking activities as recommended in the following photos 1-3 in noise mitigation measures.</li> <li>• Noise monitoring frequency was increased in order to check the effectiveness of the mitigation measures. The additional measurement was taken on 27 May, 8 June, 10 June and 12 June 2009 after all the measures implemented. The noise levels (<math>L_{eq, 30 \text{ min}}</math>) were 70.9 dB (A), 70.5 dB (A), 70.3 dB (A) and 70.3 dB (A) respectively, which comply with the limit level in accordance with the EIAO-TM. Soil nailing, excavation and rock breaking were observed during monitoring period. The measures were well in place and seemed effective during the measurement.</li> </ul>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
4	CIR-004	10 July 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/15137-09) regarding to construction dust from the outfall construction site on 10 July 2009.	<p><u>Findings/ Observations</u></p> <p>1-hour TSP concentration monitoring was on 10 July 2009 at Greenview Terrace, ASR9. Soil nailing works, concrete breaking, excavation and loading &amp; unloading excavated materials were observed during monitoring. All 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels. No exceedance was recorded on 10 July 2009.</p> <p>The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. It was confirmed that the air quality mitigation measures as recommended in EIA have been provided by the Contractor. The mitigation measures are as follows:</p> <ul style="list-style-type: none"> <li>• Water spraying was provided to the exposed surface.</li> <li>• Automatic sprinklers were provided at the outfall construction site for water spraying of the haul road.</li> <li>• Water spraying was provided during dust generating works (e.g. rock breaking and soil nailing works).</li> <li>• Tarpaulin was used for covering the dusty works in the Portal area.</li> </ul> <p><u>Conclusion/Remedial Action</u></p> <p>The complaint is considered not justifiable since no action &amp; limit level exceedance on construction dust are identified</p>	Closed
5 & 6	CIR-005	29 July 2009 & 11 August 2009 at Outfall	Public through SOR	SOR has received two complaints (SOR ref: (DC/2007/12)/M45/500/02480, 02500) from Greenview Terrace	<p><u>Findings/ Observations</u></p> <p>Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. According to the noise monitoring results from</p>	Same Case with Complaint No. 11

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				<p>regarding to daytime construction noise exceedance recorded at NSR9 on 8, 22, 23, 27 and 29 July 2009 and a large amount dust generated at the outfall construction site. The complaint dates were corresponded to 29 July and 11 August 2009.</p>	<p>6 July 2009 to 31 August 2009 at NSR 9, the measured noise levels complied with the limit level in accordance with the EIAO-TM. All 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels from 6 July 2009 to 25 August 2009.</p> <p><u>Conclusion/Remedial Action</u>                      The dust complaint on 22 July 2009 was due to the soil nailing works. The Contractor was reminded enhance the dust mitigation measures during soil nailing works. A designated staff was provided to spray water continuously during soil nailing. A nylon bag was placed on the drilling hole and keeping wet to suppress dust. A sprinkler was added at the hillside of the site and water spraying was provided continuously during operation of drilling to suppress dust.</p> <p>The documented complaint for noise is considered to trigger the action level and the Contractor was also reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures are proposed as follows:</p> <ul style="list-style-type: none"> <li>• A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level.</li> <li>• The designated staff was reminded to record all the weather condition including raining and wind speed.</li> <li>• Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible.</li> <li>• Movable noise barriers were placed on site and the</li> </ul>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>movable noise barriers were also modified.</p> <ul style="list-style-type: none"> <li>• Existing 25 ton rock breaker had been replaced by the another breaker.</li> <li>• The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap.</li> <li>• A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace.</li> </ul> <p>From the additional monitoring data and monitoring data under regular EM&amp;A requirements, noise level (<math>L_{eq, 30 \text{ min}}</math>) between 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency was maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August 2009. Noise levels (<math>L_{eq, 30 \text{ min}}</math>) were also re-measured after the implementation of the mitigation measures. Noise level (<math>L_{eq, 30 \text{ min}}</math>) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73 dB(A) to the nearest integer after the implementation of the mitigation measures. In our investigation, there was no exceedance of the measured noise level at Greenview Terrace.</p>	
