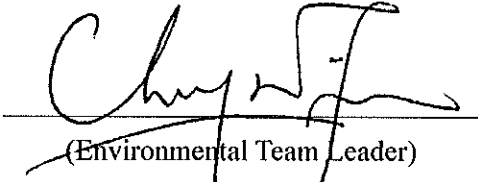


Dragages-Nishimatsu Joint Venture

Contract No. DC/2007/10
Design and Construction of
Hong Kong West Drainage Tunnel

Monthly EM&A Report

August 2011
(version 2.0)

Certified By 
(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

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TABLE OF CONTENTS

| | |
|---|-----------|
| EXECUTIVE SUMMARY | 1 |
| Introduction..... | 1 |
| Environmental Monitoring Works..... | 1 |
| Environmental Licenses and Permits..... | 6 |
| Key Information in the Reporting Month | 8 |
| 1. INTRODUCTION..... | 8 |
| Background..... | 8 |
| Project Organizations..... | 8 |
| Construction Programme | 9 |
| Summary of EM&A Requirements | 12 |
| 2. AIR QUALITY | 13 |
| Monitoring Requirements | 13 |
| Monitoring Locations | 13 |
| Monitoring Equipment..... | 13 |
| Monitoring Parameters, Frequency and Duration..... | 13 |
| Monitoring Methodology and QA/QC Procedure | 14 |
| Results and Observations..... | 16 |
| 3. NOISE | 18 |
| Airborne Construction Noise Monitoring..... | 18 |
| Monitoring Requirements | 18 |
| Monitoring Locations | 18 |
| Monitoring Equipment..... | 18 |
| Monitoring Parameters, Frequency and Duration..... | 19 |
| Monitoring Methodology and QA/QC Procedures..... | 19 |
| Maintenance and Calibration | 20 |
| Results and Observations..... | 20 |
| Ground Borne Construction Noise Monitoring | 27 |
| Monitoring Requirements | 27 |
| Monitoring Locations | 27 |
| Monitoring Equipment..... | 28 |
| Monitoring Parameters, Frequency and Duration..... | 28 |
| Results and Observations..... | 28 |
| 4. WATER QUALITY | 33 |
| Monitoring Requirements | 33 |
| Monitoring Locations | 33 |
| Monitoring Equipment..... | 33 |
| Monitoring Parameters, Frequency and Duration..... | 34 |
| Monitoring Methodology, Calibration Details and QA/QC Procedures..... | 34 |
| Results and Observations..... | 35 |
| Underground water level..... | 35 |
| 5. ENVIRONMENTAL AUDIT..... | 37 |
| Site Audits | 37 |
| Review of Environmental Monitoring Procedures | 37 |

| | |
|--|-----------|
| Status of Environmental Licensing and Permitting | 37 |
| Status of Spoil Management | 37 |
| Implementation Status of Environmental Mitigation Measures | 41 |
| Non-compliance Recorded during Site Inspections..... | 44 |
| Summary of Mitigation Measures Implemented | 44 |
| Implementation Status of Event Action Plans | 45 |
| Summary of Complaint, Warning, Notification of any Summons and Successful Prosecution | 48 |
| 6. FUTURE KEY ISSUES | 46 |
| Key Issues for the Coming Month | 46 |
| Monitoring Schedule for the Next Month..... | 47 |
| Construction Program for the Next Month..... | 47 |
| 7. CONCLUSIONS AND RECOMMENDATIONS..... | 48 |
| Conclusions..... | 48 |
| Recommendations..... | 49 |

LIST OF TABLES

| | |
|-----------|--|
| Table I | Summary Table for Non-compliance Recorded in the Reporting Month |
| Table II | Summary Table for Key Information in the Reporting Month |
| Table 1.1 | Key Project Contacts |
| Table 1.2 | Construction programme showing the inter-relationship with environmental protection/mitigation measures |
| Table 2.1 | Locations for Air Quality Monitoring |
| Table 2.2 | Air Quality Monitoring Equipment |
| Table 2.3 | Impact Dust Monitoring Parameters, Frequency and Duration |
| Table 2.4 | Summary Table of Air Quality Monitoring Results during the reporting month |
| Table 3.1 | Noise Monitoring Stations |
| Table 3.2 | Noise Monitoring Equipment |
| Table 3.3 | Noise Monitoring Parameters, Frequency and Duration |
| Table 3.4 | Noise Limit Level for Monitoring Stations |
| Table 3.5 | Summary Table of Noise Monitoring Results during the reporting month |
| Table 3.6 | Ground Borne Noise Monitoring Parameters, Frequency and Duration |
| Table 3.7 | Construction Ground Borne Noise Standards |
| Table 3.8 | Summary Table of Ground Borne Noise Monitoring Results during the Reporting Month |
| Table 4.1 | Locations for Water Quality Monitoring |
| Table 4.2 | Water Quality Monitoring Equipment |
| Table 4.3 | Frequency and Parameters of Water Quality Monitoring |
| Table 4.4 | Ground Water Level Monitoring Data |
| Table 5.1 | Summary of Environmental Licensing and Permit Status |
| Table 5.2 | Observations and Recommendations of Site Inspections |

LIST OF FIGURES

| | |
|---------------|---|
| Figure 1.1 | Layout Plan of the Project Site |
| Figure 2.1 | ET's Organization Chart |
| Figure 3.1a | Locations of Air Quality and Construction Noise Monitoring Stations at Eastern Portal |
| Figure 3.1b | Locations of Air Quality and Construction Noise Monitoring Stations at Western Portal |
| Figure 3.1c | Locations of Construction Noise Monitoring Stations at Intake E7 |
| Figure 3.1d | Locations of Construction Noise Monitoring Stations at Intake PFLR1 |
| Figure 3.1e | Locations of Construction Noise Monitoring Stations at Intake W0 |
| Figure 3.1f | Locations of Construction Noise Monitoring Stations at Intake RR1 |
| Figure 3.1g | Locations of Construction Noise Monitoring Stations at Intake W5 |
| Figure 3.1h | Locations of Construction Noise Monitoring Stations at Intake E5A |
| Figure 3.1i | Locations of Construction Noise Monitoring Stations at Intake THR2 |
| Figure 3.1j | Locations of Construction Noise Monitoring Stations at Intake P5 |
| Figure 3.1k | Locations of Construction Noise Monitoring Stations at Intake W8 |
| Figure 3.1l | Locations of Construction Noise Monitoring Stations at Intake DG1 |
| Figure 3.1m | Locations of Construction Noise Monitoring Stations at Intake MA14 |
| Figure 3.1n | Locations of Construction Noise Monitoring Stations at Intake BR6 |
| Figure 3.1o | Location of Construction Ground Borne Noise Monitoring Station |
| Figure 4.1a-b | Locations of Water Quality Monitoring Stations |
| Figure 4.2a-e | Location of Ground Water Level Monitoring Stations |

LIST OF APPENDICES

| | |
|---|--|
| A | Action and Limit Levels for Air Quality, Noise and Water Quality |
| B | Copies of Calibration Certificates |
| C | Wind Data |
| D | Environmental Monitoring Schedules |
| E | 1-hour TSP Monitoring Results, Graphical Presentations |
| F | 24-hour TSP Monitoring Results, Graphical Presentations |
| G | Noise Monitoring Results and Graphical Presentations |
| H | Summary of Exceedance |
| I | Site Audit Summary |
| J | Environmental Mitigation Implementation Schedule (EMIS) |
| K | Event Action Plans |
| L | Complaint Logs |
| M | Construction Programme |
| N | Waste Generated Quantity |
| O | Quality Control Reports for SS Laboratory Analysis |
| P | Baseline Review for Marine Water Quality Monitoring |

LIST OF ANNEX

| | |
|----|--|
| I | Review Report on Handling & Delivery of Excavation Materials at The Western Portal |
| II | Proposal of Two Blasts Per Day in Western Adits |

EXECUTIVE SUMMARY

Introduction

1. This is the 41st Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited for the “Drainage Improvement in Northern Hong Kong Island – Hong Kong West Drainage Tunnel” (the Project). This report documents the findings of EM&A Works conducted in August 2011.
2. The site activities undertaken in the reporting month included:
 - Adit excavation and outfall excavation at Western Portal, Adit excavation and River Channel construction at Eastern Portal;
 - Dropshaft pilot hole and reaming on-going at intake BR5, W10 and BR4;
 - Dropshaft reaming completed at Intakes B2, PFLR1 and W1 on 23/Aug/11, 6/Aug/11 and 27/July/11 respectively;
 - Cofferdam construction at and P5;
 - P5 dropshaft remedial measure works on-going;
 - Dropshaft Mechanical excavation at E7 on-going, and completed at BR6 on 20/Aug/11;
 - HDC works on-going at Intake W5;
 - Excavation of intake structure at Intakes RR1, MA17, W8 and M3;
 - Permanent Intake structure works at MBD2, THR2, TP5, PFLR1, GL1, MB16, MA14, DG1 and MA15;
 - Dropshaft Lining Works HKU1, TP789 and E5B was completed on 06/Aug/11, 08/Aug/2011 and 13/Aug/11 respectively. Dropshaft lining works at MA15 was started on 09/Aug/2011;
 - Permanent Adit Lining works at MB16, MBD2, THR2, E5B, MA15, TP5, TP4 and HKU1 on-going;
 - Still Chamber lining works at SM1, W0, E5A & GL1;
 - Still Chamber lining works completed at MA15 on 28/July/2011;
 - DDA submissions for Adit/Main Tunnel Intersection, Adits, Stilling Chambers and Turning Bays;
 - DDA submissions for temporary works, slope works and permanent works for Intake Structures;
 - DDA submissions for temporary and permanent works for Dropshafts;
 - Casting of dropshaft precast rings; and
 - Intake SM1, MB16 and MBD2 metal works on-going.

Environmental Monitoring Works

3. Environmental monitoring for the Project was performed in accordance with the updated EM&A Manual and the monitoring results were checked and reviewed. Site Inspections/Audits were conducted once per week. The implementation of the environmental mitigation measures, Event Action Plans and environmental complaint handling procedures were also checked.
4. Proposal for Temporary Suspension of Water Quality Monitoring Western Portal was submitted on 15th September 2009 and approved by EPD on 30th October 2009. Marine water quality monitoring was temporary suspended starting from 31st October 2009 until there is marine-

based construction activities resumed at the Western Portal. There is no marine-based construction activity to be conducted in reporting month.

5. Baseline review for marine water quality monitoring was conducted in reporting month. In addition, site inspections/audits were conducted at least twice per week at Western Portal starting from November 2009.
6. Summary of the non-compliance of the reporting month is tabulated in Table I.

Table I Summary Table for Non-compliance Recorded in the Reporting Month

| Parameter | No. of Exceedance | | No. of Exceedance Due to the Project | | Action Taken |
|----------------|-------------------|-------------|--------------------------------------|-------------|--------------|
| | Action Level | Limit Level | Action Level | Limit Level | |
| Eastern Portal | | | | | |
| 1-hr TSP | 0 | 0 | 0 | 0 | N/A |
| 24-hr TSP | 0 | 0 | 0 | 0 | N/A |
| Noise | 1 | 0 | 1 | 0 | N/A |
| Western Portal | | | | | |
| 1-hr TSP | 0 | 0 | 0 | 0 | N/A |
| 24-hr TSP | 0 | 0 | 0 | 0 | N/A |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake DG1 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake E5A | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake E7 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake MA14 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake PFLR1 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |

| | | | | | |
|------------|---|---|---|---|-----|
| Intake W0 | | | | | |
| Noise | 1 | 0 | 1 | 0 | N/A |
| Intake RR1 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake W5 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake P5 | | | | | |
| Noise | 1 | 0 | 1 | 0 | N/A |
| Intake W8 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake BR6 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake CR1 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake GL1 | | | | | |
| Noise | 0 | 0 | 0 | 0 | N/A |
| Intake W10 | | | | | |
| Noise | 1 | 0 | 1 | 0 | N/A |
| Intake BR5 | | | | | |
| Noise | 1 | 0 | 1 | 0 | N/A |

Eastern Portal

1-hour TSP Monitoring

7. All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

24-hour TSP Monitoring

8. All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No

Action/Limit Level exceedance was recorded.

Construction Noise

9. All construction noise monitoring was conducted as scheduled in the reporting month. One Action Level exceedance was recorded due to the complaint received on 11th August 2011.

Western Portal

1-hour TSP Monitoring

10. All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

24-hour TSP Monitoring

11. All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Construction Noise

12. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Water Quality

13. Marine water quality monitoring was temporary suspended starting from 31st October 2009.

14. Baseline review for marine water quality monitoring was conducted in reporting month.

Construction Ground Borne Noise

15. All construction ground borne noise monitoring was conducted in the reporting month. No Action/Limit Level exceedance was recorded.

Intake DG1

Construction Noise

16. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake E5A

Construction Noise

17. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake E7*Construction Noise*

18. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake MA14*Construction Noise*

19. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake PFLR1*Construction Noise*

20. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake RR1*Construction Noise*

21. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake W0*Construction Noise*

22. All construction noise monitoring was conducted as scheduled in the reporting month. One Action Level exceedance was recorded due to the complaint received on 9th August 2011.

Intake W5*Construction Noise*

23. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake P5*Construction Noise*

24. All construction noise monitoring was conducted as scheduled in the reporting month. One Action Level exceedance was recorded due to the complaint received on 25th August 2011.

Intake W8*Construction Noise*

25. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake BR6*Construction Noise*

26. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Intake CR1*Construction Noise*

27. No Action/Limit Level exceedance was recorded.

Intake GL1*Construction Noise*

28. No Action/Limit Level exceedance was recorded.

Intake W10*Construction Noise*

29. One Action Level exceedance was recorded due to the complaint received on 24th August 2011.

Intake BR5*Construction Noise*

30. One Action Level exceedance was recorded due to the complaint received on 26th August 2011.

Environmental Licenses and Permits

31. Licenses/Permits granted to the Project include the Environmental Permit (EP) for the Project, An Environmental Permit No. EP-272/2007 was issued on 26 April 2007 and Environmental Permit No. EP-272/2007/A was issue on 26 October 2007. Later, the further Environmental Permit (FEP-01/272/2007/A) and (FEP-01/272/2007/B) was issued on 28 January 2008 and 25 June 2009 to Dragages-Nishimatsu Joint Venture.

32. Registration of Chemical Waste Producer (License: 5213-148-D2393-02 for Eastern Portal and No. 5213-172-D2393-01 for Western Portal).
33. Water Discharge License (License No.: EP860/W10/XY0175 for Area of Mount Butler Office, EP860/W10/XY0177 for Eastern Portal, EP820/W9/XT086 and WT00005864-2010 for Western Portal, EP860/W10/XY0183 for Intake W0, WT00003372-2009 for Intake SM1, WT00003737-2009 for Intake MB16, WT00004126-2009 for Intake HKU1, WT00003738-2009 for THR2, WT00004270-2009 for PFLR1, WT00004806-2009 for Intake E7, WT00004808-2009 for MBD2, WT00004885-2009 for Intake RR1, WT00005135-2009 for Intake W10, WT00005357-2009 for Intake W5, WT00005374-2009 for Intake P5, WT00005376-2009 for Intake TP4, WT00005588-2009 for Intake TP5, WT00005643-2009 for Intake E5A, WT00005754-2010 for Intake W8, WT00005954 for Intake TP789, WT00005915 for Intake E5B, WT00006102-2010 for Intake M3, WT00006415-2010 for Intake MA15, WT00006420-2010 for Intake MA17, WT00006428-2010 for Intake BR6, WT00006609-2010 for Intake HR1, WT00006559-2010 for Intake CR1, WT00006929-2010 for Intake W1, WT00006418-2010 for Intake MA14, WT00006865-2010 for Intake BR5, WT00007039-2010 for Intake DG1 WT00007042-2010 for Intake W3, WT00007043-2010 for Intake GL1, WT00007130-2010 for Intake BR4, WT00007139-2010 for Intake BR6 – SMH17 and WT00007319-2010 for Intake B2).
34. Construction Noise Permit (License No.: GW-RS0125-11 and GW-RS692-11 for Eastern Portal, GW-RS0584-11 for Western Portal, GW-RS0244-11 for Eastern Adits, GW-RS0149-11 and GW-RS0540-11 for Intake W0, GW-RS0167-11 and GW-RS0756-11 for Intake PFLR1, GW-RS0456-11 for Intake W3, GW-RS0514-11 for Intake MA17, GW-RS0341-11 for Intake SMH17, GW-RS0441-11 for Intake BR4, GW-RS0443-11 for Intake W1, GW-RS0566-11 and GW-RS0732-11 for adits and tunnel section in Central-Western District.

Key Information in the Reporting Month

35. Summary of key information in the reporting month is tabulated in Table II.

Table II Summary Table for Key Information in the Reporting Month

| Event | Event Details | | Action Taken | Status | Remark |
|---|---------------|---|---|-----------------|--------|
| | Number | Nature | | | |
| Complaint received | 1 | Construction noise at Intake Eastern Portal | Investigation completed | Closed | --- |
| | 1 | Construction noise at Intake W0 | Investigation report was submitted | Closed | --- |
| | 1 | Construction noise at Intake W10 | Under Investigation | In-progress | --- |
| | 1 | Construction noise at Intake P5 | Investigation report was submitted | Closed | --- |
| | 1 | Construction noise at Intake BR5 | Under Investigation | In-progress | --- |
| Changes to the assumptions and key construction / operation activities recorded | 0 | --- | N/A | N/A | --- |
| Status of submissions under EP | 1 | Monthly EM&A Report (July 2011) | Submitted to EPD on 23 August 2011 (EP condition 3.3) | Verified by IEC | --- |
| Notifications of any summons & prosecutions received | 0 | --- | N/A | N/A | --- |

Future Key Issues:

Major site activities for the coming month include:

- Adit excavation, outfall excavation at West Portal.
- Permanent Adit lining works at MB16, MBD2, THR2, TP5, TP4, TP789, E7, HKU1, MA15, E5B and E5A.
- Stilling chamber lining works at GL1, E5A, SM1, M3, W10, W1, PFLR1, B2, BR5, DG1, HR1, E7, W8, W3 & W5.
- Permanent Intake Structure Construction at Intake DG1, PFLR1, BR5 GL1, HKU1, MB16, MBD2, THR2, HR1, BR4, TP4, TP5, MA15, E5A, E5B, BR6, W3, B2, TP789 and W10.
- Excavation of dropshaft at Intakes W10, MA14, BR5 and BR4 by Raise Boring method.
- Excavation of intake structure at Intakes E7, W1, MA17, RR1, W8, M3, P5 and CR1.
- Excavation of Dropshaft at Intake W5 by HDC on-going and to start at CR1.
- Cofferdam construction at Intakes P5.
- Casting dropshaft precast rings.
- Permanent dropshaft lining works at E5A, GL1 and MA15.
- Penstock and metal works at Intakes TP4, MB16, MBD2, THR2, TP4 and TP5.
- Adit Excavation : W0, BR4, BR6 and W3

1. INTRODUCTION

Background

- 1.1 Drainage Improvement in Northern Hong Kong Island – Hong Kong West Drainage Tunnel is a Designated Project (hereafter referred to as “the Project”) under the Environmental Impact Assessment Ordinance (Cap. 449). A study of environmental impact assessment (EIA) was undertaken to consider the key issues of air quality, noise, water quality, ecological, construction waste, landscape and visual, land use, cultural impacts, and identify possible mitigation measures associated with the works. An EIA Report was approved by the Environmental Protection Department (EPD) on 7 April 2006.
- 1.2 The project comprises the construction of a drainage tunnel deep into the ground in Mid-levels of the Northern Hong Kong Island from Tai Hang to Pokfulam to intercept and convey the stormwater from the upper catchment directly to the sea near Cyberport. The Drainage tunnel alignment starts from the Eastern Portal near Haw Par Mansion in Tai Hang and ends at the Western Portal located to the north of Cyberport running underneath the Pok Fu Lam, Tai Tam, Aberdeen and Lung Fu Shan Country Parks. The underground main drainage tunnel is 6.25m-7.25m in diameter and about 11km long. Two portals and a series of connecting adits and drop shafts are also been constructed. The general layout of the Project is shown in **Figure 1.1**.
- 1.3 An Environmental Permit (EP) No. EP-272/2007 was issued on 26 April 2007 for Drainage Improvement in Northern Hong Kong Island – Hong Kong West Drainage Tunnel to Drainage Services Department as the Permit Holder. Later, the further Environmental Permit (FEP-01/272/2007/A) and (FEP-01/272/2007/B) was issued on 28 January 2008 and 25 June 2009 to Dragages-Nishimatsu Joint Venture.
- 1.4 Cinotech Consultants Limited was commissioned by the Dragages-Nishimatsu Joint Venture (the Contractor) to undertake the Environmental Monitoring and Audit (EM&A) works for the Project. The Updated EM&A Manual was prepared by Cinotech to fulfil the requirements of the EP. The construction commencement of this Contract at Eastern Portal was on 17th April 2008 and 2nd May 2008 at Western Portal (land-based). The marine construction works was commenced on 30 May 2008. This is the 41st monthly EM&A report summarizing the EM&A works for the Project in August 2011.

Project Organizations

- 1.5 Different parties with different levels of involvement in the project organization include:
 - Project Proponent – Drainage Services Department (DSD).
 - The Supervising Officer or Supervising Officer’s Representative (SO or SOR) – Ove Arup & Partners (ARUP).
 - Environmental Team (ET) – Cinotech Consultants Limited (CCL).
 - Independent Environmental Checker (IEC) – Allied Environmental Consultants Limited (AEC).
 - Contractor – Dragages-Nishimatsu Joint Venture (DNJV).

1.6 The responsibilities of respective parties are detailed in Sections 1.14 to 1.28 of the updated EM&A Manual of the Project.

1.7 The key contacts of the Project are shown in Table 1.1 and the organization chart of ET is shown in **Figure 2.1**.

Table 1.1 Key Project Contacts

| Party | Role | Name | Position | Phone No. | Fax No. |
|----------|-----------------------------------|--------------------|---|-----------|-----------|
| DNJV | Permit Holder | Mr. ALTIER Daniel | Project Manager | 2671 7333 | 2671 9300 |
| | | Mr. UETAKE H. | Deputy Project Manager | | |
| ARUP | Supervising Officer | Mr. Jackson Wong | CRE | 6117 6636 | 2436 1012 |
| | | Ms. Angela Yan | RE | 3961 5206 | |
| Cinotech | Environmental Team | Dr. Priscilla Choy | ET Leader | 2151 2089 | 3107 1388 |
| | | Ms. Ivy Tam | Project Coordinator and Audit Team Leader | 2151 2090 | |
| | | Mr. Henry Leung | Monitoring Team Leader | 2151 2087 | |
| AEC | Independent Environmental Checker | Ms. Grace Kwok | Independent Environmental Checker | 2815 7028 | 2815 5399 |
| DNJV | Contractor | Mr. Chu Chung Sing | Environmental Officer | 3476 0753 | 2671 9300 |

Construction Programme

1.8 The site activities undertaken in the reporting month included:

- Adit excavation and outfall excavation at Western Portal, Adit excavation and River Channel construction at Eastern Portal;
- Dropshaft pilot hole and reaming on-going at intake BR5, W10 and BR4;
- Dropshaft reaming completed at Intakes B2, PFLR1 and W1 on 23/Aug/11, 6/Aug/11 and 27/July/11 respectively;
- Cofferdam construction at and P5;
- P5 dropshaft remedial measure works on-going;
- Dropshaft Mechanical excavation at E7 on-going, and completed at BR6 on 20/Aug/11;
- HDC works on-going at Intake W5;
- Excavation of intake structure at Intakes RR1, MA17, W8 and M3;
- Permanent Intake structure works at MBD2, THR2, TP5, PFLR1, GL1, MB16, MA14, DG1 and MA15;

- Dropshaft Lining Works HKU1, TP789 and E5B was completed on 06/Aug/11, 08/Aug/2011 and 13/Aug/11 respectively. Dropshaft lining works at MA15 was started on 09/Aug/2011;
- Permanent Adit Lining works at MB16, MBD2, THR2, E5B, MA15, TP5, TP4 and HKU1 on-going;
- Still Chamber lining works at SM1, W0, E5A & GL1;
- Still Chamber lining works completed at MA15 on 28/July/2011;
- DDA submissions for Adit/Main Tunnel Intersection, Adits, Stilling Chambers and Turning Bays;
- DDA submissions for temporary works, slope works and permanent works for Intake Structures;
- DDA submissions for temporary and permanent works for Dropshafts;
- Casting of dropshaft precast rings; and
- Intake SM1, MB16 and MBD2 metal works on-going.

Table 1.2 Construction Programme Showing the Inter-Relationship with Environmental Protection/Mitigation Measures

| Construction Works | Major Environmental Impact | Control Measures |
|---|--|---|
| Adit excavation at Western Portal, Adit excavation and River Channel excavation at Eastern Portal | Noise, dust impact, water quality and waste generation | Provided water spraying during dust generation works On-site waste sorting and implementation of trip ticket system Appropriate desilting/sedimentation devices provided on site for treatment before discharge Use of quiet plant and well-maintained construction plant Provide movable noise barrier Provide sufficient mitigation measures as recommended in Approved EIA Report |
| Dropshaft pilot hole and reaming on-going at intake BR5, W10 and BR4 | | |
| Cofferdam construction at Intake P5 | | |
| Dropshaft Mechanical excavation at BR6 and E7 | | |
| Excavation of intake structure at Intakes RR1, MA17, W8 and M3 | | |
| Permanent Intake structure works at Intake MBD2, THR2, TP5, PFLR1, GL1, MB16, MA14, DG1 and MA15 | | |
| Dropshaft Lining Works at Intake HKU1, TP789, E5B and MA15 | | |
| Permanent Adit Lining works at Intake MB16, MBD2, THR2, E5B, MA15, TP5, TP4 and HKU1 | | |
| Still Chamber lining works at Intake SM1, W0, E5A & GL1 | | |
| DDA submissions for Adit/Main Tunnel Intersection, Adits, Stilling Chambers and Turning Bays | Nil | Nil |
| DDA submissions for temporary works, slope works and permanent works for Intake Structures | | |
| DDA submissions for temporary and permanent works for Dropshafts | | |
| Environmental impact monitoring | | |
| Casting of dropshaft precast rings | | |

Summary of EM&A Requirements

- 1.9 The EM&A programme requires construction phase monitoring construction noise, air quality and water quality and environmental site audit. The EM&A requirements for each parameter are described in the following sections, including:
- All monitoring parameters;
 - Action and Limit levels for all environmental parameters;
 - Event Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA study final report; and
 - Environmental requirements in contract documents.
- 1.10 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 5 of this report.
- 1.11 This report presents the monitoring results, observations, locations, equipment, period, methodology and QA/QC procedures of the required monitoring parameters, namely air quality, water quality and noise levels and audit works for the Project in August 2011.

2. AIR QUALITY

Monitoring Requirements

- 2.1 1-hour and 24-hour TSP monitoring were conducted to monitor the air quality at Eastern and Western Portals. **Appendix A** shows the established Action/Limit Levels for the environmental monitoring works.

Monitoring Locations

- 2.2 Three designated monitoring stations, AQ1, AQ2 and AQ3 were selected for impact dust monitoring. Table 2.1 describes the air quality monitoring locations, which are also depicted in **Figure 3.1a-b**.

Table 2.1 Locations for Air Quality Monitoring

| Monitoring Stations | Locations |
|---------------------|---|
| AQ1 | True Light Middle School of Hong Kong |
| AQ2 | Outside Aegean Terrace |
| AQ3 | Outside The Site Office at Western Portal |

Monitoring Equipment

- 2.3 Table 2.2 summarizes the equipment used in the impact air monitoring programme. Copies of calibration certificates are attached in **Appendix B**.

Table 2.2 Air Quality Monitoring Equipment

| Equipment | Model and Make | Quantity |
|-----------------------|-------------------------------------|----------|
| Calibrator | G25A | 1 |
| 1-hour TSP Dust Meter | Laser Dust Monitor – Model LD3B | 1 |
| HVS Sampler | GMWS 2310 c/w of TSP sampling inlet | 2 |

Monitoring Parameters, Frequency and Duration

- 2.4 Table 2.3 summarizes the monitoring parameters and frequencies of impact dust monitoring for the whole construction period. The air quality monitoring schedule for the reporting month is shown in **Appendix D**.

Table 2.3 Impact Dust Monitoring Parameters, Frequency and Duration

| Parameters | Frequency |
|------------|----------------------|
| 1-hr TSP | Three times / 6 days |
| 24-hr TSP | Once / 6 days |

Monitoring Methodology and QA/QC Procedure

1-hour TSP Monitoring

Measuring Procedures

2.5 The measuring procedures of the 1-hour dust meters were in accordance with the Manufacturer's Instruction Manual as follows:

- Pull up the air sampling inlet cover
- Change the Mode 0 to BG with once
- Push Start/Stop switch once
- Turn the knob to SENSI.ADJ and press it
- Push Start/Stop switch once
- Return the knob to the position MEASURE slowly
- Push the timer set switch to set measuring time
- Remove the cap and make a measurement

Maintenance/Calibration

2.6 The following maintenance/calibration was required for the direct dust meters:

- Check the meter regularly and calibrate the meter at bi-monthly interval throughout all stages of the air quality monitoring.

24-hour TSP Monitoring

Instrumentation

2.7 High volume (HVS) samplers (Model GMWS-2310 Accu-Vol) completed with appropriate sampling inlets were employed for 24-hour TSP monitoring. The sampler was composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complied with that required by USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50). Moreover, the HVS also met all the requirements in section 2.5 of the updated EM&A Manual.

Operating/Analytical Procedures

2.8 Operating/analytical procedures for the operation of HVS were as follows:

- A horizontal platform was provided with appropriate support to secure the samplers against gusty wind.
- No two samplers were placed less than 2 meters apart.
- The distance between the sampler and an obstacle, such as buildings, was at least twice the height that the obstacle protrudes above the sampler.
- A minimum of 2 meters of separation from walls, parapets and penthouses was required for rooftop samples.
- A minimum of 2 meters separation from any supporting structure, measured horizontally was required.
- No furnaces or incineration flues were nearby.
- Airflow around the sampler was unrestricted.

- The sampler was more than 20 meters from the drip line.
 - Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.
- 2.9 Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 1.1 m³/min. and 1.4 m³/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.
- 2.10 Fiberglass filters were used which have a collection efficiency of larger than 99% for particles of 0.3 µm diameter.
- 2.11 The power supply was checked to ensure the sampler worked properly. On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air monitoring station.
- 2.12 The filter holding frame was then removed by loosening the four nuts and a weighted and conditioned filter was carefully centered with the stamped number upwards, on a supporting screen.
- 2.13 The filter was aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.
- 2.14 The shelter lid was closed and secured with the aluminum strip.
- 2.15 The timer was then programmed. Information was recorded on the record sheet, which included the starting time, the weather condition and the filter number (the initial weight of the filter paper can be found out by using the filter number).
- 2.16 After sampling, the filter was removed and sent to the HOKLAS laboratory (Wellab Ltd.) for weighing. The elapsed time was also recorded.
- 2.17 Before weighing, all filters were equilibrated in a conditioning environment for 24 hours. The conditioning environment temperature should be between 25°C and 30°C and not vary by more than ±3°C; the relative humidity (RH) should be < 50% and not vary by more than ±5%. A convenient working RH is 40%.

Maintenance/Calibration

- 2.18 The following maintenance/calibration was required for the HVS:
- The high volume motors and their accessories were properly maintained. Appropriate maintenance such as routine motor brushes replacement and electrical wiring checking were made to ensure that the equipment and necessary power supply are in good working condition.
 - High volume samplers were calibrated at bi-monthly intervals using G-25A Calibration Kit throughout all stages of the air quality monitoring.