7	CIR-006	12 August 2009 at Outfall	Public through SOR	SOR has received a complaint (SOR ref: (DC/2007/12)/M45/500/02527) from Greenview Terrace, via Apple Daily regarding to daytime construction noise level ( $L_{eq(30min)}$ ) was sometimes more than 80 dB(A) and a large amount dust	<p><u>Findings/ Observations</u></p> <p>Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. According to the noise monitoring results from 6 July 2009 to 31 August 2009 at NSR 9, the measured noise levels complied with the limit level in accordance with the EIAO-TM. All 1-hour TSP concentrations at ASR9 were below the established</p>	Closed



Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				<p>generated at the outfall construction site. The complaint date was corresponded to 12 August 2009.</p>	<p>Action and Limit Levels from 6 July 2009 to 25 August 2009.</p> <p><u>Conclusion/Remedial Action</u></p> <p>The dust complaint was considered not justifiable since no action &amp; limit level exceedance on construction dust were identified. However, it was a recurrent case from Greenview Terrace. The Contractor was recommended to enhance water spraying continuously especially in rock breaking activities.</p> <p>On the other hand, there was no noise levels (<math>L_{eq(30min)}</math>) from the measurement taken from ET was more than 80 dB(A). However, it was a recurrent case from Greenview Terrace. The Contractor was reminded to enhance the on-site noise mitigation measures. The enhanced mitigation measures are proposed as follows:</p> <ul style="list-style-type: none"> <li>• A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level.</li> <li>• The designated staff was reminded to record all the weather condition including raining and wind speed.</li> <li>• Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible.</li> <li>• Movable noise barriers were placed on site and the movable noise barriers were also modified.</li> <li>• Existing 25 ton rock breaker had been replaced by the another breaker.</li> <li>• The breaking tap of the 25 ton rock breaker had</li> </ul>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>been replaced by another breaking tap.</p> <ul style="list-style-type: none"> <li>A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace.</li> </ul> <p>From the additional monitoring data and monitoring data under regular EM&amp;A requirements, noise level (<math>L_{eq, 30 \text{ min}}</math>) from 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency was maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August 2009. Noise levels (<math>L_{eq, 30 \text{ min}}</math>) were also re-measured after the implementation of the mitigation measures. Noise level (<math>L_{eq, 30 \text{ min}}</math>) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73 dB(A) to the nearest integer after the implementation of the mitigation measures.</p>	
8	CIR-007	14 August 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/17978-09) from Greenview Terrace regarding to daytime construction noise from the outfall construction site. The complaint date was corresponded to 14 August 2009.	<p><u>Findings/ Observations</u>                      Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. According to the noise monitoring results from 6 July 2009 to 31 August 2009 at NSR 9, the measured noise levels complied with the limit level in accordance with the EIAO-TM.</p> <p><u>Conclusion/Remedial Action</u>                      This was a recurrent case from Greenview Terrace. The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures are proposed as follows:</p>	Same Case with Complaint No. 11

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<ul style="list-style-type: none"> <li>• A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level.</li> <li>• The designated staff was reminded to record all the weather condition including raining and wind speed.</li> <li>• Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible.</li> <li>• Movable noise barriers were placed on site and the movable noise barriers were also modified.</li> <li>• Existing 25 ton rock breaker had been replaced by the another breaker.</li> <li>• The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap.</li> <li>• A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace.</li> </ul> <p>From the additional monitoring data and monitoring data under regular EM&amp;A requirements, noise level (<math>L_{eq, 30 \text{ min}}</math>) from 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency would be maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August 2009. Noise levels (<math>L_{eq, 30 \text{ min}}</math>) were also re-measured after the implementation of the mitigation measures. Noise level (<math>L_{eq, 30 \text{ min}}</math>) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73</p>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					dB(A) to the nearest integer after the implementation of the mitigation measures.	