Results and Observations

Eastern Portal (AQ1)

- 2.19 All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 2.20 All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Western Portal (AQ2)

- 2.21 All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Western Portal (AQ3)

- 2.22 All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 2.23 Wind data was obtained from the Meteorological Observations for King’s Park Automatic Weather Station for Eastern Portal and Wong Chuk Hang Automatic Weather Station for Western Portal. These wind data for the reporting period is summarized in **Appendix C**.
- 2.24 The monitoring data and graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in **Appendices E and F** respectively.
- 2.25 The summary of exceedance record in reporting month is shown in **Appendix H**.
- 2.26 In accordance with Condition 4.2 of the EP, all environmental monitoring data was made available to the public via internet access at the website <http://www.cinotech.com.hk/projects/WestDrainageTunnel/>.
- 2.27 According to our field observations, the major dust source identified at the designated air quality monitoring stations are as follows:

| Area | Station | Major Noise Source |
|----------------|---|---|
| Eastern Portal | AQ1 – True Light Middle School of Hong Kong | Road Traffic Dust Loading/unloading activities |
| Western Portal | AQ2 – Outside Aegean Terrace | Road Traffic Dust Loading/unloading activities |
| | AQ3 – Outside The Site Office at Western Portal | |

Table 2.4 Summary Table of Air Quality Monitoring Results during the reporting month

| Parameter | Date | Concentration (µg/m ³) | Action Level, µg/m ³ | Limit Level, µg/m ³ |
|-----------------------|-----------|------------------------------------|---------------------------------|--------------------------------|
| Eastern Portal | | | | |
| 1-hr TSP (AQ1) | 4-Aug-11 | 167.6 | 345 | 500 |
| | 4-Aug-11 | 156.7 | | |
| | 4-Aug-11 | 141.6 | | |
| | 10-Aug-11 | 98.4 | | |
| | 10-Aug-11 | 135.3 | | |
| | 10-Aug-11 | 158.6 | | |
| | 16-Aug-11 | 101.6 | | |
| | 16-Aug-11 | 91.2 | | |
| | 16-Aug-11 | 102.3 | | |
| | 22-Aug-11 | 192.5 | | |
| | 22-Aug-11 | 221.4 | | |
| | 22-Aug-11 | 163.6 | | |
| | 26-Aug-11 | 95.1 | | |
| | 26-Aug-11 | 115.9 | | |
| 26-Aug-11 | 125.6 | | | |
| 24-hr TSP (AQ1) | 4-Aug-11 | 58.1 | 201 | 260 |
| | 10-Aug-11 | 35.9 | | |
| | 16-Aug-11 | 32.7 | | |
| | 22-Aug-11 | 73.5 | | |
| | 27-Aug-11 | 63.4 | | |
| Western Portal | | | | |
| 1-hr TSP (AQ2) | 4-Aug-11 | 60.8 | 321 | 500 |
| | 4-Aug-11 | 91.5 | | |
| | 4-Aug-11 | 86.1 | | |
| | 10-Aug-11 | 48.4 | | |
| | 10-Aug-11 | 49.6 | | |
| | 10-Aug-11 | 51.9 | | |
| | 16-Aug-11 | 47.4 | | |
| | 16-Aug-11 | 56.3 | | |
| | 16-Aug-11 | 44.2 | | |
| | 22-Aug-11 | 139.1 | | |
| | 22-Aug-11 | 143.0 | | |
| | 22-Aug-11 | 175.9 | | |
| | 26-Aug-11 | 60.2 | | |
| | 26-Aug-11 | 66.6 | | |
| 26-Aug-11 | 82.6 | | | |
| 24-hr TSP (AQ3) | 4-Aug-11 | 56.6 | 156 | 260 |
| | 10-Aug-11 | 120.8 | | |
| | 16-Aug-11 | 37.6 | | |
| | 22-Aug-11 | 58.7 | | |
| | 27-Aug-11 | 86.3 | | |

3. NOISE

Airborne Construction Noise Monitoring

Monitoring Requirements

3.1 Nineteen noise monitoring stations, namely NC1, NC2, NC3, NC4, NC5, NC6, NC7, NC8, NC9, NC10, NC11, NC12, NC13, NC14, NC15, NC16, NC17, NC18 and NC19 were selected for impact monitoring in the reporting month. **Appendix A** shows the established Action and Limit Levels for the environmental monitoring works.

Monitoring Locations

3.2 Noise monitoring was conducted at 19 designated monitoring stations as listed in Table 3.1. **Figure 3.1a-n** shows the locations of these stations.

Table 3.1 Noise Monitoring Stations

| Monitoring Stations | Locations |
|---------------------|---|
| NC1 | True Light Middle School of Hong Kong |
| NC2 | The Legend |
| NC3 | Outside Aegean Terrace |
| NC4 | Man Yuen Garden |
| NC5 | Blk D Villa Monte Rosa |
| NC6 | Rosaryhill School |
| NC7 | Buddist Li Ka Shing Care & Attention Home for the Elderly |
| NC8 | Marymount Secondary School |
| NC9 | 117 Blue Pool Road |
| NC10 | The Harbour View |
| NC11 | Honey Court |
| NC12 | Ying Wa Girl’s School |
| NC13 | Peaksville Court |
| NC14 | Hong Kong Japanese School |
| NC15 | Hong Kong Academy |
| NC16 | Raimondi College |
| NC17 | Hong Kong Institute of Technology |
| NC18 | Blk A, 80 Robinson Road |
| NC19 | Villa Veneto |

Monitoring Equipment

3.3 Table 3.2 summarizes the noise monitoring equipment. Copies of calibration certificates are provided in **Appendix B**.

Table 3.2 Noise Monitoring Equipment

| Equipment | Model and Make | Qty. |
|-------------------------------|-----------------------------|------|
| Integrating Sound Level Meter | SVAN 955 and B&K 2250 Light | 5 |
| Calibrator | B&K 4231 and SVAN 30A | 4 |

Monitoring Parameters, Frequency and Duration

3.4 Table 3.3 summarizes the monitoring parameters, frequency and total duration of monitoring. The noise monitoring schedule is shown in **Appendix D**.

Table 3.3 Noise Monitoring Parameters, Frequency and Duration

| Monitoring Stations | Parameter | Period | Frequency | Measurement |
|---------------------|--|----------------------------------|---------------|-------------|
| NC1 | L ₁₀ (30 min.) dB(A) L ₉₀ (30 min.) dB(A) L _{eq} (30 min.) dB(A) | 0700-1900 hrs on normal weekdays | Once per week | Façade |
| NC2 | | | | |
| NC3 | | | | |
| NC4 | | | | |
| *NC5 | | | | |
| NC6 | | | | |
| NC7 | | | | |
| NC8 | | | | |
| NC9 | | | | |
| NC10 | | | | |
| *NC11 | | | | |
| NC12 | | | | |
| NC13 | | | | |
| NC14 | | | | |
| *NC15 | | | | |
| NC16 | | | | |
| NC17 | | | | |
| NC18 | | | | |
| NC19 | | | | |

*Free Field Measurement

Monitoring Methodology and QA/QC Procedures

- The Sound Level Meter was set on a tripod at a height of 1.2 m above the ground.
- For free field measurement, the meter was positioned away from any nearby reflective surfaces. All records for free field noise levels were adjusted with a correction of +3 dB(A).
- The battery condition was checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
 - frequency weighting : A
 - time weighting : Fast
 - time measurement : 30 minutes / 5 minutes
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator

for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1.0 dB, the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.

- The wind speed was frequently checked with the portable wind meter.
- At the end of the monitoring period, the L_{eq} , L_{90} and L_{10} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Noise measurement was paused temporarily during periods of high intrusive noise if possible and observation was recorded when intrusive noise was not avoided.
- Noise monitoring was cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

Maintenance and Calibration

- 3.5 The microphone head of the sound level meter and calibrator were cleaned with a soft cloth at quarterly intervals.
- 3.6 The sound level meter and calibrator were checked and calibrated at yearly intervals.
- 3.7 Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

Results and Observations

- 3.8 Noise monitoring (0700-1900 hrs on normal weekdays) at the three designated locations (NC1, NC2 and NC3) was conducted as scheduled in the reporting month for Eastern and Western Portal.
- 3.9 Noise monitoring (0700-1900 hrs on normal weekdays) at NC4, NC5, NC6, NC7, NC8, NC9, NC10, NC11, NC12, NC13, NC14, NC15, NC16, NC17, NC18 and NC19 were conducted as scheduled in the reporting month for Intake BR6, Intake DG1, E5A, E7, MA14, PFLR1, RR1, THR2, W0, W5, W8 and P5 respectively.

Eastern Portal (NC1 & NC2) – 0700-1900 hrs on normal weekdays

- 3.10 One Action Level exceedance was recorded due to the complaint received on 11th August 2011.

Western Portal (NC3) – 0700-1900 hrs on normal weekdays

- 3.11 No Action/Limit Level exceedance was recorded.

Intake BR6 (NC4) – 0700-1900 hrs on normal weekdays

- 3.12 No Action/Limit Level exceedance was recorded.

Intake DG1 (NC5) – 0700-1900 hrs on normal weekdays

3.13 No Action/Limit Level exceedance was recorded.

Intake DG1 (NC6) – 0700-1900 hrs on normal weekdays

3.14 No Action/Limit Level exceedance was recorded.

Intake E5A (NC7) – 0700-1900 hrs on normal weekdays

3.15 No Action/Limit Level exceedance was recorded.

Intake E7 (NC8) – 0700-1900 hrs on normal weekdays

3.16 No Action/Limit Level exceedance was recorded.

Intake E7 (NC9) – 0700-1900 hrs on normal weekdays

3.17 No Action/Limit Level exceedance was recorded.

Intake MA14 (NC10) – 0700-1900 hrs on normal weekdays

3.18 No Action/Limit Level exceedance was recorded.

Intake PFLR1 (NC11) – 0700-1900 hrs on normal weekdays

3.19 No Action/Limit Level exceedance was recorded.

Intake RR1 (NC12) – 0700-1900 hrs on normal weekdays

3.20 No Action/Limit Level exceedance was recorded.

Intake RR1 (NC13) – 0700-1900 hrs on normal weekdays

3.21 No Action/Limit Level exceedance was recorded.

Intake THR2 (NC14) – 0700-1900 hrs on normal weekdays

3.22 No Action/Limit Level exceedance was recorded.

Intake W0 (NC15) – 0700-1900 hrs on normal weekdays

3.23 One Action Level exceedance was recorded due to the complaint received on 9th August 2011.

Intake W5 (NC16) – 0700-1900 hrs on normal weekdays

3.24 No Action/Limit Level exceedance was recorded.

Intake W8 (NC17) – 0700-1900 hrs on normal weekdays

3.25 No Action/Limit Level exceedance was recorded.

Intake W8 (NC18) – 0700-1900 hrs on normal weekdays

3.26 No Action/Limit Level exceedance was recorded.

Intake P5 (NC19) – 0700-1900 hrs on normal weekdays

3.27 One Action Level exceedance was recorded due to the complaint received on 25th August 2011.

Intake CR1 – 0700-1900 hrs on normal weekdays

3.28 No Action/Limit Level exceedance was recorded.

Intake GL1 – 0700-1900 hrs on normal weekdays

3.29 No Action/Limit Level exceedance was recorded.

Intake W10 – 0700-1900 hrs on normal weekdays

3.30 One Action Level exceedance was recorded due to the complaint received on 24th August 2011.

Intake BR5 – 0700-1900 hrs on normal weekdays

3.31 One Action Level exceedance was recorded due to the complaint received on 26th August 2011.

3.32 The summary of exceedance record in reporting month is shown in **Appendix H**.

3.33 The average Baseline Noise Level and Noise Limit Level at each designated noise monitoring station are summarized in Table 3.4 for reference. When the measured noise levels exceed the noise limit level, the corrected measured noise levels will be adopted. The correction would take into account the effect of the background/baseline noise levels. In consideration of the consistency, the baseline noise level corresponding to that particular monitoring time period (as shown in Table 3.5 and **Appendix G**) will be used for such correction.

3.34 Noise monitoring results and graphical presentations are shown in **Appendix G**. In accordance with Condition 4.2 of the EP, all environmental monitoring data was made available to the public via internet access at the website <http://www.cinotech.com.hk/projects/WestDrainageTunnel/>.

3.35 The major noise sources identified at the designated noise monitoring stations are as follows:

| Area | Station | Major Noise Source |
|----------------|--|---|
| Eastern Portal | NC1 – True Light Middle School of Hong Kong | Traffic Noise Loading/unloading activities |
| | NC2 – The Legend | |
| Western Portal | NC3 – Outside Aegean Terrace | Traffic Noise Loading/unloading activities Excavation works |
| Intake BR6 | NC4 - Man Yuen Garden | Traffic Noise Excavation works |
| Intake DG1 | NC5 - Blk D Villa Monte Rosa | Traffic Noise |
| | NC6 - Rosaryhill School | |
| Intake E5A | NC7 - Buddhist Li Ka Shing Care & Attention Home for the Elderly | Traffic Noise Excavation works |
| Intake E7 | NC8 – Marymount Secondary School | Traffic Noise Excavation works |
| | NC9 – 117 Blue Pool Road | |
| Intake MA14 | NC10 - The Harbour View | Traffic Noise Excavation works |
| Intake PFLR1 | NC11 – Honey Court | Traffic Noise Excavation works |
| Intake RR1 | NC12 – Ying Wa Girl’s School | Traffic Noise Excavation works |
| | NC13 – Peaksville Court | |
| Intake THR2 | NC14 – Hong Kong Japanese School | Traffic Noise |
| Intake W0 | NC15 – Hong Kong Academy | Traffic Noise |
| Intake W5 | NC16 - Raimondi College | Traffic Noise Excavation works |
| Intake W8 | NC17 - Hong Kong Institute of Technology | Traffic Noise Excavation works |
| | NC18 - Blk A, 80 Robinson Road | |
| Intake P5 | NC19 – Villa Veneto | Traffic Noise Excavation works |

Table 3.4 Baseline Noise Level and Noise Limit Level for Monitoring Stations

| Station | Baseline Noise Level, dB (A) (The average level at 0700 – 1900 hrs on normal weekdays) | Noise Limit Level, dB (A) (at 0700 – 1900 hrs on normal weekdays) |
|--|--|---|
| NC1 – True Light Middle School of Hong Kong | 70.2 | 70* |
| NC2 – The Legend | 64.8 | 75 |
| NC3 – Outside Aegean Terrace | 57.7 | |
| NC4 – Man Yuen Garden | 64.5 | |
| NC5 - Blk D Villa Monte Rosa | 66.1 | |
| NC6 - Rosaryhill School | 64.1 | 70* |
| NC7 - Buddhist Li Ka Shing Care & Attention Home for the Elderly | 65.1 | 75 |
| NC8 – Marymount Secondary School | 63.5 | 70* |
| NC9 – 117 Blue Pool Road | 63.3 | 75 |
| NC10 – The Harbour View | 71.7 | |
| NC11 – Honey Court | 63.2 | |
| NC12 – Ying Wa Girl’s School | 67.1 | 70* |
| NC13 - Peakville Court | 65.2 | 75 |
| NC14 – Hong Kong Japanese School | 60.8 | 70* |
| NC15 – Hong Kong Academy | 63.5 | |
| NC16 - Raimondi College | 70.4 | |
| NC17 - Hong Kong Institute of Technology | 66.0 | |
| NC18 - Blk A, 80 Robinson Road | 64.8 | 75 |
| NC19 – Villa Veneto | 68.6 | |

(*) reduce to 65 dB(A) during school examination periods.

Table 3.5 Summary Table of Noise Monitoring Results during the Reporting Month

| Station | Date | Measured Noise Level, Leq(30min) dB (A) | Corresponding Baseline Level ⁽¹⁾ , dB (A) | Corrected Measured Noise Level ⁽²⁾ : Leq(30min) dB (A) | Exceedance of Noise Limit Level (Yes/No) |
|---|-----------|---|--|---|--|
| 07:00 – 19:00 hrs on normal weekdays | | | | | |
| Eastern Portal | | | | | |
| NC1 | 2-Aug-11 | 71.8 | 69.7 | 67.6 | No |
| | 9-Aug-11 | 69.3 | N/A | N/A | |
| | 18-Aug-11 | 66.8 | N/A | N/A | |
| | 23-Aug-11 | 69.8 | N/A | N/A | |
| | 30-Aug-11 | 62.7 | N/A | N/A | |
| NC2 | 2-Aug-11 | 72.0 | N/A | N/A | No |
| | 9-Aug-11 | 71.5 | | | |
| | 18-Aug-11 | 68.3 | | | |
| | 23-Aug-11 | 64.0 | | | |
| | 30-Aug-11 | 60.2 | | | |
| Western Portal | | | | | |
| NC3 | 2-Aug-11 | 52.7 | N/A | N/A | No |
| | 9-Aug-11 | 52.3 | | | |
| | 18-Aug-11 | 51.7 | | | |
| | 23-Aug-11 | 51.3 | | | |
| | 30-Aug-11 | 69.3 | | | |
| Intake BR6 | | | | | |
| NC4 | 2-Aug-11 | 70.2 | N/A | N/A | No |
| | 9-Aug-11 | 70.2 | | | |
| | 18-Aug-11 | 71.4 | | | |
| | 23-Aug-11 | 72.3 | | | |
| | 30-Aug-11 | 67.4 | | | |
| Intake DG1 | | | | | |
| NC5 | 2-Aug-11 | 66.9 | N/A | N/A | No |
| | 9-Aug-11 | 65.7 | | | |
| | 18-Aug-11 | 67.1 | | | |
| | 23-Aug-11 | 67.6 | | | |
| | 30-Aug-11 | 62.5 | | | |
| NC6 | 2-Aug-11 | 67.2 | N/A | N/A | No |
| | 9-Aug-11 | 65.2 | | | |
| | 18-Aug-11 | 64.2 | | | |
| | 23-Aug-11 | 64.2 | | | |
| | 30-Aug-11 | 62.8 | | | |
| Intake E5A | | | | | |
| NC7 | 2-Aug-11 | 74.2 | N/A | N/A | No |
| | 9-Aug-11 | 74.6 | | | |
| | 18-Aug-11 | 74.4 | | | |
| | 23-Aug-11 | 74.7 | | | |
| | 30-Aug-11 | 73.4 | | | |
| Intake E7 | | | | | |
| NC8 | 2-Aug-11 | 69.7 | N/A | N/A | No |
| | 9-Aug-11 | 69.0 | | | |

| | | | | | |
|---------------------|-----------|------|-----|-----|----|
| | 18-Aug-11 | 68.8 | | | |
| | 23-Aug-11 | 69.3 | | | |
| | 30-Aug-11 | 68.3 | | | |
| NC9 | 2-Aug-11 | 68.6 | N/A | N/A | No |
| | 9-Aug-11 | 71.7 | | | |
| | 18-Aug-11 | 70.6 | | | |
| | 23-Aug-11 | 69.2 | | | |
| | 30-Aug-11 | 70.2 | | | |
| Intake MA14 | | | | | |
| NC10 | 2-Aug-11 | 72.3 | N/A | N/A | No |
| | 9-Aug-11 | 70.5 | | | |
| | 18-Aug-11 | 71.2 | | | |
| | 23-Aug-11 | 72.1 | | | |
| | 30-Aug-11 | 71.2 | | | |
| Intake PFLR1 | | | | | |
| NC11 | 2-Aug-11 | 67.2 | N/A | N/A | No |
| | 9-Aug-11 | 65.2 | | | |
| | 18-Aug-11 | 66.2 | | | |
| | 23-Aug-11 | 67.2 | | | |
| | 30-Aug-11 | 66.9 | | | |
| Intake RR1 | | | | | |
| NC12 | 2-Aug-11 | 68.2 | N/A | N/A | No |
| | 9-Aug-11 | 66.7 | | | |
| | 18-Aug-11 | 68.1 | | | |
| | 23-Aug-11 | 67.5 | | | |
| | 30-Aug-11 | 65.8 | | | |
| NC13 | 2-Aug-11 | 64.2 | N/A | N/A | No |
| | 9-Aug-11 | 64.9 | | | |
| | 18-Aug-11 | 63.7 | | | |
| | 23-Aug-11 | 64.8 | | | |
| | 30-Aug-11 | 64.1 | | | |
| Intake THR2 | | | | | |
| NC14 | 2-Aug-11 | 67.2 | N/A | N/A | No |
| | 9-Aug-11 | 65.5 | | | |
| | 18-Aug-11 | 64.9 | | | |
| | 23-Aug-11 | 69.2 | | | |
| | 30-Aug-11 | 64.1 | | | |
| Intake W0 | | | | | |
| NC15 | 2-Aug-11 | 66.7 | N/A | N/A | No |
| | 9-Aug-11 | 66.9 | | | |
| | 18-Aug-11 | 67.8 | | | |
| | 23-Aug-11 | 68.7 | | | |
| | 30-Aug-11 | 65.7 | | | |
| Intake W5 | | | | | |
| NC16 | 2-Aug-11 | 67.2 | N/A | N/A | No |
| | 9-Aug-11 | 64.2 | | | |
| | 18-Aug-11 | 63.9 | | | |
| | 23-Aug-11 | 63.8 | | | |
| | 30-Aug-11 | 66.1 | | | |
| Intake W8 | | | | | |

| | | | | | |
|------------------|-----------|------|-----|-----|----|
| NC 17 | 2-Aug-11 | 68.2 | N/A | N/A | No |
| | 9-Aug-11 | 68.7 | | | |
| | 18-Aug-11 | 69.7 | | | |
| | 23-Aug-11 | 70.5 | | | |
| | 30-Aug-11 | 67.3 | | | |
| NC 18 | 2-Aug-11 | 69.2 | N/A | N/A | No |
| | 9-Aug-11 | 68.2 | | | |
| | 18-Aug-11 | 71.8 | | | |
| | 23-Aug-11 | 72.3 | | | |
| | 30-Aug-11 | 65.4 | | | |
| Intake P5 | | | | | |
| NC19 | 2-Aug-11 | 64.2 | N/A | N/A | No |
| | 9-Aug-11 | 64.6 | | | |
| | 18-Aug-11 | 68.5 | | | |
| | 23-Aug-11 | 63.4 | | | |
| | 30-Aug-11 | 69.9 | | | |

- (1) The corresponding baseline noise levels were derived from the baseline monitoring results at the corresponding stations and time period.
- (2) The corrected measured noise levels will be adopted when the measured noise levels exceed the noise limit level. The correction would take into account the effect of the background/baseline noise levels. The baseline noise level corresponding to that particular monitoring time period will be used for such correction. The corrected noise level due to the construction work was calculated by the following formula:

$$\text{Corrected MNL} = 10 \log (10^{\text{MNL}/10} - 10^{\text{BNL}/10})$$

Remarks:

MNL = Measured Noise Level

BNL = Baseline Noise Level (Corresponding Time Period)

- (3) N/A – Not applicable (Measured Noise Level \leq Limit Level)

Ground Borne Construction Noise Monitoring

Monitoring Requirements

- 3.36 In accordance with the recommendations of the EIA study, ground borne noise monitoring is required to carry out during the TBM operation. Eight designated monitoring stations (GNC1 to GNC8) are designated for construction groundborne noise monitoring to check for compliance.

Monitoring Locations

- 3.37 Construction Ground Borne Noise Monitoring at GNC3 was temporary suspended since 7 May 2009 as the ISS EastPoint Property Management Ltd. received an instruction from the Incorporated Owners of Aegean Terrace that we are not permitted to conduct any noise monitoring inside Aegean Terrace for the Project.
- 3.38 According to the approved EIA report, noise monitoring should be performed at NSR1a (i.e. Crane Court) when TBM is operating through the tunnel section between points A and B). Therefore, Ground borne noise monitoring has been conducted at Crane Court (GNC4) since 3 June 2009 during the TBM operated.

- 3.39 Ground borne noise monitoring at GNC1 – True Light Middle School, GNC2 – The Legend and GNC4 – Crane Court were completed by end of August 2009 accordingly.
- 3.40 Ground borne noise monitoring at GNC5 was completed by end of November 2009.
- 3.41 Ground borne noise monitoring was conducted at GNC6 – French International School in the reporting month during the TBM operation and completed by end of June 2010.
- 3.42 Ground borne noise monitoring was conducted at GNC7 – Hong Villa in the reporting month. **Figure 3.1o** shows the locations of the monitoring stations.

Monitoring Equipment

- 3.43 The noise monitoring equipment shall be the same as stated in Section 3.3.

Monitoring Parameters, Frequency and Duration

- 3.44 Table 3.6 summarizes the monitoring parameters, frequency and total duration of monitoring. The noise monitoring schedule is shown in **Appendix D**.

Table 3.6 Ground Borne Noise Monitoring Parameters, Frequency and Duration

| Monitoring Stations | Parameter | Period | Frequency |
|---------------------|---|----------------------------------|---------------|
| GNC7 | L ₁₀ (30 min.) dB(A) L ₉₀ (30 min.) dB(A) L _{eq} (30 min.) dB(A) | 0700-1900 hrs on normal weekdays | Once per week |

Results and Observations

- 3.45 Groundborne Noise monitoring (0700-1900 hrs on normal weekdays) at Hong Villa (GNC7) was conducted as scheduled in the reporting month. The construction ground borne noise standards are presented at Table 3.7.

Hong Villa (GNC7) - 0700-1900 hrs on normal weekdays

- 3.46 No exceedance was recorded.

Table 3.7 Construction Ground Borne Noise Standards

| Uses | Ground Borne Noise Criteria, dB(A) (Leq 30 min) | | |
|---|---|--|-------------------------------|
| | Daytime (except General Holidays and Sundays)* | Daytime during general holidays and Sundays and all days during Evening (1900 to 2300 hrs)** | Night time (2300 to 0700 hrs) |
| Domestic Premises | 65 | 55 | 40 |
| Educational Institutions (normal periods) | 60 | 55 | (1) |

| | | | |
|--|----|----|-----|
| Education Institutions (during examination periods) | 55 | 55 | (1) |
|--|----|----|-----|

*10dB(A) below the noise criteria stipulated in EIAO-TM

**10dB(A) below the noise criteria stipulated in GW-TM

(1) No sensitive uses usually present during these periods

Table 3.8 Summary Table of Ground Borne Noise Monitoring Results during the Reporting Month

| Parameter | Date | Construction Ground Borne Noise Level : Leq(30min) dB (A) | Standards |
|-----------|-----------|--|-----------|
| GNC7 | 2-Aug-11 | 60.2 | 65 dB(A) |
| | 9-Aug-11 | 56.1 | |
| | 18-Aug-11 | 63.7 | |
| | 23-Aug-11 | 56.4 | |
| | 30-Aug-11 | 56.7 | |

4. WATER QUALITY

Monitoring Requirements

- 4.1 Dissolved oxygen (DO concentration in mg/L and DO saturation in percentage), Turbidity (Tby in NTU), Suspended Solid (SS in mg/L), pH, salinity and both water and ambient temperature monitoring were conducted to monitor the water quality. **Appendix A** shows the established Action/Limit Levels for the environmental monitoring works.
- 4.2 Proposal for Temporary Suspension of Water Quality Monitoring Western Portal was submitted on 15th September 2009 and approved by EPD on 30th October 2009. Marine water quality monitoring was temporary suspended starting from 31st October 2009 until there is marine-based construction activities resumed at the Western Portal. There is no marine-based construction activity to be conducted in reporting month.
- 4.3 Baseline review for marine water quality monitoring was conducted in reporting month and the result is shown in **Appendix P**.

Monitoring Locations

- 4.4 Locations of designated Water Quality Monitoring Stations are shown in **Figure 4.1a-b** and described in Table 4.1. Samples shall be taken at all designated Monitoring and Control Stations.

Table 4.1 Locations for Water Quality Monitoring

| Monitoring Stations | Coordinates | |
|-------------------------|-------------|---------|
| | Northing | Easting |
| <i>Control Stations</i> | | |
| CE (Ebb) | 814956 | 830026 |
| CF (Flood) | 812420 | 831778 |
| <i>Impact Stations</i> | | |
| I1 | 813654 | 831088 |
| I2 | 813582 | 831105 |
| Intake A | 813044 | 831603 |
| Intake B | 814583 | 830606 |

Monitoring Equipment

- 4.5 Table 4.2 summarizes the equipment used in the water quality monitoring program. All the monitoring equipment complied with the specifications stipulated in the Updated EM&A Manual. Copies of the calibration certificates of the equipment are shown in **Appendix B**.

Table 4.2 Water Quality Monitoring Equipment

| Equipment | Model and Make | Qty. |
|--------------------------------------|---------------------------------------|------|
| Water Sampler | Kahlsico Water-Bottle Model 135DW 150 | 1 |
| Multi-parameter Water Quality System | YSI 6820 | 2 |
| Monitoring Position Equipment | “Magellan” Handheld GPS Model GPS-320 | 1 |

Monitoring Parameters, Frequency and Duration

4.6 Table 4.3 summarizes the monitoring parameters, monitoring period and frequencies of water quality monitoring.

Table 4.3 Frequency and Parameters of Water Quality Monitoring

| Station | Parameters | Frequency | No. of depth sampled | Depth | No. of samples events |
|----------|---|------------------|----------------------|---|--|
| CE | <ul style="list-style-type: none"> • Temperature (°C) • pH (pH unit) • turbidity (NTU) • water depth (m) • salinity (mg/L) • dissolved oxygen (DO) (mg/L and % of saturation) • suspended solids (SS) (mg/L) | 3 times per week | 3 | <ul style="list-style-type: none"> • 3 water depths: 1m below water surface, mid-depth and 1m above sea bed. • If the water depth is less than 3m, mid-depth sampling only. • If the water depth is less than 6m, omit mid-depth sampling. | 2 per monitoring day (1 for mid-ebb and 1 for mid-flood) |
| CF | | | 3 | | |
| I1 | | | 3 | | |
| I2 | | | 3 | | |
| Intake A | | | 3 | | |
| Intake B | | | 3 | | |

Monitoring Methodology, Calibration Details and QA/QC Procedures

Instrumentation

4.7 A multi-parameter meter (Model YSI 6820 C-M) was used to measure DO, DO saturation, turbidity, salinity and temperature.

Operating/Analytical Procedures

- 4.8 At each measurement, two consecutive measurements of DO concentration, DO saturation, salinity, turbidity and temperature were taken. Where the difference in the value between the first and second readings of each set was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.
- 4.9 For SS measurement, duplicate water samples for SS were taken and analysed at each monitoring station at each sample depth. The sample bottles were then packed in cool-boxes (without being frozen), and delivered to a HOKLAS accredited laboratory for analysis of suspended solids concentrations within 24 hours.

Maintenance and Calibration

- 4.10 Before each round of monitoring, a zero check in distilled water was performed with the turbidity probe of YSI 6820-C-M. The probe was then calibrated with a solution of known NTU.

QA/QC procedures as attached in **Appendix O** are available for the SS analyzed in the HOKLAS-accredited laboratory, WELLAB Ltd.

Results and Observations

- 4.11 Baseline review for marine water quality monitoring was conducted. According to the baseline review data, the seawater quality is not considered to be affected by the existing work. The monitoring data of the monitoring results are shown in **Appendix P**.

Underground water level

- 4.12 Ground water levels were measured once per month during the construction phase in order to ensure the water levels at those intakes near to the natural stream courses and thus on the surrounding habitats will not be significantly affected.
- 4.13 Locations of designated ground water level (borehole with piezometer) monitoring station UC1 at Eastern Portal has been changed to ADH48 which was verified by IEC on 5th June 2008. The updated ground water level monitoring stations, TP789_DH2, TP5_DH2, THR2_DH7 and PFLR1_DH2 were also verified by IEC on 19th June 2010.
- 4.14 Ground water level monitoring location is shown in **Figure 4.2a-e** and the Monitoring data are shown in Table 4.4.

Table 4.4 Ground Water Level Monitoring Data

| Date | Water Level (from ground)/m |
|---|-----------------------------|
| Location: ADH48 (Eastern Portal) | |
| 11 August 2011 | 13 |

| | |
|----------------------------|-------|
| Location: TP789_DH2 | |
| 11 August 2011 | 32.90 |
| Location: THR2_DH7 | |
| 11 August 2011 | 2.40 |
| Location: PFLR1 | |
| 11 August 2011 | 9.84 |

5. ENVIRONMENTAL AUDIT

Site Audits

- 5.1 Site audits were carried out on a weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site. The summaries of site audits are attached in **Appendix I**.
- 5.2 Site audits were conducted on 4th, 11th, 18st, 25th and 31st August 2011. IEC site inspections were conducted on 31st August 2011. No non-compliance was observed during the site audits.
- 5.3 In order to assess the effectiveness of the implementation of water quality mitigation measures at Western Portal, additional site inspection was conducted on 2th, 10th, 16th, 22nd and 30th August 2011. No non-compliance was observed during the site audits.

Review of Environmental Monitoring Procedures

- 5.4 The monitoring works conducted by the monitoring team were inspected regularly. The following observations have been recorded for the monitoring works:

Air Quality Monitoring

- The monitoring team recorded all observations around the monitoring stations within and outside the construction site.
- The monitoring team recorded the temperature and weather conditions on the monitoring days.

Noise Monitoring

- The monitoring team recorded all observations around the monitoring stations, which might affect the monitoring result.
- Major noise sources were identified and recorded. Other intrusive noise attributing to the result was trimmed off by pausing the monitoring temporarily.

Status of Environmental Licensing and Permitting

- 5.5 All permits/licenses obtained for the Project are summarized in Table 5.1.

Status of Spoil Management

Adit spoil handling arrangements in the Western Portal

- 5.6 The spoils generated during adit excavation (drill-and-blast) were delivered by trains to the Spoil Basin at the tunnel portal. The adit spoils were transferred to a dump truck by means

of a backhoe. The dump truck was then discharge the adit spoils onto the barge at the ramp jetty. The mitigation measures for the spoil handling works at Western Portal are presented in Section 5.21.