9	CIR-008	17 August 2009 at Portion D of the Site	Public through SOR	SOR has received a complaint (SOR ref:(DC/2007/12)/M45/500/02546) from Long Bench Garden regarding to noise nuisance generated from the daytime construction work (rock-breaking) in Portion D of the Site. The complaint date was corresponded to 17 August 2009.	<p><u>Findings/ Observations</u>                      Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in August 2009. The monitoring results from 3 August 2009 to 31 August 2009 at NSR 8 showed the measured noise levels complied with the limit level in accordance with the EIAO-TM. The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. Noise mitigation measures should be enhanced continuously due to this complaint.</p> <p><u>Conclusion/Proposed Action</u>                      The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures are recommended as follows:</p> <ul style="list-style-type: none"> <li>• Movable noise barriers had been placed towards the direction of Long Bench Garden, particular for the pipe pile works in the portal.</li> <li>• Tools box talk for construction team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible.</li> <li>• The existing noisy 25 ton rock breaker had been replaced by the other breaker.</li> <li>• A joint filler wall had been fixed on the vertical face of west bound to absorb the noise generated towards Long Beach Garden.</li> </ul> <p>Noise monitoring frequency was increased twice per</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					week by ET due to this complaint. The measured noise levels were complied with the limit level in accordance with the EIAO-TM. No further complaint was received from Long Bench Garden within the reporting month.	
10	CIR-009	22 August 2009 at Outfall	Public through SOR	A complaint (SOR ref: (DC/2007/12)/M45/500/02628) was received from Greenview Terrace regarding to daytime construction noise level (Leq(30min)) was sometimes exceeded 75 dB(A) at the outfall construction site. The complaint date was corresponded to 22 August 2009.	<p><u>Findings/ Observations</u>                      Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. The monitoring results from 6 July 2009 to 31 August 2009 at NSR 9 showed the measured noise levels complied with the limit level in accordance with the EIAO-TM. The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. Noise mitigation measures should be enhanced continuously due to this complaint.</p> <p><u>Conclusion/Proposed Action</u>                      The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures are recommended as follows:</p> <ul style="list-style-type: none"> <li>• A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level.</li> <li>• The designated staff was reminded to record all the weather condition including raining and wind speed.</li> <li>• Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier</li> </ul>	Same Case with Complaint No. 11

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>should be placed to the breaking activities as much as possible.</p> <ul style="list-style-type: none"> <li>• Movable noise barriers were placed on site and the movable noise barriers were also modified.</li> <li>• Existing 25 ton rock breaker had been replaced by the another breaker.</li> <li>• The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap.</li> <li>• A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace.</li> </ul> <p>From the additional monitoring data and monitoring data under regular EM&amp;A requirements, noise level (<math>L_{eq, 30 \text{ min}}</math>) from 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency was maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August 2009. Noise levels (<math>L_{eq, 30 \text{ min}}</math>) were also re-measured after the implementation of the mitigation measures. Noise level (<math>L_{eq, 30 \text{ min}}</math>) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73 dB(A) to the nearest integer after the implementation of the mitigation measures. In our investigation, there was no exceedance of the measured noise level at Greenview Terrace.</p>	
11	CIR-010	24 September 2009 at Outfall	Public through SOR	A complaint (SOR ref: (DC/2007/12)/M45/500/02749) was received from Greenview Terrace regarding to daytime construction noise level	<p><u>Findings/ Observations</u></p> <p>Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and September 2009. The monitoring results from 6 July 2009 to 29 October 2009 at NSR 9 showed the</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				(Leq(30min)) was sometimes exceeded 75 dB(A) at the outfall construction site.	<p>measured noise levels complied with the limit level in accordance with the EIAO-TM. The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. Noise mitigation measures have been enhanced continuously due to this complaint.</p> <p><u>Conclusion/Proposed Action</u></p> <p>The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures were implemented as follows:</p> <ul style="list-style-type: none"> <li>• A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level.</li> <li>• The designated staff was reminded to record all the weather condition including raining and wind speed.</li> <li>• Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible.</li> <li>• Movable noise barriers were placed on site and the movable noise barriers were also modified.</li> <li>• Existing 25 ton rock breaker had been replaced by the another breaker.</li> <li>• The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap.</li> <li>• A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace.</li> </ul>	

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					From the additional monitoring data above and the regular monitoring under EM&A requirements, the measured noise levels were complied with the limit level in accordance with the EIAO-TM. From the noise level on 25 September 2009 and 2 October 2009, the trend of noise level seemed to be increased since the decoration work at 14/F Greenview Terrace was the domain noise source during the monitoring. The noise level during that time would be considered for reference only. There was no exceedance of the measured noise level at Greenview Terrace in our investigation.	
12	CIR-011	2 October 2009 at I-3	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/22016-09) regarding to construction dust at the Intake-3 on 2 October 2009.	<p><u>Findings/ Observations</u></p> <p>There is no representative air monitoring location as stated in the EM&amp;A Manual. The contractor and the environmental team were undertaken site investigation on the subject area at 08-Oct-09 in response to the complaint. Air quality mitigation measures as recommended in EIA have been implemented by the Contractor. However, the dust impact by exposed area could be further improved. The mitigation measures during the site investigation were observed as follows:</p> <ul style="list-style-type: none"> <li>• Water spraying was provided to the exposed surface.</li> <li>• Wheel washing facilities for dump trucks was provided at the site exit.</li> <li>• Water spraying was provided during excavation and loading/unloading works</li> </ul> <p><u>Conclusion/Proposed Action</u></p> <p>Based on our site inspection, the complaint for dust is</p>	Closed



Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					considered justifiable as it is due to windy erosion on the exposed surface. Air quality mitigation measures as recommended in EIA have also been implemented in order to control and minimise the air quality impact arising from the construction activities. In view of the recent dry season, the haul road and the exposed area would be dry very quickly. The Contractor was recommended to provide water spraying more frequently especially in the dry season.	
13	(DC/2007/12)/M45/500/2923 & email on 11 November 2009 from MCSJV	9 November 2009 at Outfall	Greenview Terrace through EPD	Movable noise barrier was not placed close enough to the piling machine.	<p><u>Immediate Action</u>                      The rig was re-orientated and the barrier was placed closed to the drilling head.</p> <p><u>Follow-up Action</u></p> <ul style="list-style-type: none"> <li>• Training was conducted to the operator to ensure that the workers aware that the barrier should be placed closed not the drilling head not the machine itself.</li> <li>• In order to prevent future occurrence, a permit to dig system was adopted. It should be checked by the Contractor and endorsed by the SOR before starting the drilling rig.</li> </ul> <p>The follow up action was checked and a permit to dig system has been implemented.</p>	Closed
14	(DC/2007/12)/M45/500/2978 & email on 19 November 2009 from MCSJV	18 November 2009 at Outfall	Greenview Terrace through EPD	Rock-breaking activity carried out in the eastern area of Portion D, closest to Greenview Terrace, was not totally screened and line of sight of the breaker was observed from the NSR.	<p><u>Follow up Action</u></p> <ul style="list-style-type: none"> <li>• The bamboo scaffold was extended further away from stage 3 scaffold to further screen off the activities to the Greenview. The length of the extension was about 8 to 10 m.</li> <li>• A strong reminded was given to the relevant staff and sub-contractor and the barrier should be placed in the right orientation before breaking.</li> </ul>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<ul style="list-style-type: none"> <li>The mitigation measures were strictly followed as stated in the proposal.</li> </ul> <p>The follow up action and relevant records was checked.</p>	
15.	CIR-12	19 January 2010 at Intake-3 construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/01270-10) regarding effluent discharge at Intake-3 construction site on 19 January 2010.	<p><u>Findings/ Observations</u>                      The effluent discharge on 19 January 2010 was due to the leakage of Gabion wall at I3. The water from the rock drilling work was flowing through the gap of the Gabion Wall to the watercourses at I3.</p> <p><u>Immediate Action</u>                      The contractor had sealed the gap at the Gabion Wall immediately after the incident.</p> <p><u>Conclusion/Proposed Action</u>                      Based on our site inspection, the complaint was due to leakage of Gabion wall. The area would be checked and maintained continuously to avoid recurrence case. The above identified mitigation measures have been implemented by the Contractor on 22 January 2010 and ET has also checked the implementation on 31 January 2010. The ET will closely inspect the watercourses during the routine site inspections and provide advice to the Contractor.</p>	Closed.