- 5.7 The management status for site arrangements on the delivery and handling of excavated materials at earlier stage of the Project, particularly the Western Portal is provided in the **Annex I** of this report for reference.

Two Blasts Per Day in Western Adits

- 5.8 Blasting works were increased to two times per day to ensure timely completion of the Project, especially when unexpected ground conditions are encountered during adit excavation. Two blasts per days are planned initially for the Adits leading to Intake HKU1, W10 and P5. The proposal of two blasts per day in Western Adits is provided in **Annex II** of this report.
- 5.9 During this reporting period, a total 18 nos. of dump trucks of waste were delivered to SENT landfill, 5 trips of C&D waste were delivered to Tuen Mun Fill Bank. 124 and 7 trips of C&D waste were delivered to Chai Wan Public Barging Point and TKO Fill Bank respectively. Both the trip ticket system and chit accounting system for disposal of waste were operating smoothly to date. 2 truck overloading case was recorded during this reporting period (all the cases were within the 105% allowable buffer weight). No disposal of inert C&D material to public sorting facilities and no dump truck without cover were reported from CEDD. In respect of the dump truck cover, DNJV keeps on take record photos and inspection to ensure that all dump trucks have fully covered the skip before leaving the site.
- 5.10 The rock materials from the Eastern Portal and Western Portal were received by the alternative disposal sites at ZhongShan. Some of the tunnel spoils from Eastern Tunnel and adits were also received by Leighton site at Ocean Park and in a residential development site at No. 1 Gough Hill Road, the Peak which was started from 24th September 2010.
- 5.11 The amount of wastes generated by the activities of the Project during the reporting month is shown in **Appendix N**.

Table 5.1 Summary of Environmental Licensing and Permit Status

| Permit No. | Valid Period | | Details | Status |
|--|--------------|----------|--|--------|
| | From | To | | |
| Environmental Permit (EP) | | | | |
| FEP-01/272/2007/B | 25/6/09 | N/A | Construction of a 6.25m-7.25m in diameter and about 11 km long underground main drainage tunnel, 2 portals and a series of connecting adits and drop shafts. | Valid |
| Effluent Discharge License | | | | |
| EP860/W10/XY0175 | 23/06/08 | 30/06/13 | Industrial discharge (Area of Mount Butler Office) | Valid |
| EP860/W10/XY0177 | 23/06/08 | 30/06/13 | Industrial discharge (Eastern Portal Site) | Valid |
| EP820/W9/XT086 | 22/07/08 | 31/07/13 | Industrial discharge (Western Portal Site) | Valid |
| WT00005864-2010 | 20/01/10 | 31/01/15 | Industrial discharge (Western Portal Site) | Valid |
| EP860/W10/XY0183 | 19/11/08 | 30/11/13 | Industrial discharge (Intake W0, Stubbs Road, Wan Chai, HK) | Valid |
| WT00003372-2009 | - | 30/4/14 | Industrial discharge (Intake SM1) | Valid |
| WT00003737-2009 | - | 31/5/14 | Industrial discharge (Intake MB16) | Valid |
| WT00004126-2009 | - | 31/5/14 | Industrial discharge (Intake HKU1) | Valid |
| WT00003738-2009 | - | 31/5/14 | Industrial discharge (Intake THR2) | Valid |
| WT00004270-2009 | - | 31/7/14 | Industrial discharge (Intake PFLR1) | Valid |
| WT00004806-2009 | - | 30/09/14 | Industrial discharge (Intake E7) | Valid |
| WT00004808-2009 | - | 30/09/14 | Industrial discharge (Intake MBD2) | Valid |
| WT00004885-2009 | - | 30/09/14 | Industrial discharge (Intake RR1) | Valid |
| WT00005135-2009 | - | 31/10/14 | Industrial discharge (Intake W10) | Valid |
| WT00005374-2009 | - | 30/11/14 | Industrial discharge (Intake P5) | Valid |
| WT00005376-2009 | - | 30/11/14 | Industrial discharge (Intake TP4) | Valid |
| WT00005357-2009 | - | 30/11/14 | Industrial discharge (Intake W5) | Valid |
| WT00005588-2009 | - | 31/12/14 | Industrial discharge (Intake TP5) | Valid |
| WT00005643-2009 | - | 31/12/14 | Industrial discharge (Intake E5A) | Valid |
| WT00005754-2010 | - | 31/01/15 | Industrial discharge (Intake W8) | Valid |
| WT00005954-2010 | - | 28/02/15 | Industrial discharge (Intake TP789) | Valid |
| WT00005915-2010 | - | 31/01/15 | Industrial discharge (Intake E5B) | Valid |
| WT00006102-2010 | - | 28/02/15 | Industrial discharge (Intake M3) | Valid |
| WT00006415-2010 | - | 30/04/15 | Industrial discharge (Intake MA15) | Valid |
| WT00006420-2010 | - | 30/04/15 | Industrial discharge (Intake MA17) | Valid |
| WT00006428-2010 | - | 30/04/15 | Industrial discharge (Intake BR6) | Valid |
| WT00006609-2010 | - | 31/05/15 | Industrial discharge (Intake HR1) | Valid |
| WT00006559-2010 | - | 30/04/15 | Industrial discharge (Intake CR1) | Valid |
| WT00006929-2010 | - | 30/06/15 | Industrial discharge (Intake W1) | Valid |
| WT00006418-2010 | - | 30/06/15 | Industrial discharge (Intake MA14) | Valid |
| WT00006865-2010 | - | 30/06/15 | Industrial discharge (Intake BR5) | Valid |
| WT00007039-2010 | - | 31/07/15 | Industrial discharge (Intake DG1) | Valid |
| WT00007042-2010 | - | 31/07/15 | Industrial discharge (Intake W3) | Valid |
| WT00007043-2010 | - | 31/07/15 | Industrial discharge (Intake GL1) | Valid |
| WT00007130-2010 | - | 31/07/15 | Industrial discharge (Intake BR4) | Valid |
| WT00007139-2010 | - | 31/07/15 | Industrial discharge (Intake BR6) – SMH17 | Valid |
| WT00007319-2010 | - | 31/08/15 | Industrial discharge (Intake B2) | Valid |
| Registration of Chemical Waste Producer | | | | |
| 5213-148-D2393-02 | --- | N/A | Chemical waste types: Spent oil | Valid |
| 5213-172-D2393-01 | --- | N/A | Chemical waste types: Spent oil | Valid |

| Permit No. | Valid Period | | Details | Status |
|--|--------------|----------|--|---------|
| | From | To | | |
| Construction Noise Permit (CNP) | | | | |
| GW-RS0125-11 | 24/02/11 | 23/08/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work at Hong Kong West Drainage Tunnel (Eastern Portal) (DSD Contract No. DC/2007/10), Tai Hang Road, Causeway Bay, Hong Kong. | Expired |
| GW-RS0692-11 | 23/08/11 | 22/2/12 | | Valid |
| GW-RS0584-11 | 03/07/11 | 02/09/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work and performing prescribed construction work at Hong Kong West Drainage Tunnel (Western Portal), Cyberport Road, Cyberport, Hong Kong (DSD Contract No. DC/2007/10). | Valid |
| GW-RS0149-11 | 19/02/11 | 18/08/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work at a construction site of "Hong Kong West Drainage Tunnel" near Stubbs Road Garden, Wan Chai, Hong Kong | Expired |
| GW-RS0540-11 | 12/06/11 | 09/12/11 | | Valid |
| GW-RS0167-11 | 19/02/11 | 18/08/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work at Section of Pokfulam Road (near Football Field, Pokfulam Road Playground), Hong Kong | Expired |
| GW-RS0756-11 | 19/08/11 | 18/02/12 | | Valid |
| GW-RS0456-11 | 01/06/11 | 30/11/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work at outside Hongkong Electric Centre, Kennedy Road, Hong Kong | Valid |
| GW-RS0514-11 | 09/06/11 | 08/12/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work and performing prescribed construction work at Junction of Magazine Gap Road and May Road, Mid-levels, Hong Kong. | Valid |
| GW-RS0244-11 | 22/03/11 | 20/09/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work and performing prescribed construction work at main tunnel and adits of Hong Kong West Drainage Tunnel under Wan Chai, Hong Kong. | Valid |

| Permit No. | Valid Period | | Details | Status |
|--------------|--------------|----------|--|---------|
| | From | To | | |
| GW-RS0341-11 | 20/04/11 | 19/10/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work and performing prescribed construction work at Kennedy Road near Royal Court for the construction of Hong Kong West Drainage Tunnel. | Valid |
| GW-RS0441-11 | 23/05/11 | 22/11/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work and performing prescribed construction work at an area near Lover's Stone Garden at Bowen Road, Wan Chai, Hong Kong. | Valid |
| GW-RS0443-11 | 23/05/11 | 22/11/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work and performing prescribed construction work at an area near the junction of Bowen Road and Wan Chai Gap Road, Wan Chai, Hong Kong. | Valid |
| GW-RS0566-11 | 20/06/11 | 20/08/11 | Construction Noise Permit for the use of powered mechanical equipment for carrying out construction work and performing prescribed construction work at Main tunnel and adits of Hong Kong West Drainage Tunnel under construction in Central & Western District, Hong Kong. | Expired |
| GW-RS0732-11 | 20/08/11 | 18/02/12 | | Valid |

Implementation Status of Environmental Mitigation Measures

5.12 During site inspections in the reporting month, no non-conformance was identified. ET weekly site inspections were carried out during the reporting month and the observations and recommendations are summarized in Table 5.2.

Table 5.2 Observations and Recommendations of Site Inspections

| Parameters | Date | Observations and Recommendations | Follow-up |
|---|-------------|--|--|
| <i>Water Quality</i> | 11/08/2011 | One compartment of sedimentation tank was observed full of deposited concrete and mud. The Contractor was reminded to clear it as soon as possible. | Rectification/improvement was observed during the follow-up audit session. |
| | 18/08/2011 | The stagnant silty water was observed within H-pile of Intake W5. The Contractor was reminded to clear it as soon as possible, to avoid mosquito breeding. | Rectification/improvement was observed during the follow-up audit session. |
| | 25/08/2011 | The three compartments of sedimentation tank were observed almost silty at Intake MA17 and THR2. The Contractor was reminded to remove the deposited silt regularly, so that the tanks can be functioned properly. | Rectification/improvement was observed during the follow-up audit session. |
| | 31/08/2011 | Stagnant water should be avoided at Eastern Portal and H-pile of E7. The Contractor was reminded to clear the stagnant water or spray larvicide regularly. | Rectification/improvement was observed during the follow-up audit session. |
| <i>Air Quality</i> | 04/08/2011 | Dark smoke emission was observed from the hydraulic breaker at Western Portal. The Contractor was reminded to provide the mitigation measure, to avoid dark smoke emission. | Rectification/improvement was observed during the follow-up audit session. |
| <i>Waste/Chemical Management</i> | 04/08/2011 | Oil stain was observed near the site boundary at Western Portal. The Contractor was reminded to clear the oil stain, to avoid directing to the sea. | Rectification/improvement was observed during the follow-up audit session. |
| | 11/08/2011 | Oil stain was observed to be disposed at Intake BR6, MA17 and TP789. The Contractor was reminded to properly clear it, to avoid directing to the public by surface runoff during rain. | Rectification/improvement was observed during the follow-up audit session. |
| <i>Reminders</i> | 04/08/2011 | The Contractor was reminded of the followings: - The ponding water should be cleared at Intake PFLR1. | Rectification/improvement was observed during the follow-up audit session. |
| | 04/08/2011 | The Contractor was reminded of the followings: - To clear the oil stain at Intake PFLR1 and BR6. | Rectification/improvement was observed during the follow-up audit session. |
| | 04/08/2011 | The Contractor was reminded of the followings: - Clear the deposited silt along the u-channel at Intake MBD2. | Rectification/improvement was observed during the follow-up audit session. |
| | 11/08/2011 | The Contractor was reminded of the followings: - Grease water should be cleared as chemical waste properly within gully at Intake M3 and along the u-channel at Intake W3 respectively. | Rectification/improvement was observed during the follow-up audit session. |

| Parameters | Date | Observations and Recommendations | Follow-up |
|------------|------------|--|--|
| | 11/08/2011 | The Contractor was reminded of the followings: - The air compressor at Intake M3 should be pasted with valid noise label. | Rectification/improvement was observed during the follow-up audit session. |
| | 11/08/2011 | The Contractor was reminded of the followings: - Clear the deposited mud along the u-channel at the entrance of Intake TP5. | Rectification/improvement was observed during the follow-up audit session. |
| | 11/08/2011 | The Contractor was reminded of the followings: - Clear the stagnant water within the sludge holding tank at Intake W0 and the drip tray at Intake HR1 respectively. | Rectification/improvement was observed during the follow-up audit session. |
| | 18/08/2011 | The Contractor was reminded of the followings: - Provide drip tray at underneath the oil drum at Intake MA15 and MBD2. | Rectification/improvement was observed during the follow-up audit session. |
| | 18/08/2011 | The Contractor was reminded of the followings: - To paste the valid noise label on the air compressor at Intake M3. | Rectification/improvement was observed during the follow-up audit session. |
| | 18/08/2011 | The Contractor was reminded of the followings: - Clear the general refuse along the u-channel at Intake B2. | Rectification/improvement was observed during the follow-up audit session. |
| | 18/08/2011 | The Contractor was reminded of the followings: - Clear the discarded oil drum as chemical waste at Intake B2. | Rectification/improvement was observed during the follow-up audit session. |
| | 18/08/2011 | The Contractor was reminded of the followings: - The u-channel at Intake MBD2 should be maintained functioning properly at all the time. | Rectification/improvement was observed during the follow-up audit session. |
| | 25/08/2011 | The Contractor was reminded of the followings: - To clear the stagnant water within the H-pile of Intake PFLR1 and wheel washing bay of Intake E5B respectively. | Rectification/improvement was observed during the follow-up audit session. |
| | 25/08/2011 | The Contractor was reminded of the followings: - Provide valid noise label on the air compressor at Intake HKU1. | Rectification/improvement was observed during the follow-up audit session. |
| | 25/08/2011 | The Contractor was reminded of the followings: - To clear the discarded leaves along the u-channel at Intake PFLR1. | Rectification/improvement was observed during the follow-up audit session. |
| | 25/08/2011 | The Contractor was reminded of the followings: - Ensure sprinkler to be provided at jetty of Western Portal. | Rectification/improvement was observed during the follow-up audit session. |
| | 31/08/2011 | The Contractor was reminded of the followings: - Clear the general refuse at Eastern Portal regularly. | Rectification/improvement was observed during the follow-up audit session. |

| Parameters | Date | Observations and Recommendations | Follow-up |
|------------|------------|---|--|
| | 31/08/2011 | The Contractor was reminded of the followings: - Clear the grease water as chemical waste within the drip tray at underneath the oil drum of Intake E5A. | Rectification/improvement was observed during the follow-up audit session. |

5.13 The monthly IEC audit was carried out on 31st August 2011, the observations were recorded and they are presented as follows:

5.14 The last observations were recorded by IEC on 28th July 2011.

31st August 2011

Follow Up Observations:

- The stagnant water on the H-pile at W10 and W5 has been cleared by the Contractor.

Observations:

- Chemical containers were found scattering at Eastern Portal without proper drip tray. The Contractor was requested to relocate the containers to designated area for proper storage. Proper drip tray shall also be provided for the containers.
- Stagnant water was observed inside the drip pan at E5A. The Contractor was requested to remove the stagnant water.
- Oil leakage was observed on the construction equipment at E5B. The Contractor was requested to provide regular maintenance to equipments.
- Stagnant water was observed on the H-pile beam at E7. The Contractor was requested to remove the stagnant water.

Non-compliance Recorded during Site Inspections

5.15 No non-compliance was recorded in the reporting month.

Summary of Mitigation Measures Implemented

5.16 The Contractor has implemented the mitigation measures as recommended in the EIA and the updated EM&A Manual in the reporting period except those mitigation measures not applicable at this stage. Status of the implementation of mitigation measures is presented in Table 1.2 and **Appendix J**.

5.17 According to the updated EM&A Manual and EP condition, mitigation measures such as noise enclosure and use of quiet PME are required to be implemented.

5.18 The actual implementation status of major mitigation measures required under the EP is as follows:

- Installation of silt curtain during the course of marine works.
- Provide noise enclosure at Eastern Portal.
- Submitted the Alternative Plant Inventory (EP condition 2.8(c)).

5.19 Alternative plant inventory for the noise performance of plants used in Eastern and Western Portal will be updated from time to time and submitted for ETL’s certification and IEC’s verification in accordance with EP condition 2.8c.

5.20 An updated summary of the EMIS is provided in **Appendix J**.

5.21 For the spoil handling works in the Western Portal, the mitigation measures including:

- Acoustic enclosure for the spoil basin;
- Sprinkle system underneath the jetty to suppress fugitive dust from unloading spoil; and
- Side curtains at the jetty to shield the unloading dump truck.

Implementation Status of Event Action Plans

5.22 The Event Action Plans for air quality and noise are presented in **Appendix K**.

Eastern Portal

1-hr TSP Monitoring

5.23 No Action/Limit Level exceedance was recorded in the reporting month.

24-hr TSP Monitoring

5.24 No Action/Limit Level exceedance was recorded in the reporting month.

Construction Noise

5.25 One Action Level exceedance was recorded due to the complaint received on 11th August 2011.

Western Portal

1-hr TSP Monitoring

5.26 No Action/Limit Level exceedance was recorded in the reporting month.

24-hr TSP Monitoring

5.27 No Action/Limit Level exceedance was recorded in the reporting month.

Construction Noise

5.28 No Action/Limit Level exceedance was recorded in the reporting month.

Water Quality

5.29 Marine water quality monitoring was temporary suspended starting from 31st October 2009.

Construction Ground Borne Noise

5.30 No Limit Level exceedance was recorded.

*Intake DG1*Construction Noise

5.31 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake E5A*Construction Noise

5.32 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake E7*Construction Noise

5.33 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake MA14*Construction Noise

5.34 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake PFLR1*Construction Noise

5.35 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake RR1*Construction Noise

5.36 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake THR2*Construction Noise

5.37 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake W0*Construction Noise

5.38 One Action Level exceedance was recorded due to the complaint received on 9th August 2011.

*Intake W5*Construction Noise

5.39 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake P5*Construction Noise

5.40 One Action Level exceedance was recorded due to the complaint received on 25th August 2011.

*Intake W8*Construction Noise

5.41 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake BR6*Construction Noise

5.42 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake CR1*Construction Noise

5.43 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake GL1*Construction Noise

5.44 No Action/Limit Level exceedance was recorded in the reporting month.

*Intake W10*Construction Noise

5.45 One Action Level exceedance was recorded due to the complaint received on 24th August 2011.

*Intake BR5*Construction Noise

5.46 One Action Level exceedance was recorded due to the complaint received on 26th August 2011.

Summary of Complaint, Warning, Notification of any Summons and Successful Prosecution

5.47 Five environmental complaints were received in the reporting month. For the details, please refer to the following table: -

| Complaint No. | Date | Complaint Details |
|-----------------|----------------|--|
| COM-2011-08-229 | 9 August 2011 | A resident complained about noise generated from DSD works area in the park on 24 Stubbs Road. The works caused obstruction to pedestrians and affected the environment. |
| COM-2011-08-230 | 11 August 2011 | A resident complained about the noise generated from rock breaking works at Eastern Portal during past few weeks. The complainant said that the noise was deafening and the breaking works was continuously carried out from 08:00 hrs to 18:00 hrs without consider the feeling of residents living nearby. It caused great nuisance to them. |
| COM-2011-08-232 | 24 August 2011 | One public complaint was raised about noise nuisance from Site Portion W10 near junction between Kotewall Road and University Drive. The complainant requested to keep the noise down in the early morning. |
| COM-2011-08-233 | 25 August 2011 | A resident complained that the noise generated from the Site Portion at the junction of Kotewall Road and Robinson Road. |
| COM-2011-08-234 | 26 August 2011 | The complainant is from the PMO of Camelot Height on Kennedy Road (near Site Portion BR5). The construction noise, generated from the work site on the slope at the back of their building, was heard at about 07:30 hrs recently. |

5.48 No warning, summon and notification of successful prosecution was received in the reporting month.

5.49 From project commencement, there were a total of 99 project-related environmental complaints, no warning, summons and successful prosecution received since the commencement of the Project. The Complaint Log is attached in **Appendix L**.

6. FUTURE KEY ISSUES

Key Issues for the Coming Month

- 6.1 Key environmental issues at Eastern and Western Portals, Intake MA16, MBD2, E5A, E5B, E7, PFLR1, RR1, THR2, SM1, W0, W5, P5, M3, TP4, TP5, TP789, HKU1, W10, W3, W8, MA15, MA17, GL1, HR1, W1, DG1, CR1, BR4, BR5, GL1, MA14 and BR6 in the coming month include:
- Noise from operation of the equipment, especially for rock-breaking activities, piling works and machinery on-site;
 - Dust generation from stockpiles of dusty materials, excavation works and rock breaking activities;
 - Runoff from exposed slope;
 - Wastewater and runoff discharge from site;
 - Regular removal of silt, mud and sand along u-channels and sedimentation tanks;
 - Review and implementation of temporary drainage system for the surface runoff;
 - Proper storage of construction materials on site;
 - Storage of chemicals/fuel and chemical waste/waste oil on site;
 - Watering for rock breaking activity, soil nailing and on haul road;
 - Accumulation of general and construction waste on site.
- 6.2 The tentative program of major site activities and the impact prediction and control measures for the coming two months, i.e. September 2011 to October 2011 are summarized as follows:

| Construction Works | Major Impact Prediction | Control Measures |
|---|--|---|
| - Adit excavation at Western Portal, Adit excavation and River Channel excavation at Eastern Portal; - Dropshaft pilot hole and reaming on-going at intake BR5, W10 and BR4; - Cofferdam construction at Intake P5; - Dropshaft Mechanical excavation at BR6 and E7; - Excavation of intake structure at Intakes RR1, MA17, W8 and M3; - Permanent Intake structure works at MBD2, THR2, TP5, PFLR1, GL1, MB16, MA14, DG1 and MA15; - Dropshaft Lining Works at HKU1, TP789, E5B and MA15; - Permanent Adit Lining works at MB16, MBD2, THR2, E5B, MA15, TP5, TP4 and HKU1; and - Still Chamber lining works at SM1, W0, E5A & GL1. | Air impact (dust) | a) Frequent watering of haul road and unpaved/exposed areas; b) Frequent watering or covering stockpiles with tarpaulin or similar means; and c) Watering of any earth moving activities. |
| | Water quality impact (surface run-off) | d) Diversion of the collected effluent to de-silting facilities for treatment prior to discharge to public storm water drains; e) Provision of adequate de-silting facilities for treating surface run-off and other collected effluents prior to discharge; f) Provision of perimeter protection such as sealing of hoarding footings to avoid run-off from entering the existing storm water drainage system via public road; and g) Provision of measures to prevent discharge into the stream. |
| | Noise Impact | h) Scheduling of noisy construction activities if necessary to avoid persistent noisy operation; i) Controlling the number of plants use on site; j) Regular maintenance of machines; and k) Use of acoustic barriers if necessary. |

Monitoring Schedule for the Next Month

6.3 The tentative environmental monitoring schedules for the next month are shown in **Appendix D**.

Construction Program for the Next Month

6.4 The tentative construction program for the Project is provided in **Appendix M**.

7. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 7.1 Environmental monitoring works were performed in the reporting month and all monitoring results were checked and reviewed.

1-hr TSP Monitoring

- 7.2 All 1-hr TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

24-hr TSP Monitoring

- 7.3 All 24-hr TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Construction Noise Monitoring

- 7.4 All noise monitoring was conducted as scheduled in the reporting month. Five Action Level exceedance was recorded due to the complaints received at Eastern Portal, Intake W10, W0, P5 and BR5.

Construction Ground Borne Noise Monitoring

- 7.5 All construction ground borne noise monitoring was conducted in the reporting month. No Limit Level exceedance was recorded.

Water Quality

- 7.6 Marine water quality monitoring was temporary suspended starting from 31st October 2009.
- 7.7 Baseline review for marine water quality monitoring was conducted in reporting month. According to the baseline review data, the seawater quality is not considered to be affected by the existing work. The monitoring results of baseline review are shown in **Appendix P**.

Complaint and Prosecution

- 7.8 Five environmental complaints and no environmental prosecution were received in the reporting month.

Recommendations

7.9 According to the environmental audit performed in the reporting period, the following recommendations were made:

Air Quality Impact

- To prohibit any open burning on site.
- To regularly maintain the quality of machinery and vehicles on site.
- To implement dust suppression measures on all haul roads, stockpiles, dry surfaces and excavation works.
- To provide hoarding along the entire length of that portion of the site boundary.

Noise Impact

- To inspect the noise sources inside the site.
- To space out noisy equipment and position the equipment as far away as possible from sensitive receivers.
- To provide temporary noise barriers for operations of noisy equipment near the noise sensitive receivers in an appropriate location.

Water Impact

- To prevent any surface runoff discharge into any stream course.
- To review and implement temporary drainage system.
- To identify any wastewater discharges from site.
- To ensure properly maintenance for de-silting facilities.
- To clear the silt and sediment in the sedimentation tanks.
- To review the capacity of de-silting facilities for discharge.
- To divert all the water generated from construction site to de-silting facilities with enough handling capacity before discharge.
- To avoid accumulation of stagnant and ponding water on site.

Waste/Chemical Management

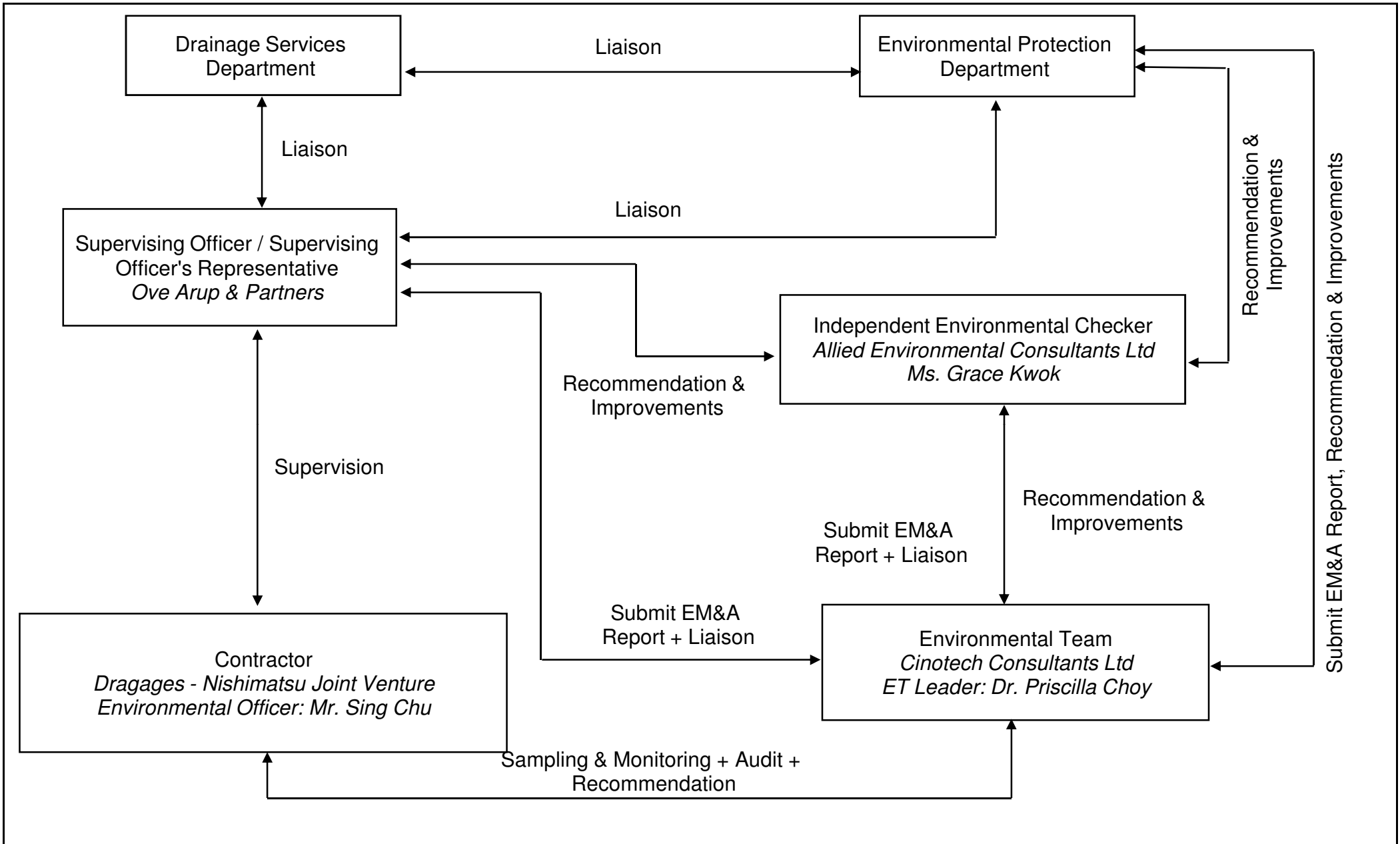
- To check for any accumulation of waste materials or rubbish on site.
- To ensure the performance of sorting of C&D materials at source (during generation);
- To carry out inspection of dump truck at site exit to ensure inert and non-inert C&D materials are properly segregated before removing off site.
- To avoid any discharge or accidental spillage of chemical waste or oil directly from the site.
- To avoid improper handling or storage of oil drum on site.