16	CIR-13	19 January 2010 at Intake-3 construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/01319-10) regarding daytime construction noise at Intake-3 construction site on 19 January 2010.	<p><u>Findings/ Observations</u>                      The monitoring station concerned is NSR6 (i.e. at Squatter facing to the construction site). Excavation, soil nailing, rock drilling and breaking, loading and unloading the materials were generally observed during monitoring period in mid-January 2010. The measured noise levels in January 2010 complied with the limit level in accordance with the EM&amp;A Manual. These cases would also be treated as two action level exceedances on noise. The Contractor and the Environmental Team were also undertaken site</p>	Closed.

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>investigation on the subject area in response to complaint. The noise mitigation measures during the site investigation were recommended as follows:</p> <ul style="list-style-type: none"> <li>• Sound insulation sheets were installed covering the working area during breaking and rock drilling in order to block the line of sight to the NSR.</li> <li>• Noise insulation materials were used to enclose the drilling rig tightly.</li> </ul> <p><u>Conclusion/Proposed Action</u>                      Based on the site inspection and monitoring results, the complaint was due to noise generated by rock breaking work. The identified mitigation measures have been discussed with the Contractor and the Contractor has submitted the remedial proposal. The proposal was implemented by the Contractor on 25 January 2010 and ET has also checked the implementation on 31 January 2010. The Contractor was also advised to review the mitigation measures from time to time near the NSR at I3. The ET will closely inspect the area during the routine site inspections and provide advice to the Contractor.</p>	
17	CIR-13	21 January 2010 at Intake-3 construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/01444-10) regarding daytime construction noise at Intake-3 construction site on 21 January 2010.	Refers to Investigation /Mitigation Action for Complaint No. 16.	Closed
18	CIR-14	27 August 2010 near Intake-2 construction site	Public through DSD	DSD has received a public complaint regarding choked sewage manhole (MH1) at Lo Wai Road construction site on 27 August 2010.	<p><u>Findings/ Observations</u>                      During DSD inspection on 30 August 2010, improper discharge from the site to manhole, MH3, which is located downstream of MH1 was observed. ET had received those information from the Contractor on 09</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>September 2010. Site investigation was also carried out by SOR's representative with the Contractor on 01 September 2010. Checking with the site log, the construction activity at Lo Wai on 27 August 2010 was pipe jacking only. No site formation works was undertaken. The contractor and SOR's representative have undertaken site investigation on the subject area on 01 September 2010. On-site flow test at Portion G had conducted.</p> <ul style="list-style-type: none"> <li>● Maeda works area is located at the lower section of Lo Wai Road and manhole MH3 is adjacent to the works area. MH1 (choked sewage manhole) is located at the upper section of Lo Wai Road. MH2 manhole is located middle section of Lo Wai Road. MH1 and MH2 are outside the works area.</li> <li>● Water flow test for manhole MH2 and MH3 and no blockage was observed.</li> <li>● Sewage overflow was found at MH1 during the joint site inspection on 01 September 2010</li> <li>● It was reported that there were water pipes connected between the site and the MH3. Discharge was found in MH3 during DSD inspection.</li> <li>● The contractor claimed that the purpose of the water pipes was to direct the storm water and underground water inside the concrete pipe "pipe jacking".</li> <li>● There was no discharge license for that portion. The Contractor had stopped on 01 September 2010 the water pumping to MH3 and apply the discharge license for the Lo Wai site.</li> </ul> <p><u>Conclusion/Proposed Action</u>                      Based on the joint site inspection, the choked manhole MH1 was not due to works activities. The Contractor had clean up the choked manhole MH1</p>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					and no sewage overflow from MH1 was observed. The Contractor was requested to divert the storm water to desilting system prior to discharge while no such discharge can be made until a valid discharge license is granted. The ET will closely inspect the vicinity area during the routine site inspections and provide advice to the Contractor as necessary.	
19&20	CIR-15	17 November 2010 at outfall construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/24002-10 and EP3/N22/RW/24006-10) regarding daytime construction noise about derrick barge squeaking and rock breaking at Outfall construction site on 17 November 2010.	<p><u>Findings/ Observations</u>                      Drilling, excavation, marine mud dredging, rock breaking, mucking-out process and crane operation were observed during site inspections on 2 and 17 December 2010. The monitoring results measured on 15 November 2010 and 25 November at NSR 9 showed that the measured noise levels complied with the limit level (75 dB(A)) in accordance with the EIAO-TM. As part of the investigation of the noise complaints, the Contractor and the ET conducted additional site inspections and reviewed and audited the current noise mitigation practices and the Contractor's environmental performance on-site.</p> <p><u>Conclusion / Proposed Action</u>                      The documented complaints for noise triggered the action level of the noise monitoring. The Contractor had implemented the following on-site noise mitigation measures:</p> <ul style="list-style-type: none"> <li>● Erection of temporary noise insulation sheet at the rim of the spiral ramp construction site;</li> <li>● Moveable barriers for rock breaker;</li> <li>● Wrapping noise absorptive material at the rock breaker head;</li> <li>● Tailor made noise enclosure for drilling rig;</li> <li>● Semi-enclosed muck out process at muck hopper;</li> </ul>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<ul style="list-style-type: none"> <li>● Use of rock splitter (which is a relatively quieter method in contrast to rock breaker); and</li> <li>● Noise insulation blanket enclosing the crane engine of derrick barge.</li> </ul> <p>Noise monitoring was increased to twice per week and the results were reported in the Complaint Investigation Report submitted on 24 December 2010. The measured noise level after implementation of the noise mitigation measures ranged from 69 to 73 dB(A) to the nearest integer and complied with the limit level in accordance with the EIAO-TM. The results showed that noise mitigation measures were effective. The contractor was advised to review the mitigation measures from time to time near the NSR 9. The ET would closely inspect the area during the routine site inspections and provide advice to the Contractor.</p>	
21	CIR-16	10 January 2011 at outfall construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/00484-11) regarding dark smoke emission from derrick barge and construction noise and dust at Outfall construction site on 10 January 2011.	<p><u>Findings/ Observations</u></p> <ol style="list-style-type: none"> <li>1. <u>Dark Smoke Emission from Derrick Barge</u> Dark smoke emitted from the derrick barge was promptly investigated after the receipt of the complaint. The issue was found specific to the mechanical operation of the barge working at the site at that moment. The derrick barge being complained was then replaced by another barge without the relevant mechanical issue. No further complaint was received since then.</li> <li>2. <u>Construction Dust</u> Regular 1-hour TSP monitoring, in accordance with EM&amp;A Manual, was carried out by the Environmental Team (ET). The monitoring station concerned is ASR 9, located at the podium level of Greenview Terrace facing the construction site. In January, 1 hour TSP</li> </ol>	Closed

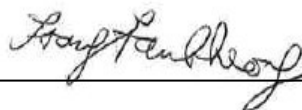
Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>concentration monitoring had been conducted on 4, 10, 14, 20 and 26 January 2011 at Greenview Terrace (ASR). Rock breaking, drilling and excavation were observed during monitoring. No exceedance was recorded.</p> <p>The contractor and the environmental team were also undertaken site investigation at the subject area on 21 January 2011 in response to the complaint. It was confirmed that the air quality mitigation measures as recommended in EIA had been provided by the Contractor. The mitigation measures are as follows:</p> <ul style="list-style-type: none"> <li>● Water spraying surrounding the spiral ramp;</li> <li>● Water spraying for rock drilling and rock breaking;</li> <li>● Water spraying for C&amp;D material before loading and unloading to derrick barge;</li> <li>● Water spraying for the exposed surface and the haul road;</li> <li>● Water spraying for trucks and vehicles at the site exit.</li> </ul> <p>3. <u>Construction Noise</u></p> <p>The documented complaints for noise triggered the action level of the noise monitoring. The Contractor had implemented the following on-site noise mitigation measures:</p> <ul style="list-style-type: none"> <li>● Extension of Temporary noise insulation barrier (made of noise blanket) at the rim of the spiral ramp construction site facing Greenview Terrace;</li> <li>● Movable noise barriers to surround the rock breaking activities at the spiral ramp where it is in safe ground condition;</li> <li>● Tailor made noise enclosure for rock drilling machine;</li> </ul>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<ul style="list-style-type: none"> <li>● Semi-enclosed muck out process at muck hopper (with noise curtain underneath);</li> <li>● Use of temporary noise enclosure for piling work at Castle Peak Road;</li> <li>● Noise insulation blanket enclosing the crane engine of derrick barge;</li> <li>● Additional noise blanket along the railings of the spiral ramp; and</li> <li>● Use of rock splitter (which is a relatively quieter method in contrast to rock breaker).</li> </ul> <p>Noise monitoring has been increased to twice per week and the results will be reported in the Complaint Investigation Report to be submitted in mid-February 2011. The measured noise level after implementation of the noise mitigation measures ranged from 71 to 74 dB(A) to the nearest integer and complied with the limit level in accordance with the EIAO-TM. The results showed that noise mitigation measures were effective. The contractor was advised to review the mitigation measures from time to time near the NSR 9. The ET would closely inspect the area during the routine site inspections and provide advice to the Contractor.</p> <p><u>Conclusion / Proposed Action</u></p> <p>1. <u>Dark Smoke Emission from Derrick Barge</u>                  Dark smoke emitted from the derrick barge was considered a stand-alone incident and was specific to the derrick barge being complained. No further complaint was received after the barge was replaced by another.</p> <p>2. <u>Construction Dust</u>                  Based on our site inspection and monitoring results,</p>	



Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>the complaint was considered not justifiable since no action and limit level exceedance on construction dust were identified. Air quality mitigation measures as recommended in EIA were implemented in order to control and minimize the air quality impact and nuisance arising from the construction activities. Nevertheless, the Contractor was reminded to enhance the air quality mitigation measures such as increasing the water spraying frequency and ensure proper functioning of the automatic sprinklers at the Outfall construction site.</p> <p>3. <u>Construction Noise</u></p> <p>Noise measurement results between 10 and 28 January 2011 were below the limit level (75 dB(A)) and complied with the noise criterion. The Contractor had implemented various mitigation measures on site to alleviate the construction noise impact. The ET will remind the Contractor to enhance and maintain the normal functioning of the measures continuously to minimize the impact. The Contractor should also closely liaise with the nearby residents and inform the progress of the construction and the implementation of the environmental mitigation measures at the Outfall construction site.</p>	

Signed by Environmental Team Leader:



Date:

1 May 2011