FIGURES



| | | | | |
|-------|---|--|--------|------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel | | N.T.S | No. MA8001 |
| | Site Layout Plan | | Date | Figure |
| | | | Apr-08 | 1.1 |





| | | | | | | |
|--------------------|---|-------|--------|-------------|--------|----------|
| Title | Contract No. DC/2007/10 | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Design and Construction of Hong Kong West Drainage Tunnel | Date | Nov-09 | Figure | 2.1 | |
| Organization Chart | | | | | | |



Title
 Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel
 (Eastern Portal)
 Locations of Air Quality and Noise Monitoring Station

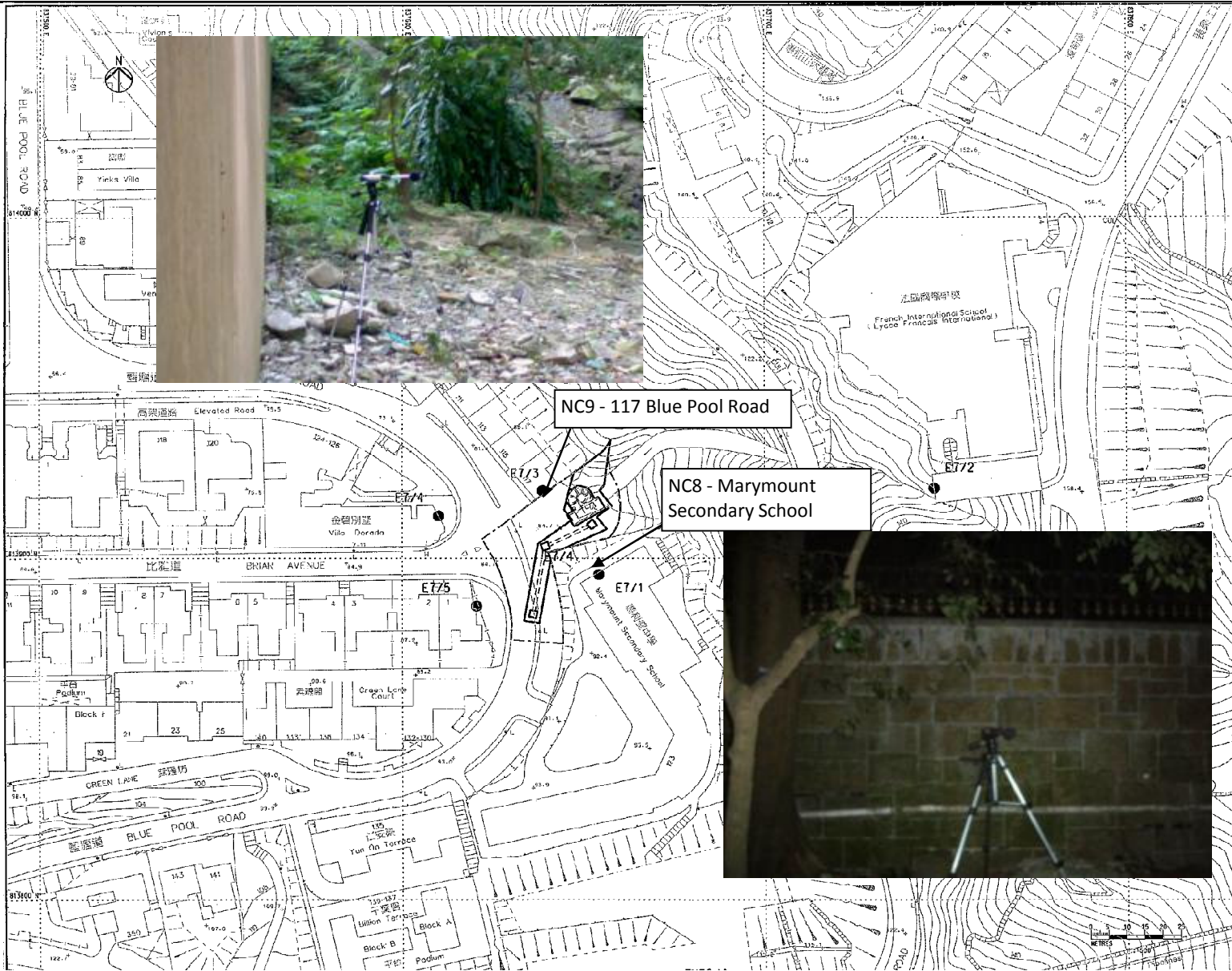
Scale
 N.T.S
 Date
 Sep-09

Project
 No. MA 8001
 Figure
 3.1a





| | | | | | | |
|-------|---|--|-------|---------|---------|----------|
| Title | Contract No. DC/2007/10 | | Scale | Project | | CINOTECH |
| | Design and Construction of Hong Kong West Drainage Tunnel (Western Portal) | | N.T.S | No. | MA 8001 | |
| | Locations of Air Quality and Noise Monitoring Station | | Date | Sep-09 | Figure | 3.1b |



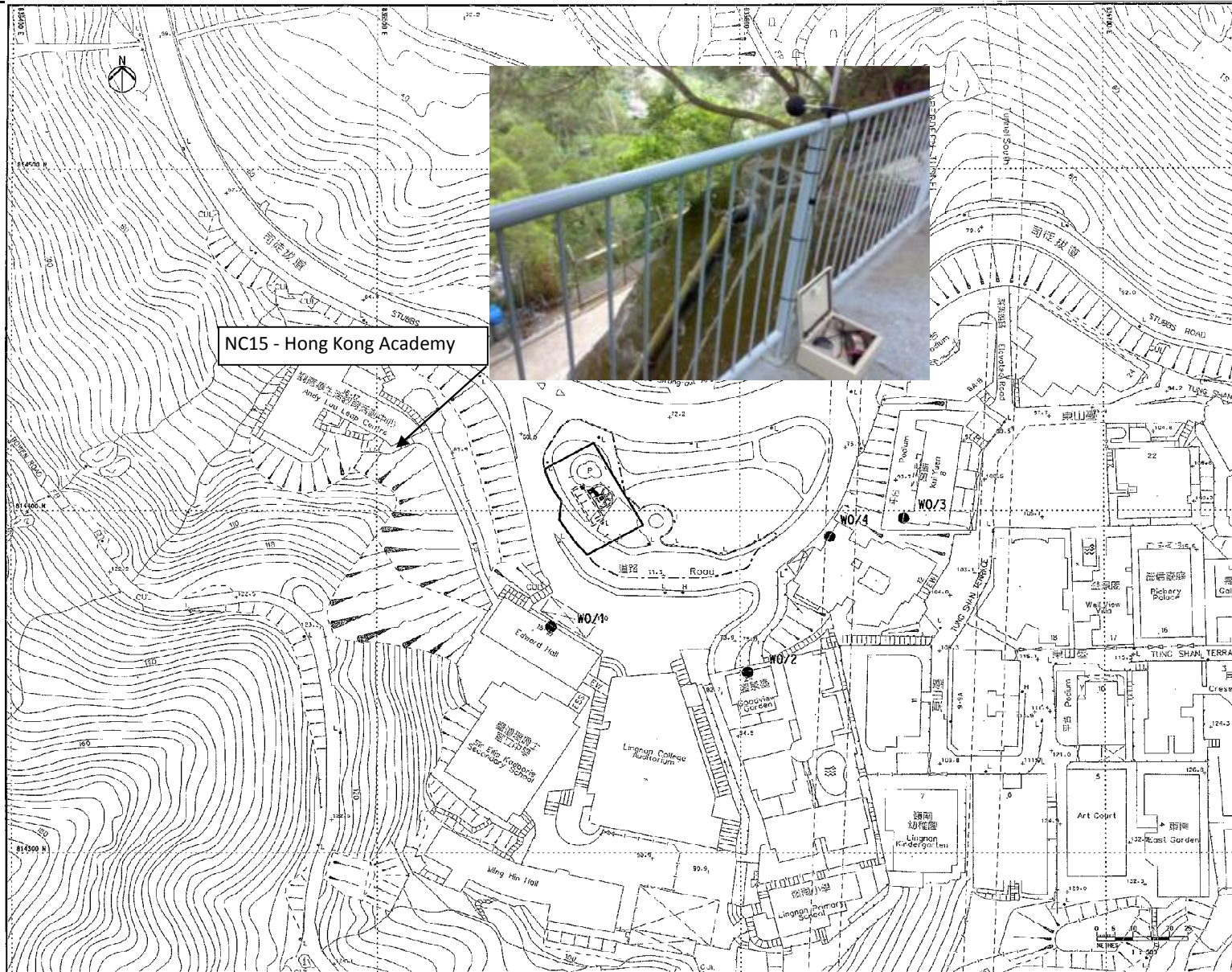
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|-------|--|--|--------|-------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake E7) | | N.T.S | No. MA 8001 |
| | Locations of Noise Monitoring Stations | | Date | Figure |
| | | | Sep-09 | 3.1c |





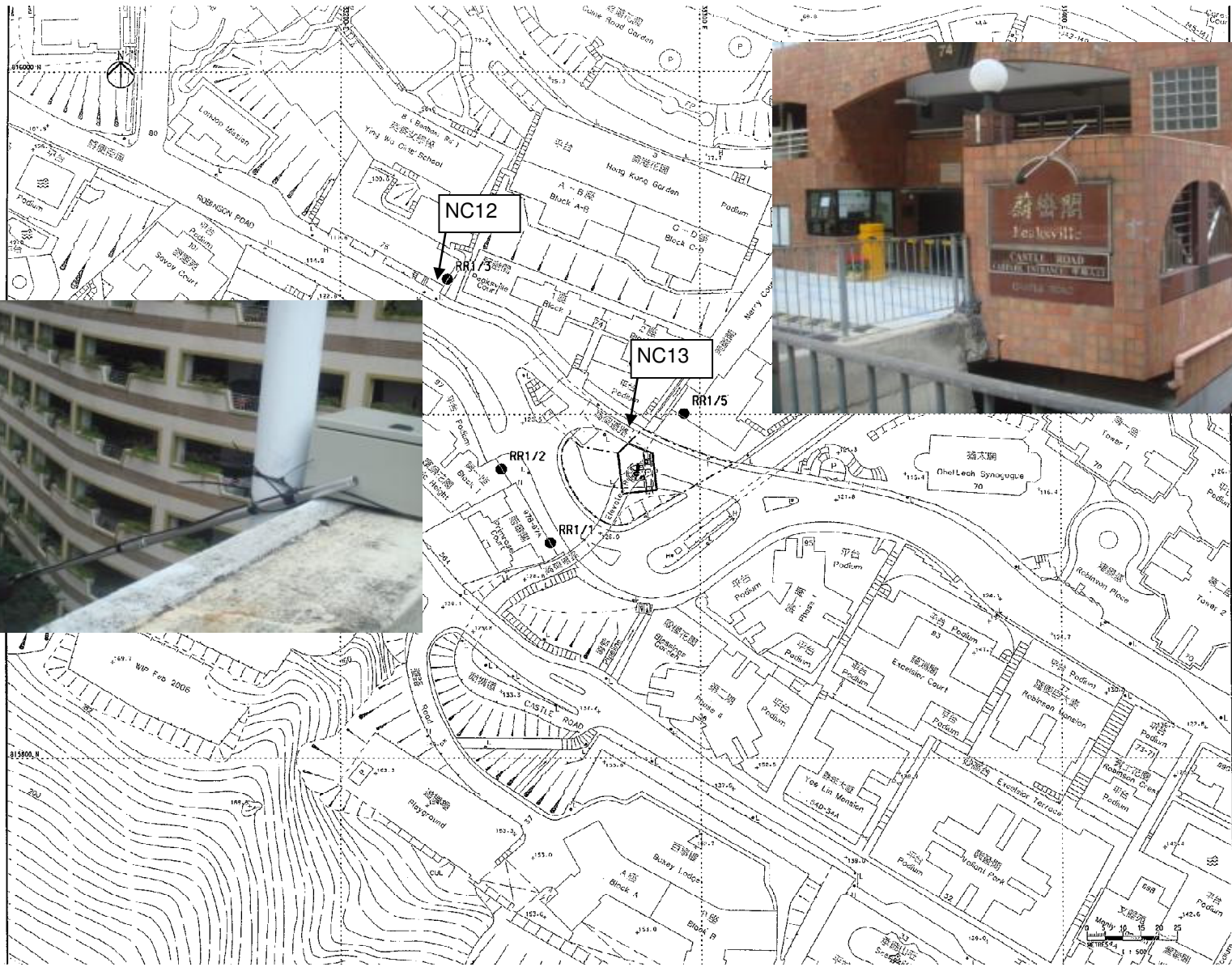
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|-------|---|--|--------|-------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake PFLR1) | | N.T.S | No. MA 8001 |
| | Locations of Noise Monitoring Stations | | Date | Figure |
| | | | Sep-09 | 3.1d |





| | | | | |
|--|--|--|--------|-------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake W0) | | N.T.S | No. MA 8001 |
| Locations of Noise Monitoring Stations | | | Date | Figure |
| | | | Sep-09 | 3.1e |

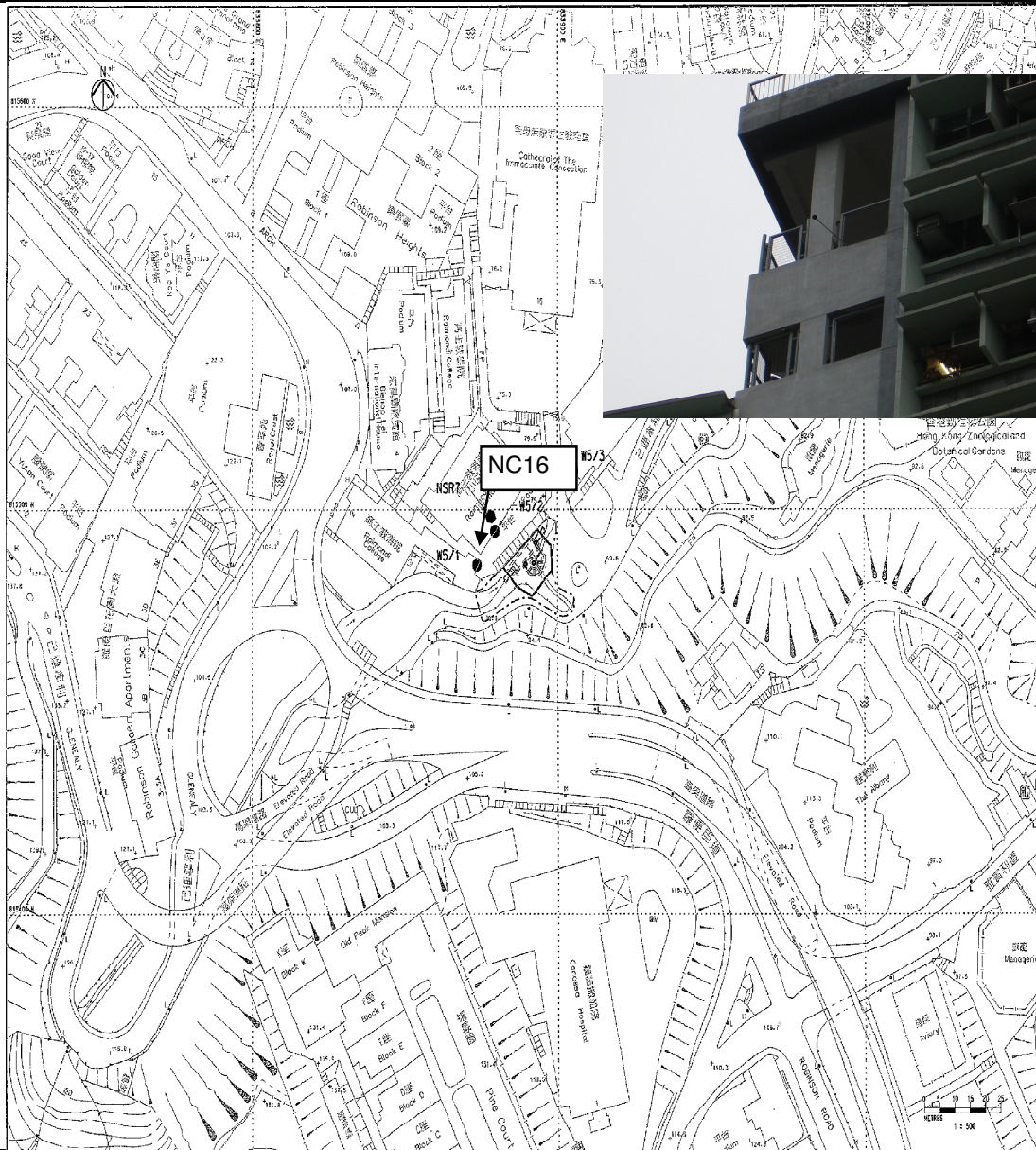





Title
 Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel
 (Intakes RR1)
 Locations of Noise Monitoring Stations

| | | | |
|-------|--------|---------|---------|
| Scale | N.T.S | Project | |
| Date | Jan 10 | No. | MA 8001 |
| | | Figure | 3.1f |





| | | | | | |
|-------|---|--|--------|---|--------|
| Title | Contract No. DC/2007/10 | | Scale | Project | |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intakes W5) | | N.T.S | No. | MA8001 |
| | Locations of Noise Monitoring Stations | | Date | Figure | 3.1g |
| | | | Jan-10 |  | |



Title

Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel
 (Intakes E5A)
 Locations of Noise Monitoring Stations

| | |
|-------|--------|
| Scale | N.T.S |
| Date | Feb-10 |

| | |
|-------------|---------|
| Project No. | MA 8001 |
| Figure | 3.1h |





| | | | | |
|-------|--|--|--------|-------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake THR2) | | N.T.S | No. MA 8001 |
| | Locations of Noise Monitoring Stations | | Date | Figure |
| | | | Feb-10 | 3.1i |





| | | | | |
|-------|---|--|--------|------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intakes P5) | | N.T.S | No. MA8001 |
| | Locations of Noise Monitoring Stations | | Date | Figure |
| | | | Feb-10 | 3.1j |





| | | | | | | |
|-----------------|--|--------|-------|-------|-------------|--------|
| Title | Contract No. DC/2007/10 | | Scale | N.T.S | Project No. | MA8001 |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake W8) | | | | | |
| | Locations of Noise Monitoring Stations | | | | | |
| Date | Jun-10 | Figure | 3.1k | | | |
| CINOTECH | | | | | | |

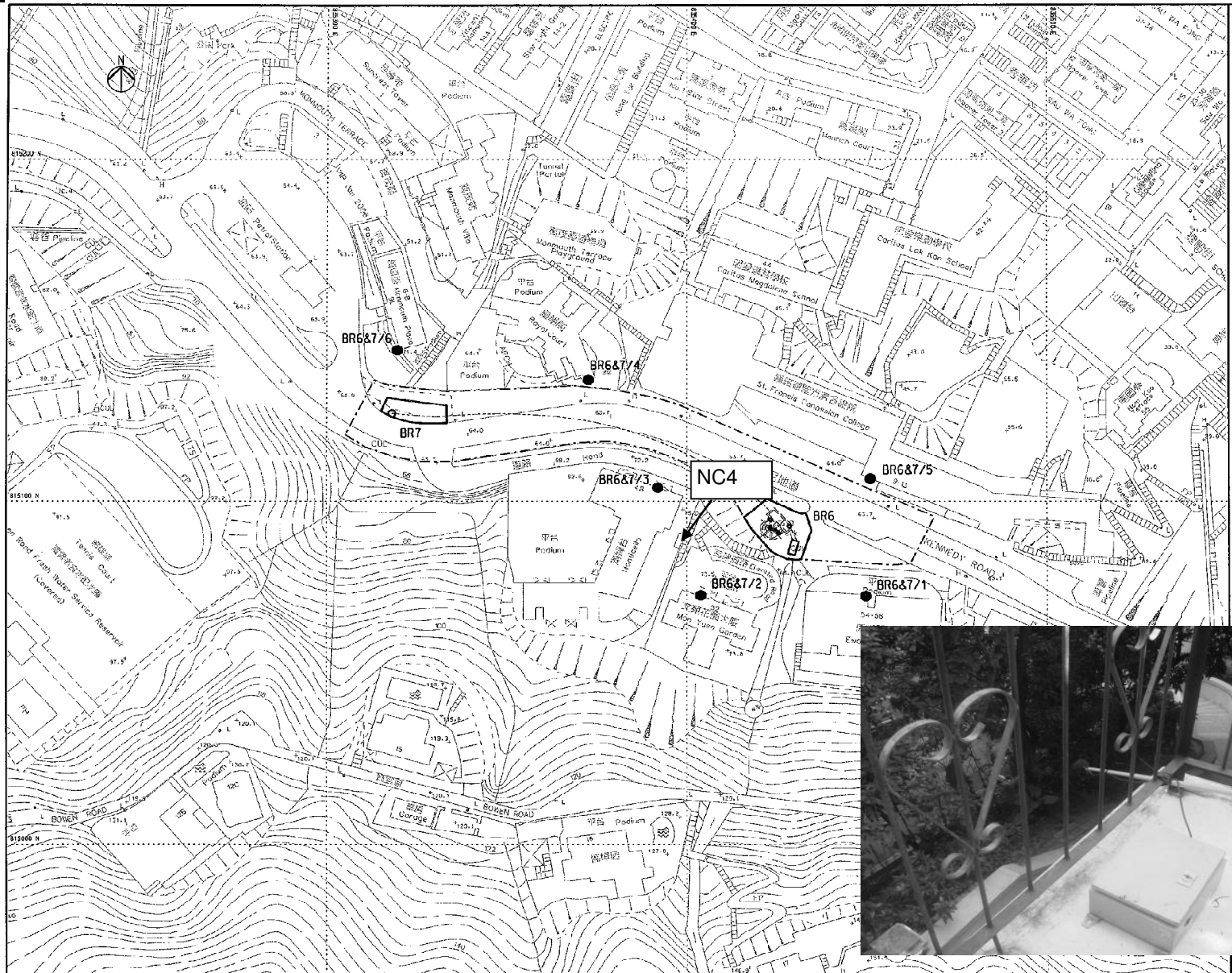


| | | | | |
|--|---|--------|-------|------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel | | N.T.S | No. MA8001 |
| | (Intake DG1) | | Date | Figure |
| Locations of Noise Monitoring Stations | | Aug-10 | 3.11 | CINOTECH |



| | | | | |
|--|--|--|--------|------------|
| Title | Contract No. DC/2007/10 | | Scale | Project |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake MA14) | | N.T.S | No. MA8001 |
| Locations of Noise Monitoring Stations | | | Date | Figure |
| | | | Aug-10 | 3.1m |





Title
 Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel
 (Intakes BR6)
 Locations of Noise Monitoring Stations

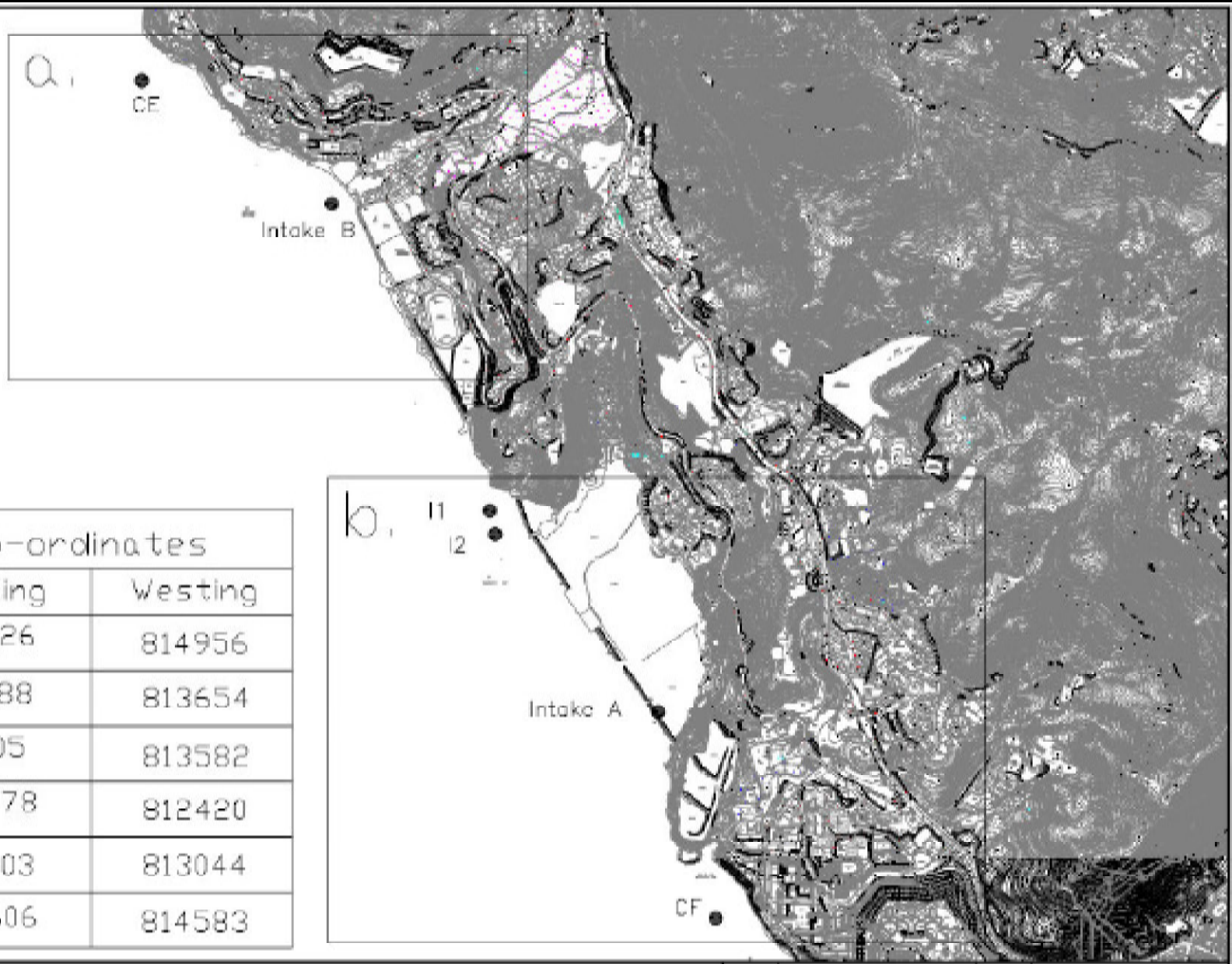
| | | | |
|-------|--------|-------------|--------|
| Scale | N.T.S | Project No. | MA8001 |
| Date | Sep-10 | Figure | 3.1n |





| | | | | | |
|-------|---|--|--------|---------|---------|
| Title | Contract No. DC/2007/10 | | Scale | Project | |
| | Design and Construction of Hong Kong West Drainage Tunnel | | N.T.S | No. | MA 8001 |
| | Locations of Groundborne Noise Monitoring Station | | Date | Figure | |
| | GNC7 (Hong Villa) | | Nov-10 | 3.1o | |





| Point No. | Co-ordinates | |
|-----------|--------------|---------|
| | Easting | Westing |
| CE | 830026 | 814956 |
| I1 | 831088 | 813654 |
| I2 | 831105 | 813582 |
| CF | 831778 | 812420 |
| Intake A | 831603 | 813044 |
| Intake B | 830606 | 814583 |

Title Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel

Scale
 N.T.S

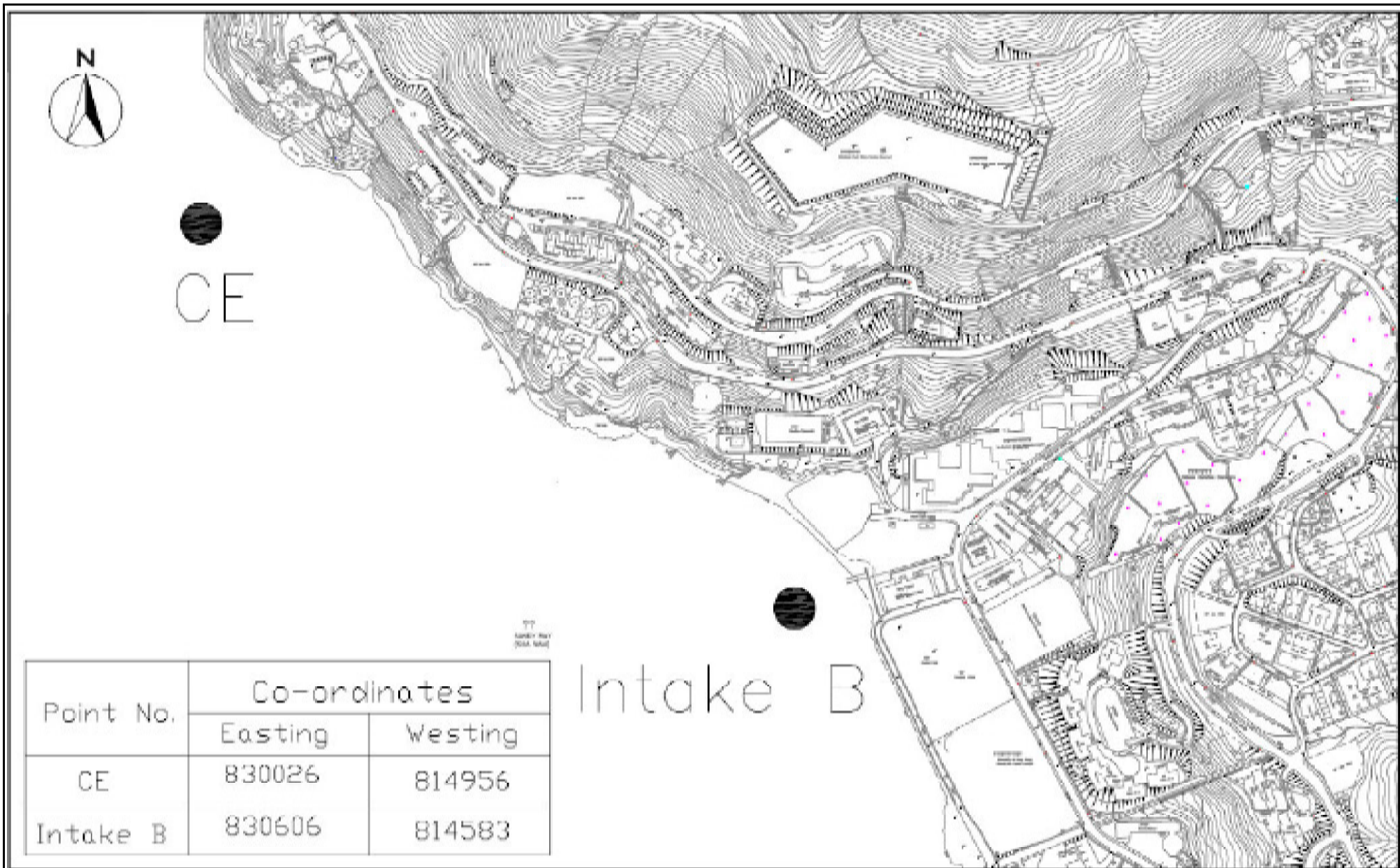
Project
 No. MA8001

Date
 Jun-08

Figure
 4.1

Locations of Water Quality Monitoring Stations

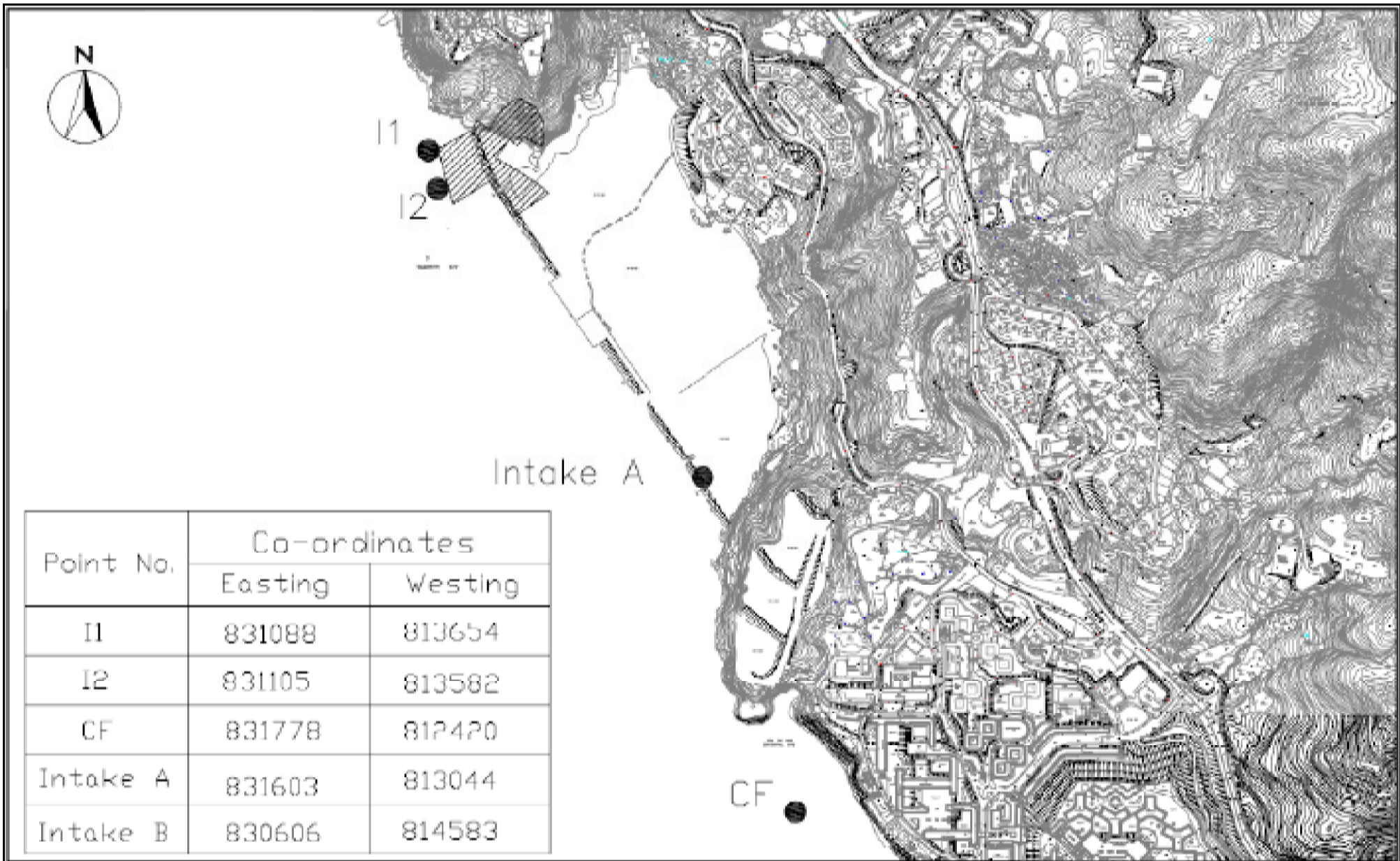




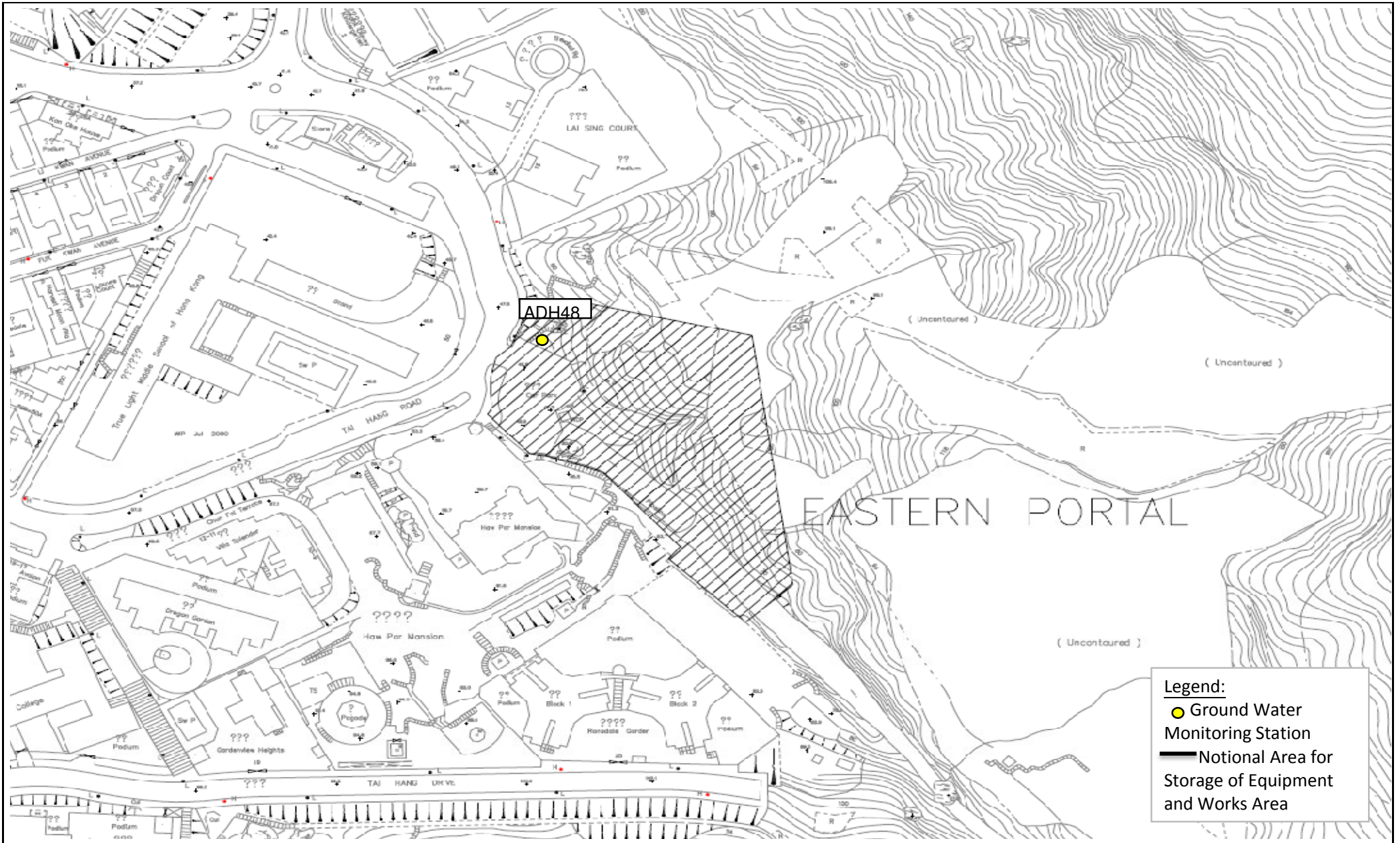
Title Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel
 Locations of Water Quality Monitoring Stations

| | | | |
|-------|--------|-------------|--------|
| Scale | N.T.S | Project No. | MA8001 |
| Date | Jun-08 | Figure | 4.1a |





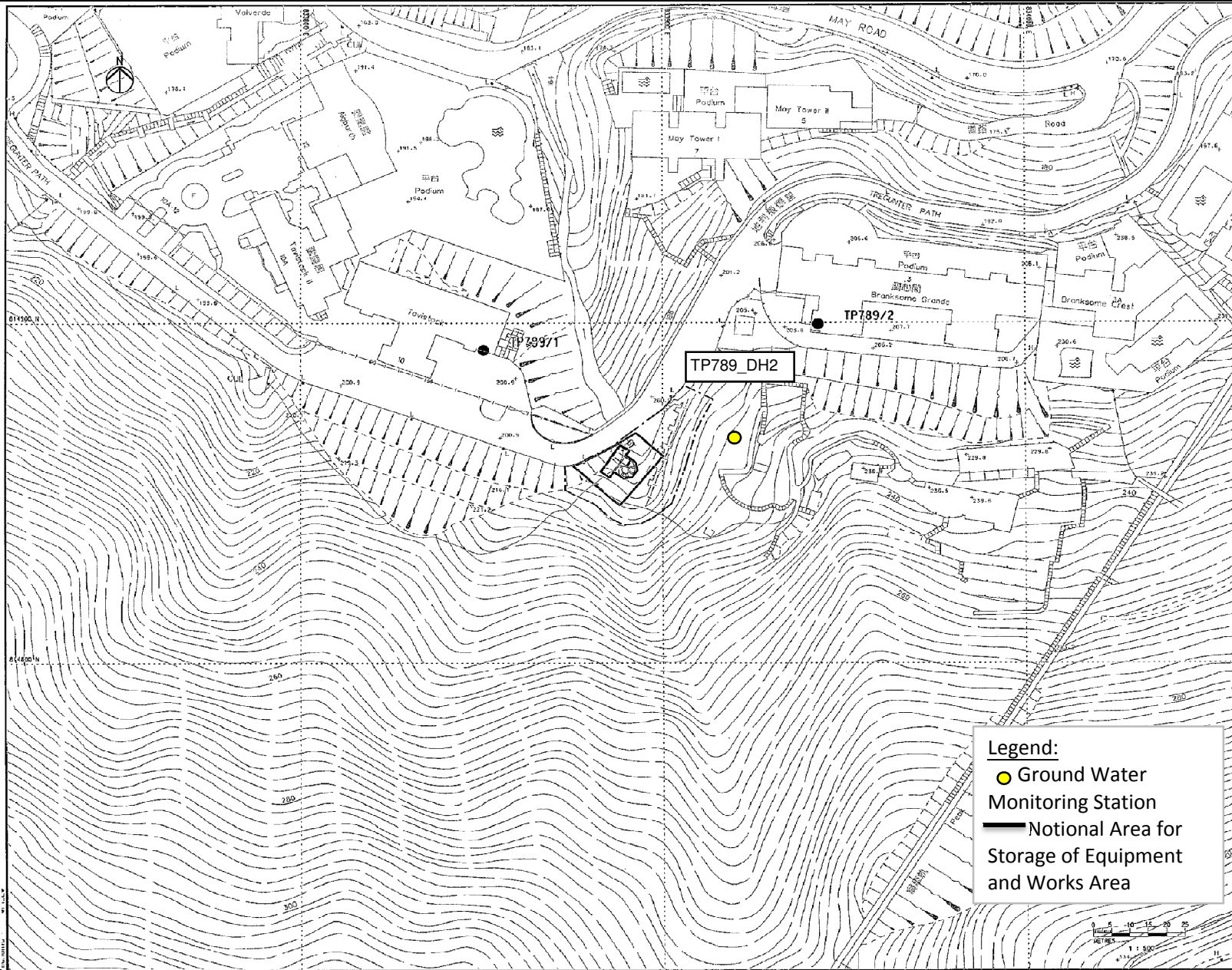
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| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Locations of Water Quality Monitoring Stations | Scale | Project | |
| | Date | Figure | |
| | N.T.S | No. MA8001 | |
| | Jun-08 | 4.1b | |



Legend:

- Ground Water Monitoring Station
- Notional Area for Storage of Equipment and Works Area

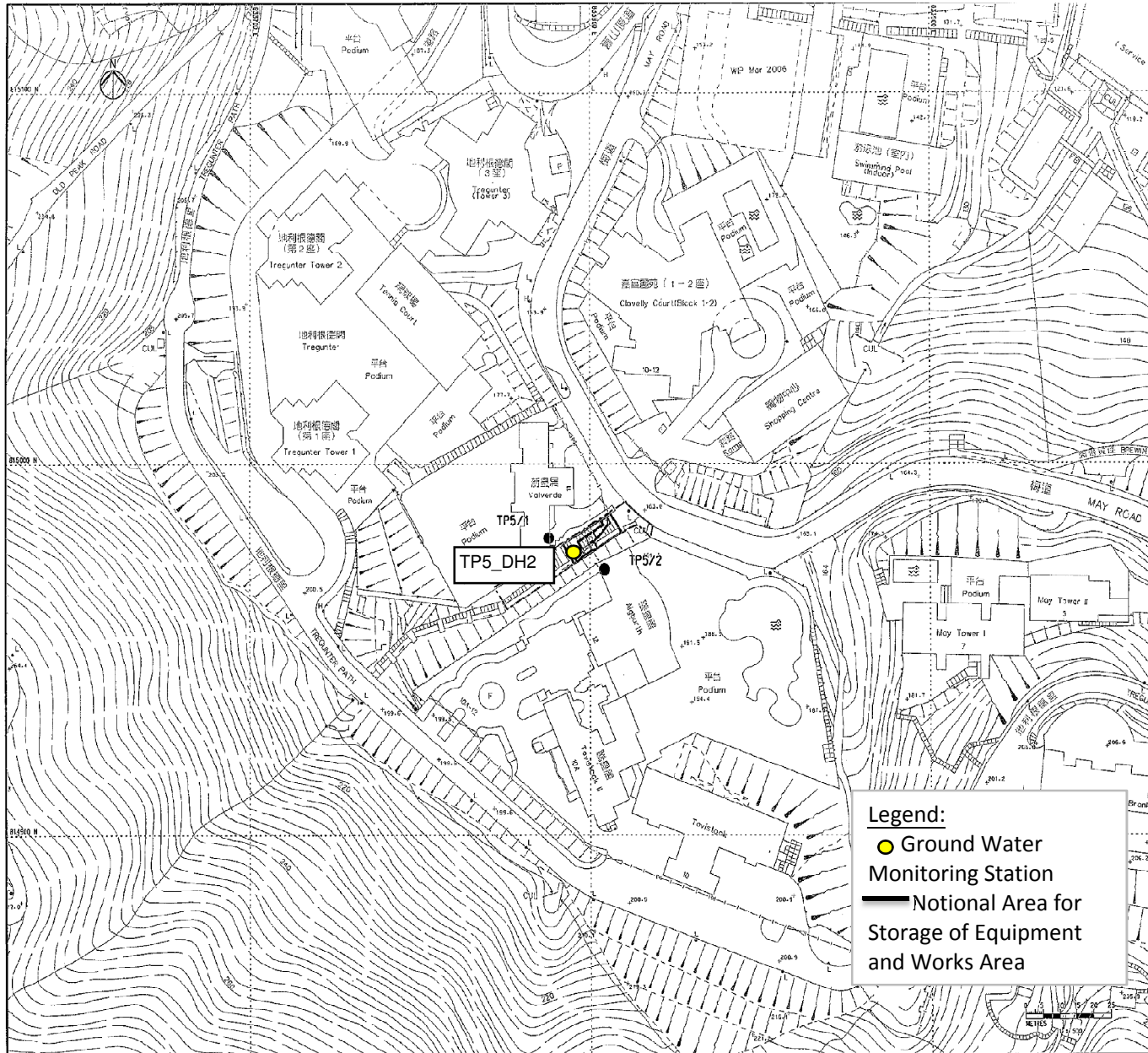
| | | | |
|--|---|--|--|
| <p>Title</p> <p style="text-align: center;">Contract No. DC/2007/10</p> <p style="text-align: center;">Design and Construction of Hong Kong West Drainage Tunnel (Eastern Portal)</p> <p style="text-align: center;">Location of ground water level Monitoring Station</p> | <p>Scale</p> <p style="text-align: center;">N.T.S</p> | <p>Project</p> <p style="text-align: center;">No. MA8001</p> | |
| | <p>Date</p> <p style="text-align: center;">Mar-10</p> | <p>Figure</p> <p style="text-align: center;">4.2a</p> | |



Legend:

- Ground Water Monitoring Station
- Notional Area for Storage of Equipment and Works Area

| | | | | | | |
|-------|---|--|--------|---------|--------|-----------------|
| Title | Contract No. DC/2007/10 | | Scale | Project | | CINOTECH |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake TP789) | | N.T.S | No. | MA8001 | |
| | Location of ground water level Monitoring Station | | Date | Figure | 4.2b | |
| | | | Mar-10 | | | |

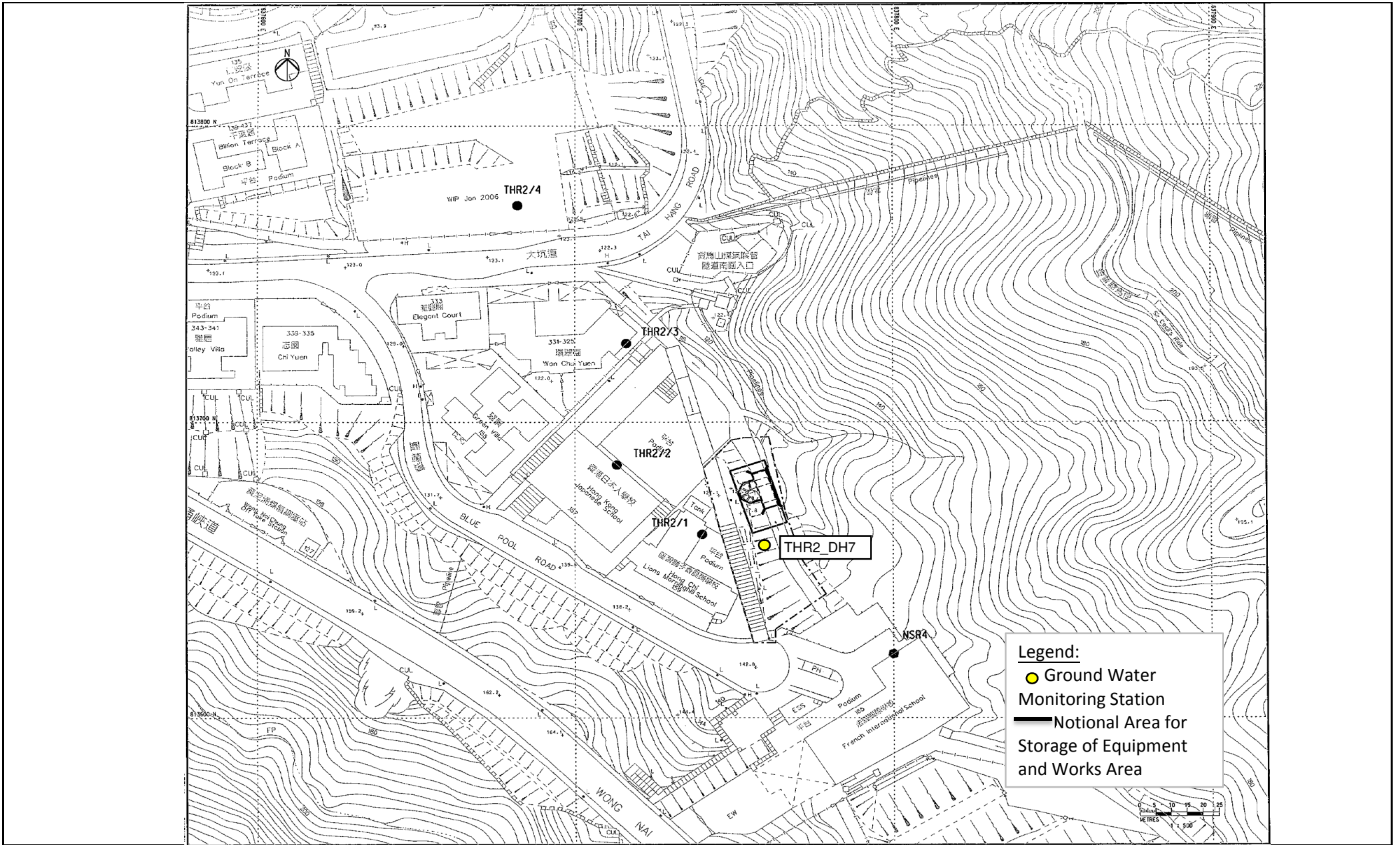


Title

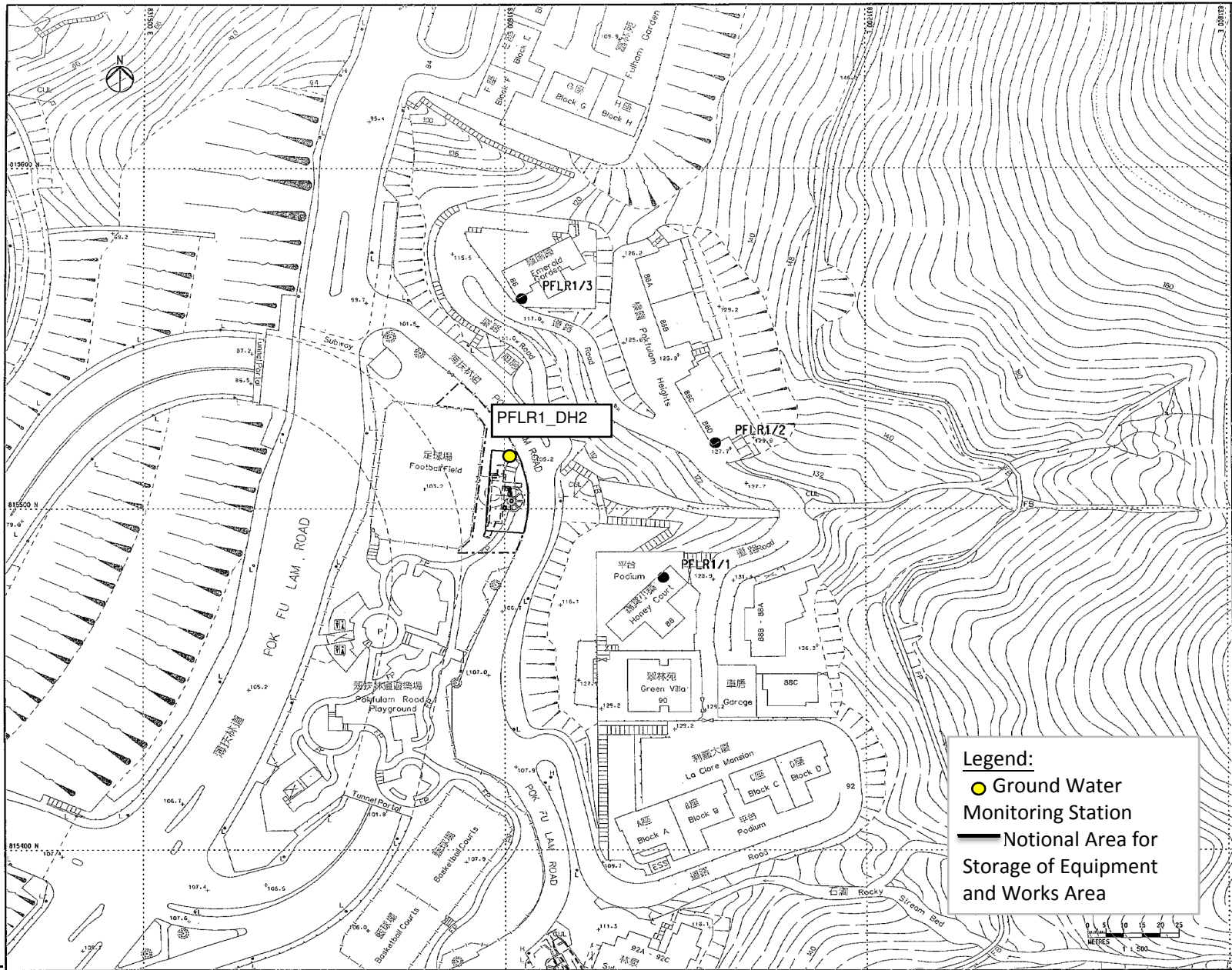
Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel
 (Intake TP5)
 Location of ground water level Monitoring Station

| | | | |
|-------|--------|-------------|--------|
| Scale | N.T.S | Project No. | MA8001 |
| Date | Mar-10 | Figure | 4.2c |





| | | | | | |
|-------|--|--|--------|------------|----------|
| Title | Contract No. DC/2007/10 | | Scale | Project | CINOTECH |
| | Design and Construction of Hong Kong West Drainage Tunnel (Intake THR2) | | N.T.S | No. MA8001 | |
| | Location of ground water level Monitoring Station | | Date | Figure | |
| | | | Mar-10 | 4.2d | |



Title

Contract No. DC/2007/10
 Design and Construction of Hong Kong West Drainage Tunnel
 (Intake PFLR1)
 Location of ground water level Monitoring Station

| | | | |
|-------|--------|-------------|--------|
| Scale | N.T.S | Project No. | MA8001 |
| Date | Mar-10 | Figure | 4.2e |

CINOTECH

**APPENDIX A
ACTION AND LIMIT LEVELS**

Appendix A - Action and Limit Levels

Table A-1 Action and Limit Levels for 1-Hour TSP

| Location | Action Level, $\mu\text{g}/\text{m}^3$ | Limit Level, $\mu\text{g}/\text{m}^3$ |
|----------|--|---------------------------------------|
| AQ1 | 345 | 500 |
| AQ2 | 321 | |

Table A-2 Action and Limit Levels for 24-Hour TSP

| Location | Action Level, $\mu\text{g}/\text{m}^3$ | Limit Level, $\mu\text{g}/\text{m}^3$ |
|----------|--|---------------------------------------|
| AQ1 | 201 | 260 |
| AQ3 | 156 | |

Table A-3 Action and Limit Levels for Construction Noise

| Time Period | Action Level | Limit Level |
|--|---|------------------|
| 0700-1900 hrs on normal weekdays | When one documented complaint is received | 75* dB(A) |
| 0700-2300 hrs on holidays; and 1900-2300 hrs on all other days | | 60/65/70** dB(A) |
| 2300-0700 hrs of next day | | 45/50/55** dB(A) |

(*) reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

(**) to be selected based on Area Sensitivity Rating.

Table A-4 Action and Limit Levels for Water Quality

| Parameter | | Action | Limit |
|----------------|--------------------|--|--|
| DO, mg/L | Surface and Middle | 6.3 | 6.2 |
| | Bottom | 6.0 | 5.8 |
| SS, mg/L | | 15.7 or 120% of upstream control station's SS at the same tide of the same day | 16.4 or 130% of SS readings at the upstream control station at the same tide of same day and specific sensitive receiver water quality requirements |
| Turbidity, NTU | | 10.2 or 120% of upstream control station's turbidity at the same tide of the same day | 11.1 or 130% of turbidity at the upstream control station at the same tide of same day |

**APPENDIX B
COPIES OF CALIBRATION
CERTIFICATES**

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA8001/44/0022

Station AQ1 - True Light Middle School of Hong Kong Operator: WK
 Date: 27-Jun-11 Next Due Date: 26-Aug-11
 Equipment No.: A-01-44 Serial No. 1316

| Ambient Condition | | | |
|---------------------|-------|---------------------|-------|
| Temperature, Ta (K) | 302.5 | Pressure, Pa (mmHg) | 755.6 |

| Orifice Transfer Standard Information | | | | | |
|---------------------------------------|-----------|--|--------|---------------|---------|
| Equipment No.: | A-04-01 | Slope, mc | 0.0462 | Intercept, bc | -0.0163 |
| Last Calibration Date: | 11-Oct-10 | $mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 9-Oct-11 | $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

| Calibration of TSP Sampler | | | | | |
|----------------------------|------------------------------------|--|---------------------|------------------------------|---|
| Calibration Point | Orifice | | | HVS | |
| | ΔH (orifice), in. of water | $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd (CFM) X - axis | ΔW (HVS), in. of oil | $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis |
| 1 | 11.0 | 3.28 | 71.40 | 7.9 | 2.78 |
| 2 | 9.6 | 3.07 | 66.72 | 6.5 | 2.52 |
| 3 | 7.4 | 2.69 | 58.62 | 5.0 | 2.21 |
| 4 | 5.2 | 2.26 | 49.20 | 3.3 | 1.80 |
| 5 | 3.2 | 1.77 | 38.67 | 1.9 | 1.36 |

By Linear Regression of Y on X

Slope, mw = 0.0427 Intercept, bw : -0.2969
 Correlation coefficient* = 0.9993

*If Correlation Coefficient < 0.990, check and recalibrate.

| Set Point Calculation | |
|---|--|
| From the TSP Field Calibration Curve, take Qstd = 43 CFM | |
| From the Regression Equation, the "Y" value according to | |
| $mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ | |
| Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ <u>2.42</u> | |

Remarks: _____

Conducted by: Wk Tang Signature: [Signature] Date: 27/6/2011
 Checked by: [Signature] Signature: [Signature] Date: 27 June 2011

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA8001/44/0023

Station AQ1 - True Light Middle School of Hong Kong Operator: WK
 Date: 23-Aug-11 Next Due Date: 22-Oct-11
 Equipment No.: A-01-44 Serial No. 1316

| Ambient Condition | | | |
|---------------------|-------|---------------------|-----|
| Temperature, Ta (K) | 303.6 | Pressure, Pa (mmHg) | 758 |

| Orifice Transfer Standard Information | | | | | |
|---------------------------------------|-----------|--|--------|---------------|---------|
| Equipment No.: | A-04-01 | Slope, mc | 0.0462 | Intercept, bc | -0.0163 |
| Last Calibration Date: | 11-Oct-10 | $mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 9-Oct-11 | $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

| Calibration of TSP Sampler | | | | | |
|----------------------------|------------------------------------|--|---------------------|------------------------------|---|
| Calibration Point | Orifice | | | HVS | |
| | ΔH (orifice), in. of water | $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd (CFM) X - axis | ΔW (HVS), in. of oil | $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis |
| 1 | 11.4 | 3.34 | 72.66 | 7.5 | 2.71 |
| 2 | 9.7 | 3.08 | 67.05 | 6.4 | 2.50 |
| 3 | 7.4 | 2.69 | 58.61 | 5.0 | 2.21 |
| 4 | 5.3 | 2.28 | 49.66 | 3.2 | 1.77 |
| 5 | 3.2 | 1.77 | 38.66 | 1.9 | 1.36 |

By Linear Regression of Y on X

Slope, mw = 0.0402 Intercept, bw : -0.1924
 Correlation coefficient* = 0.9984

*If Correlation Coefficient < 0.990, check and recalibrate.

| Set Point Calculation | |
|---|-------------|
| From the TSP Field Calibration Curve, take Qstd = 43 CFM | |
| From the Regression Equation, the "Y" value according to | |
| $mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ | |
| Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ | <u>2.41</u> |

Remarks: _____

Conducted by: Wk Tang Signature: [Signature] Date: 23/8/11
 Checked by: [Signature] Signature: [Signature] Date: 23 August 2011

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA8001/18/0021

Station AQ3 - Outside Site Office (Western Portal) Operator: WK
 Date: 27-Jun-11 Next Due Date: 26-Aug-11
 Equipment No.: A-01-18 Serial No. 0723

| Ambient Condition | | | |
|---------------------|-------|---------------------|-------|
| Temperature, Ta (K) | 302.5 | Pressure, Pa (mmHg) | 755.1 |

| Orifice Transfer Standard Information | | | | | |
|---------------------------------------|-----------|--|--------|---------------|---------|
| Equipment No.: | A-04-01 | Slope, mc | 0.0462 | Intercept, bc | -0.0163 |
| Last Calibration Date: | 11-Oct-10 | $mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 9-Oct-11 | $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

| Calibration of TSP Sampler | | | | | |
|----------------------------|----------------------------|---|------------------------|----------------------|--|
| Calibration Point | Orifice | | | HVS | |
| | ΔH (orifice), in. of water | [ΔH x (Pa/760) x (298/Ta)] ^{1/2} | Qstd (CFM) X - axis | ΔW (HVS), in. of oil | [ΔW x (Pa/760) x (298/Ta)] ^{1/2} Y-axis |
| 1 | 11.8 | 3.40 | 73.91 | 8.4 | 2.87 |
| 2 | 9.4 | 3.03 | 66.01 | 6.5 | 2.52 |
| 3 | 7.6 | 2.73 | 59.39 | 5.2 | 2.26 |
| 4 | 5.2 | 2.26 | 49.18 | 3.1 | 1.74 |
| 5 | 3.1 | 1.74 | 38.06 | 1.9 | 1.36 |

By Linear Regression of Y on X

Slope, mw = 0.0427 Intercept, bw: -0.2962
 Correlation coefficient* = 0.9981

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 43 CFM

From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; W = (mw x Qstd + bw)² x (760 / Pa) x (Ta / 298) = 2.42

Remarks: _____

Conducted by: Wk Tang Signature: _____
 Checked by: Wk Signature: _____

Date: 27/6/2011
 Date: 27 June 2011

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA8001/18/0022

Station AQ3 - Outside Site Office (Western Portal) Operator: WK
 Date: 23-Aug-11 Next Due Date: 22-Oct-11
 Equipment No.: A-01-18 Serial No. 0723

| Ambient Condition | | | |
|---------------------|-------|---------------------|-----|
| Temperature, Ta (K) | 303.6 | Pressure, Pa (mmHg) | 758 |

| Orifice Transfer Standard Information | | | | | |
|---------------------------------------|-----------|--|--------|---------------|---------|
| Equipment No.: | A-04-01 | Slope, mc | 0.0462 | Intercept, bc | -0.0163 |
| Last Calibration Date: | 11-Oct-10 | $mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 9-Oct-11 | $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

| Calibration of TSP Sampler | | | | | |
|----------------------------|------------------------------------|--|---------------------|------------------------------|---|
| Calibration Point | Orifice | | | HVS | |
| | ΔH (orifice), in. of water | $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd (CFM) X - axis | ΔW (HVS), in. of oil | $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis |
| 1 | 11.9 | 3.41 | 74.23 | 8.3 | 2.85 |
| 2 | 9.8 | 3.10 | 67.40 | 6.4 | 2.50 |
| 3 | 7.7 | 2.75 | 59.78 | 5.2 | 2.26 |
| 4 | 5.4 | 2.30 | 50.12 | 3.3 | 1.80 |
| 5 | 3.3 | 1.80 | 39.26 | 2.0 | 1.40 |

By Linear Regression of Y on X

Slope, mw = 0.0413 Intercept, bw = -0.2400
 Correlation coefficient* = 0.9983

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 43 CFM
 From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 2.41

Remarks: _____

Conducted by: Wk. Teng Signature: [Signature]
 Checked by: [Signature] Signature: _____

Date: 23/8/11
 Date: 23 August 2011

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

Test Report No.: C/11/110503
Date of Issue: 2011-05-03
Date Received: 2011-04-29
Date Tested: 2011-04-29
Date Completed: 2011-05-03
Next Due Date: 2012-05-02

ATTN: Mr. Henry Leung

Page: 1 of 1

Certificate of Calibration

Item for calibration:

Description : RS232 Integral Vane Digital Anemometer
Manufacturer : AZ Instrument
Model No. : AZ8904
Serial No. : 974835
Equipment No. : A-03-03

Test conditions:

Room Temperature : 23 degree Celsius
Relative Humidity : 65%
Pressure : 101.3 kPa

Methodology:

The anemometer has been calibrated in accordance with the documented procedures and using standard(s) and instrument(s) which are recommended by the manufacturer, or equivalent.

Results:

| | Reference Set Point | Instrument Readings |
|-----------------------------|---------------------|---------------------|
| Measuring Air Velocity, m/s | 2.00 | 2.00 |
| Temperature, °C | 21.0 | 21.0 |

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

| | | | |
|-------------|---------------------|---------------------|-----------------|
| Description | Calibration Orifice | Manufacturer | Thermo Andersen |
| Serial No. | 1536 | Temperature, Ta (K) | 295 |
| Model No. | G25A | Pressure, Pa (mmHg) | 751.5 |
| Date | 11 October 2010 | | |

| Plate | Diff.Vol (m ³) | Diff.Time (min) | Diff.Hg (mm) | Diff.H ₂ O (in.) |
|-------|----------------------------|-----------------|--------------|-----------------------------|
| 1 | 1.00 | 1.3050 | 3.8 | 1.50 |
| 2 | 1.00 | 0.9250 | 7.6 | 3.00 |
| 3 | 1.00 | 0.8540 | 8.9 | 3.50 |
| 4 | 1.00 | 0.7530 | 11.4 | 4.50 |
| 5 | 1.00 | 0.6210 | 16.5 | 6.50 |

DATA TABULATION

| Vstd | (X axis) Qstd | (Y axis) |
|--------|------------------|----------|
| 0.9938 | 0.7615 | 1.2240 |
| 0.9888 | 1.0689 | 1.7311 |
| 0.9870 | 1.1558 | 1.8698 |
| 0.9837 | 1.3064 | 2.1201 |
| 0.9769 | 1.5732 | 2.5481 |

Y axis= SQRT[H₂O(Pa/760)(298/Ta)]
Qstd Slope (m) = 1.63228
Intercept (b) = -0.01631
Coefficient (r) = 0.99998

| Va | (X axis) Qa | (Y axis) |
|--------|----------------|----------|
| 0.9949 | 0.7624 | 0.7674 |
| 0.9899 | 1.0701 | 1.0852 |
| 0.9882 | 1.1571 | 1.1722 |
| 0.9848 | 1.3079 | 1.3291 |
| 0.9780 | 1.5749 | 1.5974 |

Y axis= SQRT[H₂O(Ta/Pa)]
Qa Slope (m) = 1.02211
Intercept (b) = -0.01022
Coefficient (r) = 0.99998

CALCULATIONS

Vstd=Diff. Vol[(Pa-Diff.Hg)/760](298/Ta)
Qstd=Vstd/Time
Va=Diff.Vol[(Pa-Diff.Hg)/Pa]
Qa=Va/Time

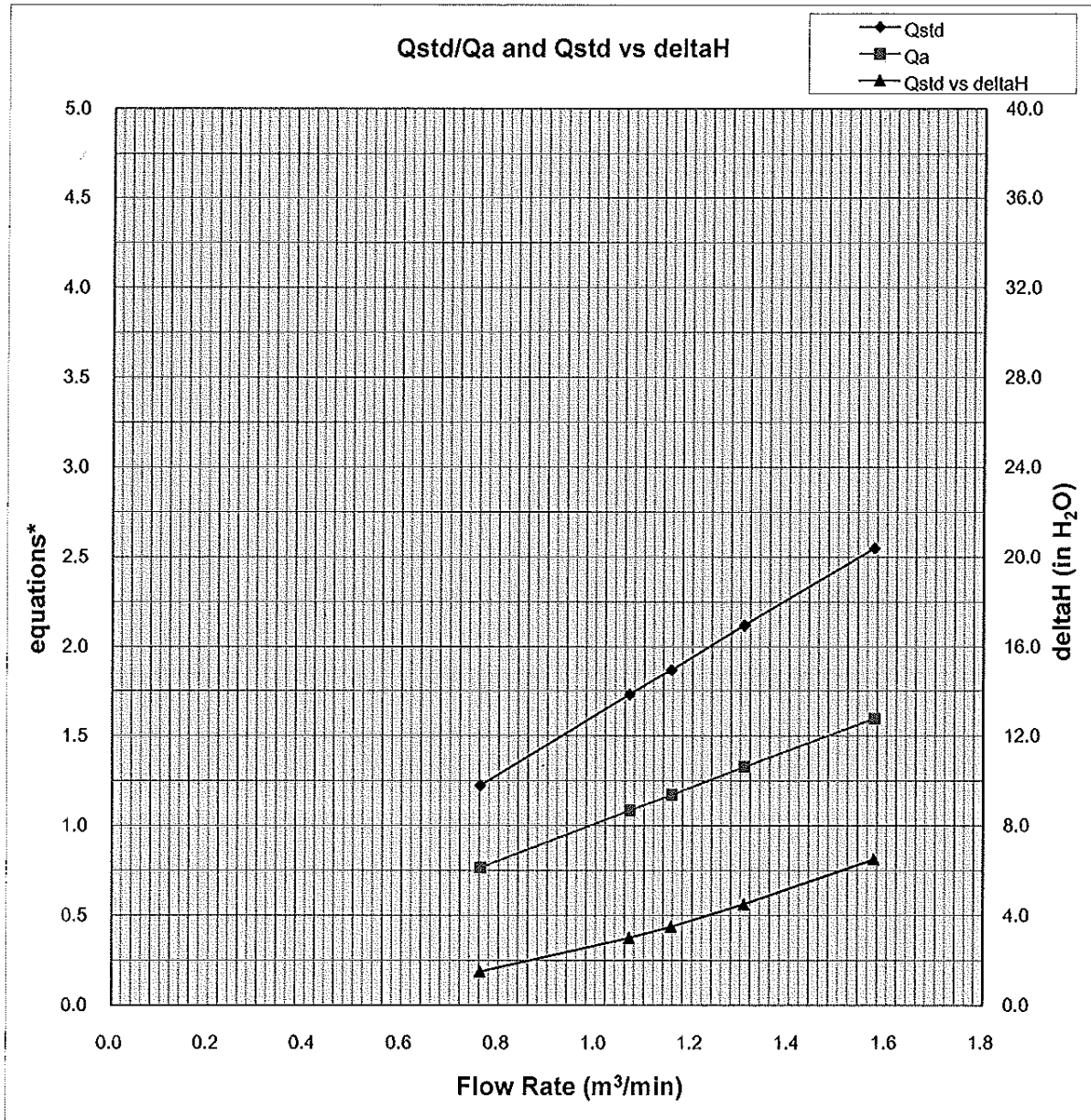
For subsequent flow rate calculations:
Qstd=l/m{[SQRT(H₂O(Pa/760)(298/Ta))]-b}
Qa=l/m{[SQRT H₂O(Ta/Pa)]-b}

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

Patrick Tse

PATRICK TSE
Laboratory Manager

TEST REPORT



Y-axis equations:

Qstd series: $\text{SQRT}[\Delta H(Pa/Pstd)(Tstd/Ta)]$

Qa series: $\text{SQRT}[\Delta H(Ta/Pa)]$

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|------------|
| Test Report No.: | C/110624/3 |
| Date of Issue: | 2011-06-27 |
| Date Received: | 2011-06-24 |
| Date Tested: | 2011-06-24 |
| Date Completed: | 2011-06-27 |
| Next Due Date: | 2011-08-26 |

ATTN: Mr. W. K. Tang

Page: 1 of 1

Certificate of Calibration

Item for Calibration:

Description : Laser Dust Monitor
 Manufacturer : Sibata
 Model No. : LD-3B
 Serial No. : 095029
 Sensitivity (K) 1 CPM : 0.001 mg/m³
 Sen. Adjustment Scale Setting : 551 CPM
 Equipment No. : A-02-10

Test Conditions:

Room Temperature : 23 degree Celsius
 Relative Humidity : 67%


Test Specifications & Methodology:

1. Instruction and Operation Manual High Volume Sampler, Andersen Samplers, Inc.
2. In-house method in according to the instruction manual: The Laser Dust Monitor was compared with a calibrated High Volume Sampler and the result was used to generate the Correlation Factor (CF) between the Laser Dust Monitor and High Volume Sampler.

Results:

| | |
|-------------------------|--------|
| Correlation Factor (CF) | 0.0030 |
|-------------------------|--------|

PREPARED AND CHECKED BY:
 For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
 Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|------------|
| Test Report No.: | C/110826/3 |
| Date of Issue: | 2011-08-29 |
| Date Received: | 2011-08-26 |
| Date Tested: | 2011-08-26 |
| Date Completed: | 2011-08-29 |
| Next Due Date: | 2011-10-28 |

ATTN: Mr. W. K. Tang

Page: 1 of 1

Certificate of Calibration

Item for Calibration:

| | |
|-------------------------------|---------------------------|
| Description | : Laser Dust Monitor |
| Manufacturer | : Sibata |
| Model No. | : LD-3B |
| Serial No. | : 095029 |
| Sensitivity (K) 1 CPM | : 0.001 mg/m ³ |
| Sen. Adjustment Scale Setting | : 551 CPM |
| Equipment No. | : A-02-10 |

Test Conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 22 degree Celsius |
| Relative Humidity | : 69% |

Test Specifications & Methodology:

1. Instruction and Operation Manual High Volume Sampler, Andersen Samplers, Inc.
2. In-house method in according to the instruction manual: The Laser Dust Monitor was compared with a calibrated High Volume Sampler and the result was used to generate the Correlation Factor (CF) between the Laser Dust Monitor and High Volume Sampler.

Results:

| | |
|-------------------------|--------|
| Correlation Factor (CF) | 0.0030 |
|-------------------------|--------|

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/100924/4 |
| Date of Issue: | 2009-09-24 |
| Date Received: | 2010-09-22 |
| Date Tested: | 2010-09-22 |
| Date Completed: | 2010-09-24 |
| Next Due Date: | 2011-09-23 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Certificate of Calibration

Item for calibration:

| | |
|----------------|---|
| Description | : 'SVANTEK' Integrating Sound Level Meter |
| Manufacturer | : SVANTEK |
| Model No. | : SVAN 955 |
| Serial No. | : 12553 |
| Microphone No. | : 35222 |
| Equipment No. | : N-08-02 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 22 degree Celsius |
| Relative Humidity | : 59% |

Test Specifications:

Performance checking at 94 and 114 dB

Methodology:

In-house method, according to manufacturer instruction manual

Results:

| Reference Set Point, dB | Instrument Readings, dB |
|-------------------------|-------------------------|
| 94 | 94.0 |
| 114 | 114.0 |

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/110117/1 |
| Date of Issue: | 2011-01-17 |
| Date Received: | 2011-01-14 |
| Date Tested: | 2011-01-14 |
| Date Completed: | 2011-01-17 |
| Next Due Date: | 2012-01-16 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Certificate of Calibration

Item for calibration:

| | |
|----------------|---|
| Description | : 'SVANTEK' Integrating Sound Level Meter |
| Manufacturer | : SVANTEK |
| Model No. | : SVAN 955 |
| Serial No. | : 14302 |
| Microphone No. | : 17204 |
| Equipment No. | : N-08-04 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 22 degree Celsius |
| Relative Humidity | : 58% |

Test Specifications:

Performance checking at 94 and 114 dB

Methodology:

In-house method, according to manufacturer instruction manual

Results:

| Reference Set Point, dB | Instrument Readings, dB |
|-------------------------|-------------------------|
| 94 | 94.0 |
| 114 | 114.0 |

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**



PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/110124/1 |
| Date of Issue: | 2011-01-24 |
| Date Received: | 2011-01-21 |
| Date Tested: | 2011-01-21 |
| Date Completed: | 2011-01-24 |
| Next Due Date: | 2012-01-23 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Certificate of Calibration

Item for calibration:

| | |
|----------------|---|
| Description | : 'SVANTEK' Integrating Sound Level Meter |
| Manufacturer | : SVANTEK |
| Model No. | : SVAN 955 |
| Serial No. | : 14303 |
| Microphone No. | : 17204 |
| Equipment No. | : N-08-05 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 23 degree Celsius |
| Relative Humidity | : 55% |

Test Specifications:

Performance checking at 94 and 114 dB

Methodology:

In-house method, according to manufacturer instruction manual

Results:

| Reference Set Point, dB | Instrument Readings, dB |
|-------------------------|-------------------------|
| 94 | 94.0 |
| 114 | 114.0 |

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/100904/1 |
| Date of Issue: | 2010-09-04 |
| Date Received: | 2010-09-03 |
| Date Tested: | 2010-09-03 |
| Date Completed: | 2010-09-04 |
| Next Due Date: | 2011-09-03 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Certificate of Calibration

Item for calibration:

| | |
|----------------|---|
| Description | : 'SVANTEK' Integrating Sound Level Meter |
| Manufacturer | : SVANTEK |
| Model No. | : SVAN 955 |
| Serial No. | : 21139 |
| Microphone No. | : 43690 |
| Equipment No. | : N-08-06 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 23 degree Celsius |
| Relative Humidity | : 65% |

Test Specifications:

Performance checking at 94 and 114 dB

Methodology:

In-house method, according to manufacturer instruction manual

Results:

| Reference Set Point, dB | Instrument Readings, dB |
|-------------------------|-------------------------|
| 94 | 94.0 |
| 114 | 114.0 |

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/110527-1 |
| Date of Issue: | 2011-05-30 |
| Date Received: | 2011-05-27 |
| Date Tested: | 2011-05-27 |
| Date Completed: | 2011-05-30 |
| Next Due Date: | 2012-05-29 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Certificate of Calibration

Item for calibration:

| | |
|----------------|---------------------------------|
| Description | : Integrating Sound Level Meter |
| Manufacturer | : Brüel & Kjær |
| Model No. | : 2250 Light |
| Serial No. | : 2648969 |
| Microphone No. | : 2698609 |
| Equipment No. | : N-11-01 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 21 degree Celsius |
| Relative Humidity | : 58% |

Test Specifications:

Performance checking at 94 and 114 dB

Methodology:

In-house method, according to manufacturer instruction manual

Results:

| Reference Set Point, dB | Instrument Readings, dB |
|-------------------------|-------------------------|
| 94 | 94.0 |
| 114 | 114.0 |

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/101115/1 |
| Date of Issue: | 2010-11-15 |
| Date Received: | 2010-11-12 |
| Date Tested: | 2010-11-12 |
| Date Completed: | 2010-11-15 |
| Next Due Date: | 2011-11-14 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Item for calibration:

| | |
|---------------|-------------------------|
| Description | : Acoustical Calibrator |
| Manufacturer | : Brüel & Kjær |
| Model No. | : 4231 |
| Serial No. | : 2326353 |
| Project No. | : C13 |
| Equipment No. | : N-02-01 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 22 degree Celsius |
| Relative Humidity | : 64% |

Methodology:

The sound calibrator has been calibrated in accordance with the documented procedures and using standard(s) and instrument(s) which are recommended by the manufacturer, or equivalent.

Results:

| Sound Pressure Level (1kHz) | Measured SPL | Tolerance |
|-----------------------------|--------------|----------------|
| At 94 dB SPL | 94.0 | 94.0 ± 0.1 dB |
| At 114 dB SPL | 114.0 | 114.0 ± 0.1 dB |

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**



PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/100902-3 |
| Date of Issue: | 2010-09-02 |
| Date Received: | 2010-09-01 |
| Date Tested: | 2010-09-01 |
| Date Completed: | 2010-09-02 |
| Next Due Date: | 2011-09-01 |

ATTN: Mr. Henry Leung

Item for calibration:

| | |
|---------------|-------------------------|
| Description | : Acoustical Calibrator |
| Manufacturer | : Brüel & Kjær |
| Model No. | : 4231 |
| Serial No. | : 2412367 |
| Equipment No. | : N-02-03 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 23 degree Celsius |
| Relative Humidity | : 65% |

Methodology:

The Sound Level Calibrator has been calibrated in accordance with the documented procedures and using standard(s) and instrument(s) which are recommended by the manufacturer, or equivalent.

Results:

| Sound Pressure Level (1kHz) | Measured SPL | Tolerance |
|-----------------------------|--------------|----------------|
| At 94 dB SPL | 94.0 | 94.0 ± 0.1 dB |
| At 114 dB SPL | 114.0 | 114.0 ± 0.1 dB |

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**



PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/100924/2 |
| Date of Issue: | 2010-09-24 |
| Date Received: | 2010-09-22 |
| Date Tested: | 2010-09-22 |
| Date Completed: | 2010-09-24 |
| Next Due Date: | 2011-09-23 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Item for calibration:

Description : Acoustical Calibrator
Manufacturer : SVANTEK
Model No. : SV30A
Serial No. : 10929
Equipment No. : N-09-01

Test conditions:

Room Temperature : 22 degree Celsius
Relative Humidity : 59%

Methodology:

The Sound Level Calibrator has been calibrated in accordance with the documented procedures and using standard(s) and instrument(s) which are recommended by the manufacturer, or equivalent.

Results:

| Sound Pressure Level (1kHz) | Measured SPL | Tolerance |
|-----------------------------|--------------|----------------|
| At 94 dB SPL | 94.0 | 94.0 ± 0.1 dB |
| At 114 dB SPL | 114.0 | 114.0 ± 0.1 dB |

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/N/101110/1 |
| Date of Issue: | 2010-11-10 |
| Date Received: | 2010-11-08 |
| Date Tested: | 2010-11-08 |
| Date Completed: | 2010-11-10 |
| Next Due Date: | 2011-11-09 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Item for calibration:

| | |
|---------------|-------------------------|
| Description | : Acoustical Calibrator |
| Manufacturer | : SVANTEK |
| Model No. | : SV30A |
| Serial No. | : 10965 |
| Equipment No. | : N-09-02 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 22 degree Celsius |
| Relative Humidity | : 57% |

Methodology:

The Sound Level Calibrator has been calibrated in accordance with the documented procedures and using standard(s) and instrument(s) which are recommended by the manufacturer, or equivalent.

Results:

| Sound Pressure Level (1kHz) | Measured SPL | Tolerance |
|-----------------------------|--------------|----------------|
| At 94 dB SPL | 94.0 | 94.0 ± 0.1 dB |
| At 114 dB SPL | 114.0 | 114.0 ± 0.1 dB |

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/W/110617-1 |
| Date of Issue: | 2011-06-18 |
| Date Received: | 2011-06-17 |
| Date Tested: | 2011-06-17 |
| Date Completed: | 2011-06-18 |
| Next Due Date: | 2011-09-17 |

ATTN: Mr. Henry Leung

Page: 1 of 2

Certificate of Calibration

Item for calibration:

| | |
|---------------|---|
| Description | : Sonde Environmental Monitoring System |
| Manufacturer | : YSI |
| Model No. | : 6820-C-M |
| Serial No. | : 02D0126AA |
| Equipment No. | : W.03.01 |
| Project No. | : C013 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 24 degree Celsius |
| Relative Humidity | : 56% |

Test Specifications:

Conductivity & Salinity Sensor, Model: 6560, S/N: 05A1209
1. Conductivity performance check with Potassium Chloride standard solution
2. Salinity performance check with Sodium Chloride standard solution
Dissolved Oxygen Sensor, Model: 6562, S/N: 04A0145
1. Performance check against Winkler titration
Turbidity Sensor, Model: 6136, S/N: 05A1610AJ
1. Calibration check with Formazin standard solution
pH Meter, Model: 6561, S/N: 01J
1. Calibration check with standard pH buffer
Depth Meter
1. Calibration check at 1m water level depth

Methodologies:

1. YSI 6-Series Sonde Environmental Monitoring System Instruction Manual
2. In-house method with reference to APHA and ISO standards

PREPARED AND CHECKED BY:

For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

| | |
|------------------|--------------|
| Test Report No.: | C/W/110617-1 |
| Date of Issue: | 2011-06-18 |
| Date Received: | 2011-06-17 |
| Date Tested: | 2011-06-17 |
| Date Completed: | 2011-06-18 |
| Next Due Date: | 2011-09-17 |

Page: 2 of 2

Results:

1. Conductivity performance check

| Specific Conductivity, $\mu\text{S/cm}$ | | Correction, $\mu\text{S/cm}$ | Acceptable range |
|---|------------------------|------------------------------|------------------|
| Salinity Meter (C1) | Theoretical Value (C2) | $D = C1 - C2$ | |
| 1421 | 1420 | 2 | 1420 ± 20 |

2. Salinity Performance check

| Salinity, ppt | | Correction, ppt | Acceptable range |
|--------------------|-------------------|-----------------|------------------|
| Instrument Reading | Theoretical Value | | |
| 30.0 | 30.0 | 0.0 | 30.0 ± 3 |

3. Dissolved Oxygen check

| Oxygen level in water at 20°C | Dissolved Oxygen, mg O ₂ /L | | Correction, mg O ₂ /L | Acceptable range |
|-------------------------------|--|-------------------|----------------------------------|------------------|
| | D.O. Meter | Winkler Titration | | |
| Saturated | 9.1 | 9.1 | 0.0 | ± 0.2 |
| Half-saturated | 5.6 | 5.6 | 0.0 | ± 0.2 |
| Zero | 0.0 | 0.0 | 0.0 | ± 0.2 |

4. Turbidity check

| Turbidity value in solution, NTU | Calibration Value, NTU | Correction, NTU | Acceptable range |
|----------------------------------|------------------------|-----------------|------------------|
| 0.00 | 0.00 | 0.00 | 0.00 ± 0.05 |
| 100 | 100 | 0 | 100 ± 5 |

5. pH Meter check

| Test Parameters | Performance characteristic | Acceptable range |
|---|----------------------------|------------------|
| Liquid junction error ΔpH_j , pH unit | 0.01 | Less than 0.05 |
| Shift on stirring ΔpH_s , pH unit | 0.01 | Less than 0.02 |
| Noise ΔpH_n , pH unit | 0.00 | Less than 0.02 |

6. Depth Meter check

| Instrument Reading, m | Calibration Value, m | Correction, m | Acceptable range |
|-----------------------|----------------------|---------------|------------------|
| 1.0 | 1.00 | 0.00 | 1.00 ± 0.05 |

*****END OF REPORT*****

TEST REPORT

APPLICANT: Cinotech Consultants Limited
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong

| | |
|------------------|--------------|
| Test Report No.: | C/W/110617-2 |
| Date of Issue: | 2011-06-18 |
| Date Received: | 2011-06-17 |
| Date Tested: | 2011-06-17 |
| Date Completed: | 2011-06-18 |
| Next Due Date: | 2011-09-17 |

ATTN: Mr. Henry Leung

Page: 1 of 2

Certificate of Calibration

Item for calibration:

| | |
|---------------|---|
| Description | : Sonde Environmental Monitoring System |
| Manufacturer | : YSI |
| Model No. | : 6820-C-M |
| Serial No. | : 02D0293AA |
| Equipment No. | : W.03.02 |
| Project No. | : C013 |

Test conditions:

| | |
|-------------------|---------------------|
| Room Temperature | : 24 degree Celsius |
| Relative Humidity | : 56% |

Test Specifications:

Conductivity & Salinity Sensor, Model: 6560, S/N: 02C0886

1. Conductivity performance check with Potassium Chloride standard solution
2. Salinity performance check with Sodium Chloride standard solution

Dissolved Oxygen Sensor, Model: 6562, S/N: 0261137

1. Performance check against Winkler titration

Turbidity Sensor, Model: 6136, S/N: 05F2030AQ

1. Calibration check with Formazin standard solution

pH Meter, Model: 6561, S/N: 02A

1. Calibration check with standard pH buffer

Depth Meter

1. Calibration check at 1m water level depth

Methodologies:

1. YSI 6-Series Sonde Environmental Monitoring System Instruction Manual
2. In-house method with reference to APHA and ISO standards

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**


PATRICK TSE
Laboratory Manager

TEST REPORT

| | |
|------------------|--------------|
| Test Report No.: | C/W/110617-2 |
| Date of Issue: | 2011-06-18 |
| Date Received: | 2011-06-17 |
| Date Tested: | 2011-06-17 |
| Date Completed: | 2011-06-18 |
| Next Due Date: | 2011-09-17 |
| Page: | 2 of 2 |

Results:

1. Conductivity performance check

| Specific Conductivity, $\mu\text{S}/\text{cm}$ | | Correction, $\mu\text{S}/\text{cm}$ | Acceptable range |
|--|------------------------|-------------------------------------|------------------|
| Salinity Meter (C1) | Theoretical Value (C2) | $D = C1 - C2$ | |
| 1420 | 1420 | 0 | 1420 ± 20 |

2. Salinity Performance check

| Salinity, ppt | | Correction, ppt | Acceptable range |
|--------------------|-------------------|-----------------|------------------|
| Instrument Reading | Theoretical Value | | |
| 30.1 | 30.0 | 0.1 | 30.0 ± 3 |

3. Dissolved Oxygen check

| Oxygen level in water at 20°C | Dissolved Oxygen, mg O ₂ /L | | Correction, mg O ₂ /L | Acceptable range |
|-------------------------------|--|-------------------|----------------------------------|------------------|
| | D.O. Meter | Winkler Titration | | |
| Saturated | 9.0 | 9.0 | 0.0 | ± 0.2 |
| Half-saturated | 5.8 | 5.8 | 0.0 | ± 0.2 |
| Zero | 0.0 | 0.0 | 0.0 | ± 0.2 |

4. Turbidity check

| Turbidity value in solution, NTU | Calibration Value, NTU | Correction, NTU | Acceptable range |
|----------------------------------|------------------------|-----------------|------------------|
| 0.00 | 0.00 | 0.00 | 0.00 ± 0.05 |
| 100 | 100 | 0 | 100 ± 5 |

5. pH Meter check

| Test Parameters | Performance characteristic | Acceptable range |
|---|----------------------------|------------------|
| Liquid junction error ΔpH_j , pH unit | 0.01 | Less than 0.05 |
| Shift on stirring ΔpH_s , pH unit | 0.01 | Less than 0.02 |
| Noise ΔpH_n , pH unit | 0.01 | Less than 0.02 |

6. Depth Meter check

| Instrument Reading, m | Calibration Value, m | Correction, m | Acceptable range |
|-----------------------|----------------------|---------------|------------------|
| 1.0 | 1.00 | 0.00 | 1.00 ± 0.05 |

*****END OF REPORT*****

APPENDIX C
WIND DATA

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 1-Aug-2011 | 0:00 | 1.8 | SSW |
| 1-Aug-2011 | 1:00 | 1.8 | SW |
| 1-Aug-2011 | 2:00 | 2 | W |
| 1-Aug-2011 | 3:00 | 2 | NE |
| 1-Aug-2011 | 4:00 | 1.8 | SE |
| 1-Aug-2011 | 5:00 | 1.8 | SSW |
| 1-Aug-2011 | 6:00 | 1.7 | ESE |
| 1-Aug-2011 | 7:00 | 1.8 | E |
| 1-Aug-2011 | 8:00 | 2.1 | E |
| 1-Aug-2011 | 9:00 | 2.2 | SE |
| 1-Aug-2011 | 10:00 | 2.3 | SSE |
| 1-Aug-2011 | 11:00 | 2.6 | SE |
| 1-Aug-2011 | 12:00 | 3 | SSW |
| 1-Aug-2011 | 13:00 | 2.9 | ENE |
| 1-Aug-2011 | 14:00 | 2.8 | NNW |
| 1-Aug-2011 | 15:00 | 2.8 | SSE |
| 1-Aug-2011 | 16:00 | 2.8 | SSE |
| 1-Aug-2011 | 17:00 | 2.2 | NE |
| 1-Aug-2011 | 18:00 | 2 | NE |
| 1-Aug-2011 | 19:00 | 1.6 | SE |
| 1-Aug-2011 | 20:00 | 1.7 | S |
| 1-Aug-2011 | 21:00 | 1.8 | E |
| 1-Aug-2011 | 22:00 | 2 | E |
| 1-Aug-2011 | 23:00 | 1.9 | NNE |
| 2-Aug-2011 | 0:00 | 2 | N |
| 2-Aug-2011 | 1:00 | 1.8 | W |
| 2-Aug-2011 | 2:00 | 2 | S |
| 2-Aug-2011 | 3:00 | 1.8 | NW |
| 2-Aug-2011 | 4:00 | 1.8 | SW |
| 2-Aug-2011 | 5:00 | 1.6 | WSW |
| 2-Aug-2011 | 6:00 | 1.6 | SSW |
| 2-Aug-2011 | 7:00 | 1.7 | SE |
| 2-Aug-2011 | 8:00 | 1.8 | ENE |
| 2-Aug-2011 | 9:00 | 2 | NNE |
| 2-Aug-2011 | 10:00 | 2.3 | ENE |
| 2-Aug-2011 | 11:00 | 2.7 | NE |
| 2-Aug-2011 | 12:00 | 3.1 | ENE |
| 2-Aug-2011 | 13:00 | 3 | ESE |
| 2-Aug-2011 | 14:00 | 3.2 | ENE |
| 2-Aug-2011 | 15:00 | 3 | NE |
| 2-Aug-2011 | 16:00 | 2.6 | SSE |
| 2-Aug-2011 | 17:00 | 2.6 | SSW |
| 2-Aug-2011 | 18:00 | 2.6 | WSW |
| 2-Aug-2011 | 19:00 | 2.2 | SW |
| 2-Aug-2011 | 20:00 | 2.1 | WSW |
| 2-Aug-2011 | 21:00 | 2.3 | SW |
| 2-Aug-2011 | 22:00 | 2.3 | SSE |
| 2-Aug-2011 | 23:00 | 2 | SW |
| 3-Aug-2011 | 0:00 | 2.1 | |
| 3-Aug-2011 | 1:00 | 2.4 | WSW |
| 3-Aug-2011 | 2:00 | 2 | SSW |
| 3-Aug-2011 | 3:00 | 1.7 | WSW |
| 3-Aug-2011 | 4:00 | 1.9 | NNW |
| 3-Aug-2011 | 5:00 | 1.9 | WSW |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 3-Aug-2011 | 6:00 | 1.8 | W |
| 3-Aug-2011 | 7:00 | 2.1 | WNW |
| 3-Aug-2011 | 8:00 | 2.6 | WSW |
| 3-Aug-2011 | 9:00 | 2.6 | WNW |
| 3-Aug-2011 | 10:00 | 2.7 | SW |
| 3-Aug-2011 | 11:00 | 3.1 | SSW |
| 3-Aug-2011 | 12:00 | 3.2 | SSW |
| 3-Aug-2011 | 13:00 | 3.2 | NNW |
| 3-Aug-2011 | 14:00 | 3.1 | NNW |
| 3-Aug-2011 | 15:00 | 3.2 | NNW |
| 3-Aug-2011 | 16:00 | 3.2 | WSW |
| 3-Aug-2011 | 17:00 | 2.7 | WSW |
| 3-Aug-2011 | 18:00 | 2.4 | SW |
| 3-Aug-2011 | 19:00 | 2.2 | WNW |
| 3-Aug-2011 | 20:00 | 2 | NNE |
| 3-Aug-2011 | 21:00 | 2 | NW |
| 3-Aug-2011 | 22:00 | 2.1 | NW |
| 3-Aug-2011 | 23:00 | 2 | WNW |
| 4-Aug-2011 | 0:00 | 2.3 | WSW |
| 4-Aug-2011 | 1:00 | 2.6 | WSW |
| 4-Aug-2011 | 2:00 | 2.5 | WSW |
| 4-Aug-2011 | 3:00 | 2.4 | W |
| 4-Aug-2011 | 4:00 | 2.1 | WSW |
| 4-Aug-2011 | 5:00 | 2.6 | WSW |
| 4-Aug-2011 | 6:00 | 2.4 | WSW |
| 4-Aug-2011 | 7:00 | 2.2 | WSW |
| 4-Aug-2011 | 8:00 | 2.5 | WSW |
| 4-Aug-2011 | 9:00 | 2.8 | SW |
| 4-Aug-2011 | 10:00 | 2.9 | SW |
| 4-Aug-2011 | 11:00 | 3.2 | WNW |
| 4-Aug-2011 | 12:00 | 3.4 | WSW |
| 4-Aug-2011 | 13:00 | 3.5 | SW |
| 4-Aug-2011 | 14:00 | 3.3 | SW |
| 4-Aug-2011 | 15:00 | 3.5 | WNW |
| 4-Aug-2011 | 16:00 | 3.3 | WNW |
| 4-Aug-2011 | 17:00 | 3.1 | SSW |
| 4-Aug-2011 | 18:00 | 2.6 | W |
| 4-Aug-2011 | 19:00 | 2.6 | W |
| 4-Aug-2011 | 20:00 | 2.6 | W |
| 4-Aug-2011 | 21:00 | 2.5 | SW |
| 4-Aug-2011 | 22:00 | 2.4 | WSW |
| 4-Aug-2011 | 23:00 | 2.6 | SSW |
| 5-Aug-2011 | 0:00 | 2.2 | WNW |
| 5-Aug-2011 | 1:00 | 2.1 | WSW |
| 5-Aug-2011 | 2:00 | 2.5 | WNW |
| 5-Aug-2011 | 3:00 | 2 | WNW |
| 5-Aug-2011 | 4:00 | 2 | WNW |
| 5-Aug-2011 | 5:00 | 1.8 | WSW |
| 5-Aug-2011 | 6:00 | 2 | W |
| 5-Aug-2011 | 7:00 | 1.4 | W |
| 5-Aug-2011 | 8:00 | 1.9 | WNW |
| 5-Aug-2011 | 9:00 | 2.4 | WNW |
| 5-Aug-2011 | 10:00 | 2.7 | SSW |
| 5-Aug-2011 | 11:00 | 2.5 | SSW |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 5-Aug-2011 | 12:00 | 2.8 | W |
| 5-Aug-2011 | 13:00 | 3 | W |
| 5-Aug-2011 | 14:00 | 2.9 | W |
| 5-Aug-2011 | 15:00 | 3.1 | WSW |
| 5-Aug-2011 | 16:00 | 2.6 | WNW |
| 5-Aug-2011 | 17:00 | 2.6 | SW |
| 5-Aug-2011 | 18:00 | 2.5 | WNW |
| 5-Aug-2011 | 19:00 | 1.9 | WNW |
| 5-Aug-2011 | 20:00 | 1.8 | W |
| 5-Aug-2011 | 21:00 | 1.9 | WSW |
| 5-Aug-2011 | 22:00 | 2 | SSW |
| 5-Aug-2011 | 23:00 | 1.8 | WSW |
| 6-Aug-2011 | 0:00 | 1.7 | W |
| 6-Aug-2011 | 1:00 | 1.9 | W |
| 6-Aug-2011 | 2:00 | 1.6 | WNW |
| 6-Aug-2011 | 3:00 | 2 | WNW |
| 6-Aug-2011 | 4:00 | 2 | NW |
| 6-Aug-2011 | 5:00 | 1.9 | SW |
| 6-Aug-2011 | 6:00 | 1.9 | WSW |
| 6-Aug-2011 | 7:00 | 1.9 | W |
| 6-Aug-2011 | 8:00 | 1.9 | WNW |
| 6-Aug-2011 | 9:00 | 2.2 | SW |
| 6-Aug-2011 | 10:00 | 2.6 | WSW |
| 6-Aug-2011 | 11:00 | 2.9 | W |
| 6-Aug-2011 | 12:00 | 2.8 | W |
| 6-Aug-2011 | 13:00 | 3.1 | W |
| 6-Aug-2011 | 14:00 | 2.8 | NE |
| 6-Aug-2011 | 15:00 | 3 | WSW |
| 6-Aug-2011 | 16:00 | 2.8 | SSW |
| 6-Aug-2011 | 17:00 | 2.6 | W |
| 6-Aug-2011 | 18:00 | 2.3 | SSW |
| 6-Aug-2011 | 19:00 | 2.2 | WSW |
| 6-Aug-2011 | 20:00 | 2.1 | SSW |
| 6-Aug-2011 | 21:00 | 1.8 | SSW |
| 6-Aug-2011 | 22:00 | 1.5 | WNW |
| 6-Aug-2011 | 23:00 | 1.5 | W |
| 7-Aug-2011 | 0:00 | 1.6 | WSW |
| 7-Aug-2011 | 1:00 | 1.4 | W |
| 7-Aug-2011 | 2:00 | 1.3 | W |
| 7-Aug-2011 | 3:00 | 1.2 | W |
| 7-Aug-2011 | 4:00 | 1.2 | W |
| 7-Aug-2011 | 5:00 | 1.5 | SW |
| 7-Aug-2011 | 6:00 | 1.5 | W |
| 7-Aug-2011 | 7:00 | 1.6 | W |
| 7-Aug-2011 | 8:00 | 1.8 | ESE |
| 7-Aug-2011 | 9:00 | 2.2 | WNW |
| 7-Aug-2011 | 10:00 | 2.6 | WNW |
| 7-Aug-2011 | 11:00 | 2.8 | NNE |
| 7-Aug-2011 | 12:00 | 3.1 | ESE |
| 7-Aug-2011 | 13:00 | 2.9 | WNW |
| 7-Aug-2011 | 14:00 | 2.9 | WNW |
| 7-Aug-2011 | 15:00 | 2.8 | WNW |
| 7-Aug-2011 | 16:00 | 2.6 | W |
| 7-Aug-2011 | 17:00 | 2.7 | W |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 7-Aug-2011 | 18:00 | 2.6 | W |
| 7-Aug-2011 | 19:00 | 2 | SW |
| 7-Aug-2011 | 20:00 | 1.7 | SSW |
| 7-Aug-2011 | 21:00 | 1.8 | WSW |
| 7-Aug-2011 | 22:00 | 1.9 | SW |
| 7-Aug-2011 | 23:00 | 1.9 | SW |
| 8-Aug-2011 | 0:00 | 2 | W |
| 8-Aug-2011 | 1:00 | 2.2 | WNW |
| 8-Aug-2011 | 2:00 | 2 | W |
| 8-Aug-2011 | 3:00 | 1.8 | WNW |
| 8-Aug-2011 | 4:00 | 1.9 | SW |
| 8-Aug-2011 | 5:00 | 2.1 | W |
| 8-Aug-2011 | 6:00 | 2 | WNW |
| 8-Aug-2011 | 7:00 | 2.1 | SW |
| 8-Aug-2011 | 8:00 | 2.6 | SSW |
| 8-Aug-2011 | 9:00 | 2.8 | W |
| 8-Aug-2011 | 10:00 | 3.1 | SSW |
| 8-Aug-2011 | 11:00 | 3.1 | WSW |
| 8-Aug-2011 | 12:00 | 3.3 | W |
| 8-Aug-2011 | 13:00 | 3.2 | W |
| 8-Aug-2011 | 14:00 | 3.4 | W |
| 8-Aug-2011 | 15:00 | 3.6 | WSW |
| 8-Aug-2011 | 16:00 | 3.1 | W |
| 8-Aug-2011 | 17:00 | 2.9 | SSW |
| 8-Aug-2011 | 18:00 | 2.8 | S |
| 8-Aug-2011 | 19:00 | 2.3 | WNW |
| 8-Aug-2011 | 20:00 | 2.2 | W |
| 8-Aug-2011 | 21:00 | 2.2 | WNW |
| 8-Aug-2011 | 22:00 | 2.1 | SW |
| 8-Aug-2011 | 23:00 | 2 | SW |
| 9-Aug-2011 | 0:00 | 1.9 | SW |
| 9-Aug-2011 | 1:00 | 1.8 | WNW |
| 9-Aug-2011 | 2:00 | 1.7 | W |
| 9-Aug-2011 | 3:00 | 1.9 | W |
| 9-Aug-2011 | 4:00 | 2.1 | W |
| 9-Aug-2011 | 5:00 | 2.2 | WSW |
| 9-Aug-2011 | 6:00 | 1.8 | W |
| 9-Aug-2011 | 7:00 | 1.9 | W |
| 9-Aug-2011 | 8:00 | 2.2 | NNE |
| 9-Aug-2011 | 9:00 | 2.6 | WNW |
| 9-Aug-2011 | 10:00 | 2.8 | S |
| 9-Aug-2011 | 11:00 | 2.6 | W |
| 9-Aug-2011 | 12:00 | 2.7 | NNE |
| 9-Aug-2011 | 13:00 | 2.7 | N |
| 9-Aug-2011 | 14:00 | 2.3 | NE |
| 9-Aug-2011 | 15:00 | 2.6 | NE |
| 9-Aug-2011 | 16:00 | 2.8 | ESE |
| 9-Aug-2011 | 17:00 | 2.4 | ENE |
| 9-Aug-2011 | 18:00 | 1.9 | W |
| 9-Aug-2011 | 19:00 | 1.7 | E |
| 9-Aug-2011 | 20:00 | 1.2 | SW |
| 9-Aug-2011 | 21:00 | 1.6 | S |
| 9-Aug-2011 | 22:00 | 1.4 | SSW |
| 9-Aug-2011 | 23:00 | 1.5 | SW |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 10-Aug-2011 | 0:00 | 1.4 | SSW |
| 10-Aug-2011 | 1:00 | 1.8 | SW |
| 10-Aug-2011 | 2:00 | 1.4 | N |
| 10-Aug-2011 | 3:00 | 1.2 | NE |
| 10-Aug-2011 | 4:00 | 1.3 | SE |
| 10-Aug-2011 | 5:00 | 1.3 | ENE |
| 10-Aug-2011 | 6:00 | 0.9 | ESE |
| 10-Aug-2011 | 7:00 | 1.1 | ESE |
| 10-Aug-2011 | 8:00 | 1.4 | NE |
| 10-Aug-2011 | 9:00 | 1.7 | ENE |
| 10-Aug-2011 | 10:00 | 2.4 | ESE |
| 10-Aug-2011 | 11:00 | 2.6 | ENE |
| 10-Aug-2011 | 12:00 | 2.8 | NE |
| 10-Aug-2011 | 13:00 | 2.9 | ENE |
| 10-Aug-2011 | 14:00 | 3.1 | SSE |
| 10-Aug-2011 | 15:00 | 2.9 | N |
| 10-Aug-2011 | 16:00 | 2.6 | NNE |
| 10-Aug-2011 | 17:00 | 2.5 | NE |
| 10-Aug-2011 | 18:00 | 2.3 | ESE |
| 10-Aug-2011 | 19:00 | 1.7 | ESE |
| 10-Aug-2011 | 20:00 | 1.8 | ENE |
| 10-Aug-2011 | 21:00 | 1.7 | SSE |
| 10-Aug-2011 | 22:00 | 1.8 | ESE |
| 10-Aug-2011 | 23:00 | 1.6 | ESE |
| 11-Aug-2011 | 0:00 | 1.8 | ENE |
| 11-Aug-2011 | 1:00 | 2.1 | E |
| 11-Aug-2011 | 2:00 | 2.2 | WNW |
| 11-Aug-2011 | 3:00 | 2 | WNW |
| 11-Aug-2011 | 4:00 | 1.7 | WNW |
| 11-Aug-2011 | 5:00 | 1.9 | ENE |
| 11-Aug-2011 | 6:00 | 1.8 | WSW |
| 11-Aug-2011 | 7:00 | 1.9 | W |
| 11-Aug-2011 | 8:00 | 2 | ESE |
| 11-Aug-2011 | 9:00 | 2.2 | E |
| 11-Aug-2011 | 10:00 | 2.4 | ESE |
| 11-Aug-2011 | 11:00 | 2.8 | W |
| 11-Aug-2011 | 12:00 | 3.1 | S |
| 11-Aug-2011 | 13:00 | 3.1 | W |
| 11-Aug-2011 | 14:00 | 2.8 | SW |
| 11-Aug-2011 | 15:00 | 2.9 | SE |
| 11-Aug-2011 | 16:00 | 2.6 | SSW |
| 11-Aug-2011 | 17:00 | 2.7 | WNW |
| 11-Aug-2011 | 18:00 | 2.5 | SW |
| 11-Aug-2011 | 19:00 | 2.5 | ESE |
| 11-Aug-2011 | 20:00 | 2.2 | SE |
| 11-Aug-2011 | 21:00 | 2.1 | ESE |
| 11-Aug-2011 | 22:00 | 2.2 | NE |
| 11-Aug-2011 | 23:00 | 2.5 | NE |
| 12-Aug-2011 | 0:00 | 2.5 | NNW |
| 12-Aug-2011 | 1:00 | 2.6 | ENE |
| 12-Aug-2011 | 2:00 | 2.2 | NE |
| 12-Aug-2011 | 3:00 | 2 | W |
| 12-Aug-2011 | 4:00 | 2 | WSW |
| 12-Aug-2011 | 5:00 | 2 | SW |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 12-Aug-2011 | 6:00 | 1.7 | WNW |
| 12-Aug-2011 | 7:00 | 2 | WNW |
| 12-Aug-2011 | 8:00 | 2.2 | WNW |
| 12-Aug-2011 | 9:00 | 2.4 | W |
| 12-Aug-2011 | 10:00 | 2.5 | NW |
| 12-Aug-2011 | 11:00 | 3 | N |
| 12-Aug-2011 | 12:00 | 3 | WSW |
| 12-Aug-2011 | 13:00 | 2.9 | NW |
| 12-Aug-2011 | 14:00 | 2.9 | W |
| 12-Aug-2011 | 15:00 | 3.1 | W |
| 12-Aug-2011 | 16:00 | 2.9 | WSW |
| 12-Aug-2011 | 17:00 | 2.9 | WNW |
| 12-Aug-2011 | 18:00 | 2.6 | WNW |
| 12-Aug-2011 | 19:00 | 2.7 | WSW |
| 12-Aug-2011 | 20:00 | 2.4 | W |
| 12-Aug-2011 | 21:00 | 2.1 | W |
| 12-Aug-2011 | 22:00 | 1.9 | WSW |
| 12-Aug-2011 | 23:00 | 2.1 | W |
| 13-Aug-2011 | 0:00 | 2 | WSW |
| 13-Aug-2011 | 1:00 | 2.2 | WNW |
| 13-Aug-2011 | 2:00 | 1.8 | SW |
| 13-Aug-2011 | 3:00 | 1.8 | W |
| 13-Aug-2011 | 4:00 | 1.8 | W |
| 13-Aug-2011 | 5:00 | 1.9 | SW |
| 13-Aug-2011 | 6:00 | 1.8 | SSW |
| 13-Aug-2011 | 7:00 | 1.9 | NE |
| 13-Aug-2011 | 8:00 | 2.4 | SSW |
| 13-Aug-2011 | 9:00 | 3.1 | ENE |
| 13-Aug-2011 | 10:00 | 3.3 | S |
| 13-Aug-2011 | 11:00 | 3.1 | ESE |
| 13-Aug-2011 | 12:00 | 3.3 | SSE |
| 13-Aug-2011 | 13:00 | 3.2 | SSE |
| 13-Aug-2011 | 14:00 | 3.1 | SSE |
| 13-Aug-2011 | 15:00 | 3.1 | S |
| 13-Aug-2011 | 16:00 | 3.1 | ESE |
| 13-Aug-2011 | 17:00 | 3.1 | ENE |
| 13-Aug-2011 | 18:00 | 2.6 | S |
| 13-Aug-2011 | 19:00 | 2.1 | SSE |
| 13-Aug-2011 | 20:00 | 2.1 | ESE |
| 13-Aug-2011 | 21:00 | 1.6 | ENE |
| 13-Aug-2011 | 22:00 | 1.6 | SE |
| 13-Aug-2011 | 23:00 | 1.5 | ESE |
| 14-Aug-2011 | 0:00 | 1.8 | ESE |
| 14-Aug-2011 | 1:00 | 2 | SE |
| 14-Aug-2011 | 2:00 | 2 | SSE |
| 14-Aug-2011 | 3:00 | 2.2 | S |
| 14-Aug-2011 | 4:00 | 1.5 | SE |
| 14-Aug-2011 | 5:00 | 1.7 | SSE |
| 14-Aug-2011 | 6:00 | 1.5 | SSE |
| 14-Aug-2011 | 7:00 | 1.5 | ENE |
| 14-Aug-2011 | 8:00 | 2.1 | NNE |
| 14-Aug-2011 | 9:00 | 2.7 | ESE |
| 14-Aug-2011 | 10:00 | 3.5 | S |
| 14-Aug-2011 | 11:00 | 3.5 | S |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 14-Aug-2011 | 12:00 | 3.3 | SE |
| 14-Aug-2011 | 13:00 | 3.7 | N |
| 14-Aug-2011 | 14:00 | 3.2 | N |
| 14-Aug-2011 | 15:00 | 3.6 | E |
| 14-Aug-2011 | 16:00 | 3.5 | NNW |
| 14-Aug-2011 | 17:00 | 2.9 | WSW |
| 14-Aug-2011 | 18:00 | 2.9 | SW |
| 14-Aug-2011 | 19:00 | 3.1 | SW |
| 14-Aug-2011 | 20:00 | 2.8 | SSE |
| 14-Aug-2011 | 21:00 | 3.1 | SSE |
| 14-Aug-2011 | 22:00 | 3.3 | SSE |
| 14-Aug-2011 | 23:00 | 3 | SE |
| 15-Aug-2011 | 0:00 | 3.2 | SSE |
| 15-Aug-2011 | 1:00 | 3.6 | SSE |
| 15-Aug-2011 | 2:00 | 3.1 | ENE |
| 15-Aug-2011 | 3:00 | 2.8 | SSE |
| 15-Aug-2011 | 4:00 | 3 | SSE |
| 15-Aug-2011 | 5:00 | 2.9 | E |
| 15-Aug-2011 | 6:00 | 3.2 | E |
| 15-Aug-2011 | 7:00 | 3 | E |
| 15-Aug-2011 | 8:00 | 2.9 | NE |
| 15-Aug-2011 | 9:00 | 3 | NE |
| 15-Aug-2011 | 10:00 | 2.6 | NE |
| 15-Aug-2011 | 11:00 | 3.2 | S |
| 15-Aug-2011 | 12:00 | 2.9 | SSE |
| 15-Aug-2011 | 13:00 | 2.8 | SSE |
| 15-Aug-2011 | 14:00 | 3 | SSE |
| 15-Aug-2011 | 15:00 | 2.9 | SE |
| 15-Aug-2011 | 16:00 | 2.9 | SE |
| 15-Aug-2011 | 17:00 | 2.9 | SE |
| 15-Aug-2011 | 18:00 | 2.9 | SE |
| 15-Aug-2011 | 19:00 | 2.6 | SSE |
| 15-Aug-2011 | 20:00 | 2.7 | NE |
| 15-Aug-2011 | 21:00 | 2.6 | ENE |
| 15-Aug-2011 | 22:00 | 2.5 | ENE |
| 15-Aug-2011 | 23:00 | 2.2 | ESE |
| 16-Aug-2011 | 0:00 | 2.4 | ENE |
| 16-Aug-2011 | 1:00 | 2.3 | ENE |
| 16-Aug-2011 | 2:00 | 2.4 | NE |
| 16-Aug-2011 | 3:00 | 2.3 | SSE |
| 16-Aug-2011 | 4:00 | 2.6 | SE |
| 16-Aug-2011 | 5:00 | 2.6 | SE |
| 16-Aug-2011 | 6:00 | 2.2 | SSE |
| 16-Aug-2011 | 7:00 | 2.2 | ESE |
| 16-Aug-2011 | 8:00 | 2.2 | ESE |
| 16-Aug-2011 | 9:00 | 2.5 | NE |
| 16-Aug-2011 | 10:00 | 3 | SE |
| 16-Aug-2011 | 11:00 | 2.9 | NE |
| 16-Aug-2011 | 12:00 | 3 | SE |
| 16-Aug-2011 | 13:00 | 3.1 | NE |
| 16-Aug-2011 | 14:00 | 2.9 | SSE |
| 16-Aug-2011 | 15:00 | 3.2 | SE |
| 16-Aug-2011 | 16:00 | 3.5 | SE |
| 16-Aug-2011 | 17:00 | 3.1 | NNE |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 16-Aug-2011 | 18:00 | 2.9 | SW |
| 16-Aug-2011 | 19:00 | 2.3 | SSW |
| 16-Aug-2011 | 20:00 | 1.8 | N |
| 16-Aug-2011 | 21:00 | 2 | SW |
| 16-Aug-2011 | 22:00 | 1.8 | E |
| 16-Aug-2011 | 23:00 | 1.5 | WNW |
| 17-Aug-2011 | 0:00 | 1.7 | ESE |
| 17-Aug-2011 | 1:00 | 1.7 | SSW |
| 17-Aug-2011 | 2:00 | 2 | SSE |
| 17-Aug-2011 | 3:00 | 1.7 | NE |
| 17-Aug-2011 | 4:00 | 1.4 | N |
| 17-Aug-2011 | 5:00 | 1.5 | WNW |
| 17-Aug-2011 | 6:00 | 1.3 | W |
| 17-Aug-2011 | 7:00 | 1.5 | ENE |
| 17-Aug-2011 | 8:00 | 2 | W |
| 17-Aug-2011 | 9:00 | 2.2 | NNE |
| 17-Aug-2011 | 10:00 | 2.8 | SSE |
| 17-Aug-2011 | 11:00 | 3.1 | NE |
| 17-Aug-2011 | 12:00 | 3.2 | N |
| 17-Aug-2011 | 13:00 | 3.1 | SW |
| 17-Aug-2011 | 14:00 | 3.6 | ENE |
| 17-Aug-2011 | 15:00 | 3 | ENE |
| 17-Aug-2011 | 16:00 | 3.1 | NW |
| 17-Aug-2011 | 17:00 | 2.7 | N |
| 17-Aug-2011 | 18:00 | 2.5 | WNW |
| 17-Aug-2011 | 19:00 | 2.4 | W |
| 17-Aug-2011 | 20:00 | 2.4 | NW |
| 17-Aug-2011 | 21:00 | 2.5 | WNW |
| 17-Aug-2011 | 22:00 | 2.2 | SSW |
| 17-Aug-2011 | 23:00 | 2.4 | ENE |
| 18-Aug-2011 | 0:00 | 1.8 | W |
| 18-Aug-2011 | 1:00 | 1.6 | NNE |
| 18-Aug-2011 | 2:00 | 2 | N |
| 18-Aug-2011 | 3:00 | 1.9 | ENE |
| 18-Aug-2011 | 4:00 | 2.1 | WNW |
| 18-Aug-2011 | 5:00 | 1.8 | WNW |
| 18-Aug-2011 | 6:00 | 1.9 | W |
| 18-Aug-2011 | 7:00 | 1.8 | NW |
| 18-Aug-2011 | 8:00 | 2 | E |
| 18-Aug-2011 | 9:00 | 2.6 | WNW |
| 18-Aug-2011 | 10:00 | 3.5 | SW |
| 18-Aug-2011 | 11:00 | 3.6 | S |
| 18-Aug-2011 | 12:00 | 3.6 | WNW |
| 18-Aug-2011 | 13:00 | 4.1 | WNW |
| 18-Aug-2011 | 14:00 | 3.9 | WNW |
| 18-Aug-2011 | 15:00 | 3.8 | W |
| 18-Aug-2011 | 16:00 | 3.7 | NW |
| 18-Aug-2011 | 17:00 | 3.3 | E |
| 18-Aug-2011 | 18:00 | 3.1 | S |
| 18-Aug-2011 | 19:00 | 2.6 | ENE |
| 18-Aug-2011 | 20:00 | 2.4 | ENE |
| 18-Aug-2011 | 21:00 | 2.5 | N |
| 18-Aug-2011 | 22:00 | 3.1 | NE |
| 18-Aug-2011 | 23:00 | 2.9 | NE |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 19-Aug-2011 | 0:00 | 2.6 | E |
| 19-Aug-2011 | 1:00 | 3 | NE |
| 19-Aug-2011 | 2:00 | 3.2 | NE |
| 19-Aug-2011 | 3:00 | 2.7 | WSW |
| 19-Aug-2011 | 4:00 | 2.4 | SW |
| 19-Aug-2011 | 5:00 | 2.5 | WSW |
| 19-Aug-2011 | 6:00 | 2.5 | W |
| 19-Aug-2011 | 7:00 | 2.3 | W |
| 19-Aug-2011 | 8:00 | 2.7 | WNW |
| 19-Aug-2011 | 9:00 | 3 | W |
| 19-Aug-2011 | 10:00 | 3.1 | WNW |
| 19-Aug-2011 | 11:00 | 3.2 | W |
| 19-Aug-2011 | 12:00 | 3.4 | NW |
| 19-Aug-2011 | 13:00 | 3.1 | N |
| 19-Aug-2011 | 14:00 | 3.1 | NE |
| 19-Aug-2011 | 15:00 | 3.2 | ENE |
| 19-Aug-2011 | 16:00 | 3.1 | N |
| 19-Aug-2011 | 17:00 | 3.2 | NNE |
| 19-Aug-2011 | 18:00 | 2.7 | ENE |
| 19-Aug-2011 | 19:00 | 2 | ENE |
| 19-Aug-2011 | 20:00 | 1.9 | ENE |
| 19-Aug-2011 | 21:00 | 1.9 | ENE |
| 19-Aug-2011 | 22:00 | 2 | E |
| 19-Aug-2011 | 23:00 | 2 | SE |
| 20-Aug-2011 | 0:00 | 2 | SSE |
| 20-Aug-2011 | 1:00 | 2.2 | S |
| 20-Aug-2011 | 2:00 | 2.4 | S |
| 20-Aug-2011 | 3:00 | 1.9 | SSW |
| 20-Aug-2011 | 4:00 | 1.7 | SSW |
| 20-Aug-2011 | 5:00 | 2 | SSW |
| 20-Aug-2011 | 6:00 | 2.1 | S |
| 20-Aug-2011 | 7:00 | 1.9 | S |
| 20-Aug-2011 | 8:00 | 2 | SSW |
| 20-Aug-2011 | 9:00 | 2.7 | SSW |
| 20-Aug-2011 | 10:00 | 3.4 | NW |
| 20-Aug-2011 | 11:00 | 3.3 | WNW |
| 20-Aug-2011 | 12:00 | 3.6 | W |
| 20-Aug-2011 | 13:00 | 3.5 | SSE |
| 20-Aug-2011 | 14:00 | 3.3 | ESE |
| 20-Aug-2011 | 15:00 | 3.5 | NW |
| 20-Aug-2011 | 16:00 | 3 | WNW |
| 20-Aug-2011 | 17:00 | 2.9 | WNW |
| 20-Aug-2011 | 18:00 | 2.7 | SSW |
| 20-Aug-2011 | 19:00 | 2.7 | NW |
| 20-Aug-2011 | 20:00 | 2.4 | WNW |
| 20-Aug-2011 | 21:00 | 2.4 | W |
| 20-Aug-2011 | 22:00 | 1.9 | WNW |
| 20-Aug-2011 | 23:00 | 2.4 | NW |
| 21-Aug-2011 | 0:00 | 2.2 | WNW |
| 21-Aug-2011 | 1:00 | 2.2 | NW |
| 21-Aug-2011 | 2:00 | 2.1 | WNW |
| 21-Aug-2011 | 3:00 | 2.1 | NW |
| 21-Aug-2011 | 4:00 | 2.2 | WNW |
| 21-Aug-2011 | 5:00 | 1.8 | WNW |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 21-Aug-2011 | 6:00 | 1.8 | NNW |
| 21-Aug-2011 | 7:00 | 2.1 | NW |
| 21-Aug-2011 | 8:00 | 2.4 | NW |
| 21-Aug-2011 | 9:00 | 2.6 | NW |
| 21-Aug-2011 | 10:00 | 2.9 | NNW |
| 21-Aug-2011 | 11:00 | 3.4 | WNW |
| 21-Aug-2011 | 12:00 | 3.5 | NNW |
| 21-Aug-2011 | 13:00 | 3.7 | N |
| 21-Aug-2011 | 14:00 | 3.8 | NNW |
| 21-Aug-2011 | 15:00 | 3.6 | W |
| 21-Aug-2011 | 16:00 | 3.4 | WNW |
| 21-Aug-2011 | 17:00 | 3.5 | WNW |
| 21-Aug-2011 | 18:00 | 3.4 | NNE |
| 21-Aug-2011 | 19:00 | 3.1 | WSW |
| 21-Aug-2011 | 20:00 | 3.2 | WNW |
| 21-Aug-2011 | 21:00 | 3.1 | ENE |
| 21-Aug-2011 | 22:00 | 2.8 | SE |
| 21-Aug-2011 | 23:00 | 2.7 | ESE |
| 22-Aug-2011 | 0:00 | 2.5 | NW |
| 22-Aug-2011 | 1:00 | 2 | ESE |
| 22-Aug-2011 | 2:00 | 1.7 | ESE |
| 22-Aug-2011 | 3:00 | 1.8 | NW |
| 22-Aug-2011 | 4:00 | 2 | ESE |
| 22-Aug-2011 | 5:00 | 2.1 | NW |
| 22-Aug-2011 | 6:00 | 2.2 | NNW |
| 22-Aug-2011 | 7:00 | 1.8 | SSW |
| 22-Aug-2011 | 8:00 | 2.4 | NE |
| 22-Aug-2011 | 9:00 | 3.2 | NNW |
| 22-Aug-2011 | 10:00 | 3 | WNW |
| 22-Aug-2011 | 11:00 | 3.2 | WSW |
| 22-Aug-2011 | 12:00 | 3.1 | WNW |
| 22-Aug-2011 | 13:00 | 2.5 | WNW |
| 22-Aug-2011 | 14:00 | 2.5 | S |
| 22-Aug-2011 | 15:00 | 2.6 | SE |
| 22-Aug-2011 | 16:00 | 2.6 | ENE |
| 22-Aug-2011 | 17:00 | 2.5 | SSE |
| 22-Aug-2011 | 18:00 | 2.5 | NW |
| 22-Aug-2011 | 19:00 | 2.2 | SW |
| 22-Aug-2011 | 20:00 | 2.2 | NW |
| 22-Aug-2011 | 21:00 | 2.6 | NW |
| 22-Aug-2011 | 22:00 | 2 | NW |
| 22-Aug-2011 | 23:00 | 2.1 | WNW |
| 23-Aug-2011 | 0:00 | 2 | WNW |
| 23-Aug-2011 | 1:00 | 2 | NNW |
| 23-Aug-2011 | 2:00 | 2 | NNW |
| 23-Aug-2011 | 3:00 | 1.9 | W |
| 23-Aug-2011 | 4:00 | 1.5 | N |
| 23-Aug-2011 | 5:00 | 1.6 | NNW |
| 23-Aug-2011 | 6:00 | 1.6 | NNW |
| 23-Aug-2011 | 7:00 | 1.3 | W |
| 23-Aug-2011 | 8:00 | 1.9 | NNW |
| 23-Aug-2011 | 9:00 | 1.9 | NNW |
| 23-Aug-2011 | 10:00 | 2.7 | WNW |
| 23-Aug-2011 | 11:00 | 3.1 | WNW |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 23-Aug-2011 | 12:00 | 2.9 | NW |
| 23-Aug-2011 | 13:00 | 2.9 | NNW |
| 23-Aug-2011 | 14:00 | 2.9 | WSW |
| 23-Aug-2011 | 15:00 | 3.3 | WSW |
| 23-Aug-2011 | 16:00 | 3.4 | NW |
| 23-Aug-2011 | 17:00 | 3.1 | NW |
| 23-Aug-2011 | 18:00 | 2.9 | NW |
| 23-Aug-2011 | 19:00 | 2.7 | S |
| 23-Aug-2011 | 20:00 | 2.4 | S |
| 23-Aug-2011 | 21:00 | 2.4 | SSW |
| 23-Aug-2011 | 22:00 | 2.3 | NNE |
| 23-Aug-2011 | 23:00 | 2 | NNE |
| 24-Aug-2011 | 0:00 | 2.3 | NW |
| 24-Aug-2011 | 1:00 | 2.4 | NW |
| 24-Aug-2011 | 2:00 | 2.5 | NNE |
| 24-Aug-2011 | 3:00 | 2.3 | S |
| 24-Aug-2011 | 4:00 | 2.6 | WNW |
| 24-Aug-2011 | 5:00 | 2.8 | WSW |
| 24-Aug-2011 | 6:00 | 2.7 | SW |
| 24-Aug-2011 | 7:00 | 2.6 | SSW |
| 24-Aug-2011 | 8:00 | 2.7 | WNW |
| 24-Aug-2011 | 9:00 | 3 | WNW |
| 24-Aug-2011 | 10:00 | 3.5 | WNW |
| 24-Aug-2011 | 11:00 | 3.7 | WSW |
| 24-Aug-2011 | 12:00 | 3.4 | WNW |
| 24-Aug-2011 | 13:00 | 3.4 | NW |
| 24-Aug-2011 | 14:00 | 3.2 | NW |
| 24-Aug-2011 | 15:00 | 3 | NW |
| 24-Aug-2011 | 16:00 | 3 | NNW |
| 24-Aug-2011 | 17:00 | 2.7 | NNW |
| 24-Aug-2011 | 18:00 | 2.6 | NNW |
| 24-Aug-2011 | 19:00 | 2.3 | NNW |
| 24-Aug-2011 | 20:00 | 2.1 | NW |
| 24-Aug-2011 | 21:00 | 2.8 | NW |
| 24-Aug-2011 | 22:00 | 2.6 | WNW |
| 24-Aug-2011 | 23:00 | 2.4 | NW |
| 25-Aug-2011 | 0:00 | 2.4 | NW |
| 25-Aug-2011 | 1:00 | 2.1 | NNW |
| 25-Aug-2011 | 2:00 | 2 | NNW |
| 25-Aug-2011 | 3:00 | 2.7 | NW |
| 25-Aug-2011 | 4:00 | 2.3 | WNW |
| 25-Aug-2011 | 5:00 | 1.9 | NW |
| 25-Aug-2011 | 6:00 | 2 | NW |
| 25-Aug-2011 | 7:00 | 2.3 | NW |
| 25-Aug-2011 | 8:00 | 2.1 | NNW |
| 25-Aug-2011 | 9:00 | 2.4 | NNW |
| 25-Aug-2011 | 10:00 | 2.7 | NW |
| 25-Aug-2011 | 11:00 | 2.8 | W |
| 25-Aug-2011 | 12:00 | 2.6 | WNW |
| 25-Aug-2011 | 13:00 | 2.7 | NNW |
| 25-Aug-2011 | 14:00 | 2.7 | NW |
| 25-Aug-2011 | 15:00 | 2.8 | WNW |
| 25-Aug-2011 | 16:00 | 2.9 | WNW |
| 25-Aug-2011 | 17:00 | 2 | S |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 25-Aug-2011 | 18:00 | 1.9 | SE |
| 25-Aug-2011 | 19:00 | 2 | ESE |
| 25-Aug-2011 | 20:00 | 1.3 | W |
| 25-Aug-2011 | 21:00 | 1.6 | NW |
| 25-Aug-2011 | 22:00 | 1.4 | WNW |
| 25-Aug-2011 | 23:00 | 1.3 | NW |
| 26-Aug-2011 | 0:00 | 1.1 | NW |
| 26-Aug-2011 | 1:00 | 0.9 | NW |
| 26-Aug-2011 | 2:00 | 1.2 | SSE |
| 26-Aug-2011 | 3:00 | 1.3 | S |
| 26-Aug-2011 | 4:00 | 1.4 | S |
| 26-Aug-2011 | 5:00 | 1.3 | S |
| 26-Aug-2011 | 6:00 | 1.6 | WNW |
| 26-Aug-2011 | 7:00 | 1.8 | WNW |
| 26-Aug-2011 | 8:00 | 2 | NW |
| 26-Aug-2011 | 9:00 | 2.4 | NW |
| 26-Aug-2011 | 10:00 | 2.4 | NW |
| 26-Aug-2011 | 11:00 | 2.8 | S |
| 26-Aug-2011 | 12:00 | 2.9 | S |
| 26-Aug-2011 | 13:00 | 3.2 | S |
| 26-Aug-2011 | 14:00 | 2.8 | SW |
| 26-Aug-2011 | 15:00 | 2.5 | NNW |
| 26-Aug-2011 | 16:00 | 2.6 | SW |
| 26-Aug-2011 | 17:00 | 2.6 | WNW |
| 26-Aug-2011 | 18:00 | 2.1 | NW |
| 26-Aug-2011 | 19:00 | 1.8 | NW |
| 26-Aug-2011 | 20:00 | 1.5 | NW |
| 26-Aug-2011 | 21:00 | 1.8 | NW |
| 26-Aug-2011 | 22:00 | 1.5 | NNW |
| 26-Aug-2011 | 23:00 | 1.7 | NNW |
| 27-Aug-2011 | 0:00 | 1.9 | NW |
| 27-Aug-2011 | 1:00 | 1.8 | W |
| 27-Aug-2011 | 2:00 | 1.8 | WNW |
| 27-Aug-2011 | 3:00 | 1.8 | WNW |
| 27-Aug-2011 | 4:00 | 1.7 | WNW |
| 27-Aug-2011 | 5:00 | 1.8 | NNW |
| 27-Aug-2011 | 6:00 | 1.6 | NNW |
| 27-Aug-2011 | 7:00 | 1.9 | NW |
| 27-Aug-2011 | 8:00 | 2 | NNW |
| 27-Aug-2011 | 9:00 | 2.6 | WNW |
| 27-Aug-2011 | 10:00 | 2.7 | NNW |
| 27-Aug-2011 | 11:00 | 2.9 | ENE |
| 27-Aug-2011 | 12:00 | 3.1 | SSE |
| 27-Aug-2011 | 13:00 | 3.4 | WNW |
| 27-Aug-2011 | 14:00 | 3.4 | NW |
| 27-Aug-2011 | 15:00 | 3.3 | ESE |
| 27-Aug-2011 | 16:00 | 3.1 | SE |
| 27-Aug-2011 | 17:00 | 3 | SE |
| 27-Aug-2011 | 18:00 | 2.5 | SE |
| 27-Aug-2011 | 19:00 | 2.3 | ESE |
| 27-Aug-2011 | 20:00 | 2.2 | S |
| 27-Aug-2011 | 21:00 | 2.6 | SE |
| 27-Aug-2011 | 22:00 | 1.6 | S |
| 27-Aug-2011 | 23:00 | 2 | SE |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 28-Aug-2011 | 0:00 | 2 | S |
| 28-Aug-2011 | 1:00 | 2 | SE |
| 28-Aug-2011 | 2:00 | 1.8 | S |
| 28-Aug-2011 | 3:00 | 2.6 | SW |
| 28-Aug-2011 | 4:00 | 2.4 | S |
| 28-Aug-2011 | 5:00 | 2.3 | S |
| 28-Aug-2011 | 6:00 | 2.4 | SSW |
| 28-Aug-2011 | 7:00 | 2.6 | S |
| 28-Aug-2011 | 8:00 | 3.2 | SSW |
| 28-Aug-2011 | 9:00 | 3.5 | SW |
| 28-Aug-2011 | 10:00 | 3.7 | WNW |
| 28-Aug-2011 | 11:00 | 3.9 | WNW |
| 28-Aug-2011 | 12:00 | 3.1 | NNW |
| 28-Aug-2011 | 13:00 | 3.1 | NNW |
| 28-Aug-2011 | 14:00 | 3.3 | NNW |
| 28-Aug-2011 | 15:00 | 3.5 | NW |
| 28-Aug-2011 | 16:00 | 3.6 | NW |
| 28-Aug-2011 | 17:00 | 3.7 | NW |
| 28-Aug-2011 | 18:00 | 3.3 | WNW |
| 28-Aug-2011 | 19:00 | 2.9 | WNW |
| 28-Aug-2011 | 20:00 | 2.9 | NW |
| 28-Aug-2011 | 21:00 | 2.9 | NNW |
| 28-Aug-2011 | 22:00 | 2.9 | N |
| 28-Aug-2011 | 23:00 | 3.1 | WNW |
| 29-Aug-2011 | 0:00 | 3.1 | WNW |
| 29-Aug-2011 | 1:00 | 2.4 | WNW |
| 29-Aug-2011 | 2:00 | 2.6 | NNW |
| 29-Aug-2011 | 3:00 | 3 | ESE |
| 29-Aug-2011 | 4:00 | 2.9 | NNW |
| 29-Aug-2011 | 5:00 | 2.9 | WNW |
| 29-Aug-2011 | 6:00 | 2.9 | WSW |
| 29-Aug-2011 | 7:00 | 2.5 | NNW |
| 29-Aug-2011 | 8:00 | 2.6 | WNW |
| 29-Aug-2011 | 9:00 | 3.3 | NW |
| 29-Aug-2011 | 10:00 | 3.9 | S |
| 29-Aug-2011 | 11:00 | 3.8 | ENE |
| 29-Aug-2011 | 12:00 | 3.7 | NNE |
| 29-Aug-2011 | 13:00 | 3.3 | N |
| 29-Aug-2011 | 14:00 | 3.1 | N |
| 29-Aug-2011 | 15:00 | 2.9 | N |
| 29-Aug-2011 | 16:00 | 2.9 | ENE |
| 29-Aug-2011 | 17:00 | 2.8 | WSW |
| 29-Aug-2011 | 18:00 | 2.5 | S |
| 29-Aug-2011 | 19:00 | 2.3 | S |
| 29-Aug-2011 | 20:00 | 2 | SE |
| 29-Aug-2011 | 21:00 | 2.1 | SSE |
| 29-Aug-2011 | 22:00 | 2 | SSE |
| 29-Aug-2011 | 23:00 | 1.8 | ESE |
| 30-Aug-2011 | 0:00 | 1.8 | SSE |
| 30-Aug-2011 | 1:00 | 1.8 | ESE |
| 30-Aug-2011 | 2:00 | 1.5 | ESE |
| 30-Aug-2011 | 3:00 | 2 | ESE |
| 30-Aug-2011 | 4:00 | 2.1 | ESE |
| 30-Aug-2011 | 5:00 | 1.8 | S |

Appendix C - Wind Data (Eastern Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 30-Aug-2011 | 6:00 | 1.7 | S |
| 30-Aug-2011 | 7:00 | 1.8 | SW |
| 30-Aug-2011 | 8:00 | 2 | WNW |
| 30-Aug-2011 | 9:00 | 3.5 | NE |
| 30-Aug-2011 | 10:00 | 2.4 | E |
| 30-Aug-2011 | 11:00 | 2.9 | NE |
| 30-Aug-2011 | 12:00 | 3.4 | ENE |
| 30-Aug-2011 | 13:00 | 3.3 | ENE |
| 30-Aug-2011 | 14:00 | 3.3 | W |
| 30-Aug-2011 | 15:00 | 3 | ESE |
| 30-Aug-2011 | 16:00 | 2.7 | NE |
| 30-Aug-2011 | 17:00 | 2.5 | WNW |
| 30-Aug-2011 | 18:00 | 2.5 | ENE |
| 30-Aug-2011 | 19:00 | 2.4 | SSE |
| 30-Aug-2011 | 20:00 | 2.4 | ENE |
| 30-Aug-2011 | 21:00 | 2.4 | SE |
| 30-Aug-2011 | 22:00 | 2.4 | SE |
| 30-Aug-2011 | 23:00 | 2.3 | SSE |
| 31-Aug-2011 | 0:00 | 2.2 | SSE |
| 31-Aug-2011 | 1:00 | 2.4 | ENE |
| 31-Aug-2011 | 2:00 | 2.2 | ENE |
| 31-Aug-2011 | 3:00 | 2.4 | E |
| 31-Aug-2011 | 4:00 | 2.2 | SE |
| 31-Aug-2011 | 5:00 | 2.2 | NNE |
| 31-Aug-2011 | 6:00 | 2.3 | ESE |
| 31-Aug-2011 | 7:00 | 2.2 | ESE |
| 31-Aug-2011 | 8:00 | 2.3 | NNE |
| 31-Aug-2011 | 9:00 | 2.3 | ENE |
| 31-Aug-2011 | 10:00 | 2.8 | SSE |
| 31-Aug-2011 | 11:00 | 2.4 | NNE |
| 31-Aug-2011 | 12:00 | 2.9 | ESE |
| 31-Aug-2011 | 13:00 | 3.2 | SSE |
| 31-Aug-2011 | 14:00 | 2.9 | NNE |
| 31-Aug-2011 | 15:00 | 2.9 | ENE |
| 31-Aug-2011 | 16:00 | 2.5 | ESE |
| 31-Aug-2011 | 17:00 | 2.4 | SE |
| 31-Aug-2011 | 18:00 | 2.1 | W |
| 31-Aug-2011 | 19:00 | 2.4 | W |
| 31-Aug-2011 | 20:00 | 2.2 | W |
| 31-Aug-2011 | 21:00 | 2.4 | SSW |
| 31-Aug-2011 | 22:00 | 2.1 | SSE |
| 31-Aug-2011 | 23:00 | 1.7 | ESE |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 1-Aug-2011 | 0:00 | 1.8 | NE |
| 1-Aug-2011 | 1:00 | 1.7 | NE |
| 1-Aug-2011 | 2:00 | 1.6 | NNE |
| 1-Aug-2011 | 3:00 | 1.4 | NNE |
| 1-Aug-2011 | 4:00 | 1.3 | NNE |
| 1-Aug-2011 | 5:00 | 1.6 | NNE |
| 1-Aug-2011 | 6:00 | 1.4 | N |
| 1-Aug-2011 | 7:00 | 1.9 | N |
| 1-Aug-2011 | 8:00 | 1.9 | NNE |
| 1-Aug-2011 | 9:00 | 2.5 | NE |
| 1-Aug-2011 | 10:00 | 2.5 | NE |
| 1-Aug-2011 | 11:00 | 2.7 | ENE |
| 1-Aug-2011 | 12:00 | 2.8 | NE |
| 1-Aug-2011 | 13:00 | 2.5 | NE |
| 1-Aug-2011 | 14:00 | 2.5 | NE |
| 1-Aug-2011 | 15:00 | 2.5 | NNE |
| 1-Aug-2011 | 16:00 | 2.2 | NE |
| 1-Aug-2011 | 17:00 | 1.5 | ENE |
| 1-Aug-2011 | 18:00 | 1.8 | NNE |
| 1-Aug-2011 | 19:00 | 1.4 | NNE |
| 1-Aug-2011 | 20:00 | 1.4 | NNE |
| 1-Aug-2011 | 21:00 | 2.1 | NNE |
| 1-Aug-2011 | 22:00 | 2.5 | N |
| 1-Aug-2011 | 23:00 | 1.8 | NE |
| 2-Aug-2011 | 0:00 | 1.6 | E |
| 2-Aug-2011 | 1:00 | 1.4 | NW |
| 2-Aug-2011 | 2:00 | 1.6 | NE |
| 2-Aug-2011 | 3:00 | 1.8 | NE |
| 2-Aug-2011 | 4:00 | 1.7 | N |
| 2-Aug-2011 | 5:00 | 1.5 | N |
| 2-Aug-2011 | 6:00 | 1.3 | NNE |
| 2-Aug-2011 | 7:00 | 1.2 | N |
| 2-Aug-2011 | 8:00 | 1.3 | W |
| 2-Aug-2011 | 9:00 | 1.6 | W |
| 2-Aug-2011 | 10:00 | 1.9 | W |
| 2-Aug-2011 | 11:00 | 1.9 | W |
| 2-Aug-2011 | 12:00 | 2.5 | WSW |
| 2-Aug-2011 | 13:00 | 2.6 | WNW |
| 2-Aug-2011 | 14:00 | 2.4 | SSW |
| 2-Aug-2011 | 15:00 | 2.5 | WNW |
| 2-Aug-2011 | 16:00 | 2.2 | NW |
| 2-Aug-2011 | 17:00 | 2 | NNW |
| 2-Aug-2011 | 18:00 | 1.4 | W |
| 2-Aug-2011 | 19:00 | 1.3 | W |
| 2-Aug-2011 | 20:00 | 1.3 | WSW |
| 2-Aug-2011 | 21:00 | 1.3 | SW |
| 2-Aug-2011 | 22:00 | 1.4 | WNW |
| 2-Aug-2011 | 23:00 | 1.3 | W |
| 3-Aug-2011 | 0:00 | 1.3 | WNW |
| 3-Aug-2011 | 1:00 | 1.3 | WNW |
| 3-Aug-2011 | 2:00 | 1.6 | NW |
| 3-Aug-2011 | 3:00 | 2 | WNW |
| 3-Aug-2011 | 4:00 | 2.1 | WNW |
| 3-Aug-2011 | 5:00 | 2 | WNW |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 3-Aug-2011 | 6:00 | 1.7 | W |
| 3-Aug-2011 | 7:00 | 1.8 | SW |
| 3-Aug-2011 | 8:00 | 1.9 | W |
| 3-Aug-2011 | 9:00 | 2.5 | N |
| 3-Aug-2011 | 10:00 | 3.1 | WNW |
| 3-Aug-2011 | 11:00 | 3.1 | N |
| 3-Aug-2011 | 12:00 | 2.9 | WNW |
| 3-Aug-2011 | 13:00 | 3.2 | WNW |
| 3-Aug-2011 | 14:00 | 3 | WNW |
| 3-Aug-2011 | 15:00 | 2.2 | WNW |
| 3-Aug-2011 | 16:00 | 2.7 | WNW |
| 3-Aug-2011 | 17:00 | 2.2 | W |
| 3-Aug-2011 | 18:00 | 2 | NW |
| 3-Aug-2011 | 19:00 | 1.6 | W |
| 3-Aug-2011 | 20:00 | 1.3 | WNW |
| 3-Aug-2011 | 21:00 | 1.2 | NW |
| 3-Aug-2011 | 22:00 | 1.6 | WNW |
| 3-Aug-2011 | 23:00 | 1.4 | WNW |
| 4-Aug-2011 | 0:00 | 1.7 | WNW |
| 4-Aug-2011 | 1:00 | 1.8 | WNW |
| 4-Aug-2011 | 2:00 | 1.8 | WNW |
| 4-Aug-2011 | 3:00 | 1.8 | SW |
| 4-Aug-2011 | 4:00 | 2.1 | WSW |
| 4-Aug-2011 | 5:00 | 2.1 | W |
| 4-Aug-2011 | 6:00 | 2.6 | WSW |
| 4-Aug-2011 | 7:00 | 2.4 | WSW |
| 4-Aug-2011 | 8:00 | 2.4 | SSW |
| 4-Aug-2011 | 9:00 | 2.9 | WSW |
| 4-Aug-2011 | 10:00 | 3.2 | SW |
| 4-Aug-2011 | 11:00 | 3.3 | NW |
| 4-Aug-2011 | 12:00 | 3.4 | WNW |
| 4-Aug-2011 | 13:00 | 3.6 | WNW |
| 4-Aug-2011 | 14:00 | 3.6 | NNE |
| 4-Aug-2011 | 15:00 | 3 | WNW |
| 4-Aug-2011 | 16:00 | 2.8 | WNW |
| 4-Aug-2011 | 17:00 | 3.1 | WNW |
| 4-Aug-2011 | 18:00 | 2.5 | WNW |
| 4-Aug-2011 | 19:00 | 2.2 | WNW |
| 4-Aug-2011 | 20:00 | 2 | WNW |
| 4-Aug-2011 | 21:00 | 1.7 | NE |
| 4-Aug-2011 | 22:00 | 1.6 | NE |
| 4-Aug-2011 | 23:00 | 1.7 | NE |
| 5-Aug-2011 | 0:00 | 1.8 | NE |
| 5-Aug-2011 | 1:00 | 1.6 | NNE |
| 5-Aug-2011 | 2:00 | 1.3 | NNE |
| 5-Aug-2011 | 3:00 | 1 | NNE |
| 5-Aug-2011 | 4:00 | 1.3 | NE |
| 5-Aug-2011 | 5:00 | 1.6 | NE |
| 5-Aug-2011 | 6:00 | 1.7 | E |
| 5-Aug-2011 | 7:00 | 1.5 | NW |
| 5-Aug-2011 | 8:00 | 2 | SSE |
| 5-Aug-2011 | 9:00 | 2.8 | SSE |
| 5-Aug-2011 | 10:00 | 2.9 | SSW |
| 5-Aug-2011 | 11:00 | 2.9 | SW |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 5-Aug-2011 | 12:00 | 2.6 | NNE |
| 5-Aug-2011 | 13:00 | 2.6 | NNE |
| 5-Aug-2011 | 14:00 | 2.4 | NNE |
| 5-Aug-2011 | 15:00 | 3 | NNE |
| 5-Aug-2011 | 16:00 | 3.1 | NNE |
| 5-Aug-2011 | 17:00 | 3 | NE |
| 5-Aug-2011 | 18:00 | 2.4 | NNE |
| 5-Aug-2011 | 19:00 | 1.5 | SE |
| 5-Aug-2011 | 20:00 | 1.7 | SE |
| 5-Aug-2011 | 21:00 | 1.7 | SSW |
| 5-Aug-2011 | 22:00 | 1.7 | ENE |
| 5-Aug-2011 | 23:00 | 1.6 | NE |
| 6-Aug-2011 | 0:00 | 1.3 | SSW |
| 6-Aug-2011 | 1:00 | 1.4 | WSW |
| 6-Aug-2011 | 2:00 | 1.2 | N |
| 6-Aug-2011 | 3:00 | 1.3 | SW |
| 6-Aug-2011 | 4:00 | 1.3 | SW |
| 6-Aug-2011 | 5:00 | 1.3 | WNW |
| 6-Aug-2011 | 6:00 | 1.3 | SW |
| 6-Aug-2011 | 7:00 | 1.1 | ENE |
| 6-Aug-2011 | 8:00 | 1.1 | ENE |
| 6-Aug-2011 | 9:00 | 1.6 | E |
| 6-Aug-2011 | 10:00 | 2.2 | SE |
| 6-Aug-2011 | 11:00 | 2.5 | SE |
| 6-Aug-2011 | 12:00 | 2.8 | W |
| 6-Aug-2011 | 13:00 | 2.8 | W |
| 6-Aug-2011 | 14:00 | 2.7 | W |
| 6-Aug-2011 | 15:00 | 2.5 | W |
| 6-Aug-2011 | 16:00 | 2.5 | S |
| 6-Aug-2011 | 17:00 | 2.4 | ENE |
| 6-Aug-2011 | 18:00 | 2.1 | ENE |
| 6-Aug-2011 | 19:00 | 1.7 | SSE |
| 6-Aug-2011 | 20:00 | 1.2 | SSE |
| 6-Aug-2011 | 21:00 | 1.2 | SSW |
| 6-Aug-2011 | 22:00 | 1.1 | SSW |
| 6-Aug-2011 | 23:00 | 1.2 | SW |
| 7-Aug-2011 | 0:00 | 1.5 | ENE |
| 7-Aug-2011 | 1:00 | 1.5 | WNW |
| 7-Aug-2011 | 2:00 | 1.4 | W |
| 7-Aug-2011 | 3:00 | 1.3 | WNW |
| 7-Aug-2011 | 4:00 | 1.5 | SW |
| 7-Aug-2011 | 5:00 | 1.5 | WNW |
| 7-Aug-2011 | 6:00 | 1.5 | SE |
| 7-Aug-2011 | 7:00 | 1.3 | W |
| 7-Aug-2011 | 8:00 | 1.4 | S |
| 7-Aug-2011 | 9:00 | 1.8 | ENE |
| 7-Aug-2011 | 10:00 | 2.3 | ENE |
| 7-Aug-2011 | 11:00 | 2.3 | ENE |
| 7-Aug-2011 | 12:00 | 2.6 | E |
| 7-Aug-2011 | 13:00 | 2.3 | W |
| 7-Aug-2011 | 14:00 | 2.1 | NNE |
| 7-Aug-2011 | 15:00 | 2.4 | NE |
| 7-Aug-2011 | 16:00 | 2 | WNW |
| 7-Aug-2011 | 17:00 | 2.1 | WNW |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 7-Aug-2011 | 18:00 | 2 | WNW |
| 7-Aug-2011 | 19:00 | 2 | ENE |
| 7-Aug-2011 | 20:00 | 1.6 | WNW |
| 7-Aug-2011 | 21:00 | 1.7 | WNW |
| 7-Aug-2011 | 22:00 | 1.5 | WNW |
| 7-Aug-2011 | 23:00 | 1.3 | ENE |
| 8-Aug-2011 | 0:00 | 1.3 | WNW |
| 8-Aug-2011 | 1:00 | 1.6 | WNW |
| 8-Aug-2011 | 2:00 | 1.7 | WNW |
| 8-Aug-2011 | 3:00 | 1.6 | WNW |
| 8-Aug-2011 | 4:00 | 1.6 | NW |
| 8-Aug-2011 | 5:00 | 1.6 | NNE |
| 8-Aug-2011 | 6:00 | 1.6 | ENE |
| 8-Aug-2011 | 7:00 | 1.6 | S |
| 8-Aug-2011 | 8:00 | 1.6 | S |
| 8-Aug-2011 | 9:00 | 2.2 | ENE |
| 8-Aug-2011 | 10:00 | 2.4 | SSE |
| 8-Aug-2011 | 11:00 | 2.9 | SSE |
| 8-Aug-2011 | 12:00 | 3.3 | NE |
| 8-Aug-2011 | 13:00 | 3.2 | SW |
| 8-Aug-2011 | 14:00 | 2.6 | ENE |
| 8-Aug-2011 | 15:00 | 2.8 | SSE |
| 8-Aug-2011 | 16:00 | 2.7 | E |
| 8-Aug-2011 | 17:00 | 2.4 | SE |
| 8-Aug-2011 | 18:00 | 1.8 | SE |
| 8-Aug-2011 | 19:00 | 1.7 | ESE |
| 8-Aug-2011 | 20:00 | 1.4 | ESE |
| 8-Aug-2011 | 21:00 | 1.7 | ESE |
| 8-Aug-2011 | 22:00 | 1.7 | ENE |
| 8-Aug-2011 | 23:00 | 1.6 | ESE |
| 9-Aug-2011 | 0:00 | 1.7 | E |
| 9-Aug-2011 | 1:00 | 1.6 | SSE |
| 9-Aug-2011 | 2:00 | 1.6 | ESE |
| 9-Aug-2011 | 3:00 | 2 | E |
| 9-Aug-2011 | 4:00 | 1.9 | SSE |
| 9-Aug-2011 | 5:00 | 1.8 | WNW |
| 9-Aug-2011 | 6:00 | 1.7 | WSW |
| 9-Aug-2011 | 7:00 | 1.8 | ESE |
| 9-Aug-2011 | 8:00 | 2 | ENE |
| 9-Aug-2011 | 9:00 | 2.2 | ENE |
| 9-Aug-2011 | 10:00 | 2.5 | E |
| 9-Aug-2011 | 11:00 | 2.3 | ENE |
| 9-Aug-2011 | 12:00 | 2.8 | NE |
| 9-Aug-2011 | 13:00 | 2.7 | ENE |
| 9-Aug-2011 | 14:00 | 2.4 | ESE |
| 9-Aug-2011 | 15:00 | 2.1 | ESE |
| 9-Aug-2011 | 16:00 | 2.3 | N |
| 9-Aug-2011 | 17:00 | 1.7 | N |
| 9-Aug-2011 | 18:00 | 1.2 | E |
| 9-Aug-2011 | 19:00 | 0.8 | ENE |
| 9-Aug-2011 | 20:00 | 0.9 | NNE |
| 9-Aug-2011 | 21:00 | 0.9 | NNE |
| 9-Aug-2011 | 22:00 | 1.1 | ENE |
| 9-Aug-2011 | 23:00 | 0.7 | NE |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 10-Aug-2011 | 0:00 | 0.9 | NE |
| 10-Aug-2011 | 1:00 | 1.2 | N |
| 10-Aug-2011 | 2:00 | 0.8 | ENE |
| 10-Aug-2011 | 3:00 | 0.6 | ENE |
| 10-Aug-2011 | 4:00 | 0.7 | NE |
| 10-Aug-2011 | 5:00 | 0.9 | E |
| 10-Aug-2011 | 6:00 | 0.8 | NNE |
| 10-Aug-2011 | 7:00 | 0.8 | NE |
| 10-Aug-2011 | 8:00 | 0.9 | ENE |
| 10-Aug-2011 | 9:00 | 1.6 | NE |
| 10-Aug-2011 | 10:00 | 2 | NNE |
| 10-Aug-2011 | 11:00 | 2.3 | NNE |
| 10-Aug-2011 | 12:00 | 2.2 | ENE |
| 10-Aug-2011 | 13:00 | 2.4 | NE |
| 10-Aug-2011 | 14:00 | 2.2 | ENE |
| 10-Aug-2011 | 15:00 | 1.9 | NE |
| 10-Aug-2011 | 16:00 | 2 | NNE |
| 10-Aug-2011 | 17:00 | 1.8 | ENE |
| 10-Aug-2011 | 18:00 | 1.4 | NE |
| 10-Aug-2011 | 19:00 | 0.9 | E |
| 10-Aug-2011 | 20:00 | 1.1 | NNW |
| 10-Aug-2011 | 21:00 | 1.5 | WNW |
| 10-Aug-2011 | 22:00 | 1.2 | SE |
| 10-Aug-2011 | 23:00 | 1.1 | ENE |
| 11-Aug-2011 | 0:00 | 1.1 | NE |
| 11-Aug-2011 | 1:00 | 1.3 | NNE |
| 11-Aug-2011 | 2:00 | 1.2 | WSW |
| 11-Aug-2011 | 3:00 | 1.3 | SW |
| 11-Aug-2011 | 4:00 | 1.1 | SW |
| 11-Aug-2011 | 5:00 | 1.1 | SSE |
| 11-Aug-2011 | 6:00 | 1.3 | SSE |
| 11-Aug-2011 | 7:00 | 1.3 | SSE |
| 11-Aug-2011 | 8:00 | 1.5 | SW |
| 11-Aug-2011 | 9:00 | 1.5 | NW |
| 11-Aug-2011 | 10:00 | 1.6 | SSE |
| 11-Aug-2011 | 11:00 | 1.9 | SE |
| 11-Aug-2011 | 12:00 | 2.2 | SE |
| 11-Aug-2011 | 13:00 | 2.1 | SSE |
| 11-Aug-2011 | 14:00 | 2.1 | ESE |
| 11-Aug-2011 | 15:00 | 2.6 | ENE |
| 11-Aug-2011 | 16:00 | 2.3 | SSE |
| 11-Aug-2011 | 17:00 | 1.9 | S |
| 11-Aug-2011 | 18:00 | 1.8 | ESE |
| 11-Aug-2011 | 19:00 | 1.7 | N |
| 11-Aug-2011 | 20:00 | 1.8 | SW |
| 11-Aug-2011 | 21:00 | 1.6 | ENE |
| 11-Aug-2011 | 22:00 | 1.7 | N |
| 11-Aug-2011 | 23:00 | 1.6 | ENE |
| 12-Aug-2011 | 0:00 | 1.5 | NE |
| 12-Aug-2011 | 1:00 | 1.5 | W |
| 12-Aug-2011 | 2:00 | 0.9 | ENE |
| 12-Aug-2011 | 3:00 | 1 | ENE |
| 12-Aug-2011 | 4:00 | 0.9 | N |
| 12-Aug-2011 | 5:00 | 1.1 | N |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 12-Aug-2011 | 6:00 | 1 | SW |
| 12-Aug-2011 | 7:00 | 1.1 | SW |
| 12-Aug-2011 | 8:00 | 1.2 | W |
| 12-Aug-2011 | 9:00 | 1.5 | S |
| 12-Aug-2011 | 10:00 | 2.1 | S |
| 12-Aug-2011 | 11:00 | 2.4 | W |
| 12-Aug-2011 | 12:00 | 2.3 | ESE |
| 12-Aug-2011 | 13:00 | 2 | NE |
| 12-Aug-2011 | 14:00 | 2.3 | NNW |
| 12-Aug-2011 | 15:00 | 2.7 | NE |
| 12-Aug-2011 | 16:00 | 2.8 | NE |
| 12-Aug-2011 | 17:00 | 2.5 | N |
| 12-Aug-2011 | 18:00 | 2.2 | ESE |
| 12-Aug-2011 | 19:00 | 1.9 | NNE |
| 12-Aug-2011 | 20:00 | 2 | NNE |
| 12-Aug-2011 | 21:00 | 1.9 | NNE |
| 12-Aug-2011 | 22:00 | 2 | NE |
| 12-Aug-2011 | 23:00 | 2.4 | NNE |
| 13-Aug-2011 | 0:00 | 2.1 | NNE |
| 13-Aug-2011 | 1:00 | 2.1 | SSW |
| 13-Aug-2011 | 2:00 | 2 | N |
| 13-Aug-2011 | 3:00 | 1.9 | NE |
| 13-Aug-2011 | 4:00 | 2.1 | S |
| 13-Aug-2011 | 5:00 | 2 | WSW |
| 13-Aug-2011 | 6:00 | 1.9 | SE |
| 13-Aug-2011 | 7:00 | 1.5 | NE |
| 13-Aug-2011 | 8:00 | 1.6 | N |
| 13-Aug-2011 | 9:00 | 2.2 | NNE |
| 13-Aug-2011 | 10:00 | 2.7 | SSE |
| 13-Aug-2011 | 11:00 | 3 | SSE |
| 13-Aug-2011 | 12:00 | 3.2 | SW |
| 13-Aug-2011 | 13:00 | 3 | WNW |
| 13-Aug-2011 | 14:00 | 3.2 | ESE |
| 13-Aug-2011 | 15:00 | 3 | SE |
| 13-Aug-2011 | 16:00 | 2.7 | SSE |
| 13-Aug-2011 | 17:00 | 2.4 | SE |
| 13-Aug-2011 | 18:00 | 2.3 | N |
| 13-Aug-2011 | 19:00 | 2 | SSW |
| 13-Aug-2011 | 20:00 | 1.8 | SSW |
| 13-Aug-2011 | 21:00 | 1.4 | WNW |
| 13-Aug-2011 | 22:00 | 1.3 | WSW |
| 13-Aug-2011 | 23:00 | 1.3 | WNW |
| 14-Aug-2011 | 0:00 | 1.1 | W |
| 14-Aug-2011 | 1:00 | 1 | W |
| 14-Aug-2011 | 2:00 | 1.2 | WNW |
| 14-Aug-2011 | 3:00 | 1.1 | ESE |
| 14-Aug-2011 | 4:00 | 1.6 | SW |
| 14-Aug-2011 | 5:00 | 1.5 | SW |
| 14-Aug-2011 | 6:00 | 1.5 | NE |
| 14-Aug-2011 | 7:00 | 1.5 | NE |
| 14-Aug-2011 | 8:00 | 1.8 | SW |
| 14-Aug-2011 | 9:00 | 2.1 | ENE |
| 14-Aug-2011 | 10:00 | 2.3 | ENE |
| 14-Aug-2011 | 11:00 | 2.7 | E |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 14-Aug-2011 | 12:00 | 3.2 | SSE |
| 14-Aug-2011 | 13:00 | 3 | ESE |
| 14-Aug-2011 | 14:00 | 2.8 | SSE |
| 14-Aug-2011 | 15:00 | 3.1 | ESE |
| 14-Aug-2011 | 16:00 | 3.2 | NE |
| 14-Aug-2011 | 17:00 | 2.8 | ENE |
| 14-Aug-2011 | 18:00 | 2.3 | NNE |
| 14-Aug-2011 | 19:00 | 2.3 | N |
| 14-Aug-2011 | 20:00 | 2 | N |
| 14-Aug-2011 | 21:00 | 2.1 | ENE |
| 14-Aug-2011 | 22:00 | 2 | NNE |
| 14-Aug-2011 | 23:00 | 1.9 | ENE |
| 15-Aug-2011 | 0:00 | 2.2 | ENE |
| 15-Aug-2011 | 1:00 | 2.4 | ENE |
| 15-Aug-2011 | 2:00 | 2.5 | NE |
| 15-Aug-2011 | 3:00 | 2.1 | NNE |
| 15-Aug-2011 | 4:00 | 2.4 | NE |
| 15-Aug-2011 | 5:00 | 2.5 | NE |
| 15-Aug-2011 | 6:00 | 2.5 | NE |
| 15-Aug-2011 | 7:00 | 2.4 | NE |
| 15-Aug-2011 | 8:00 | 2.1 | ENE |
| 15-Aug-2011 | 9:00 | 2.7 | NNE |
| 15-Aug-2011 | 10:00 | 2.5 | NNE |
| 15-Aug-2011 | 11:00 | 2.5 | E |
| 15-Aug-2011 | 12:00 | 2.5 | NNE |
| 15-Aug-2011 | 13:00 | 2.6 | ENE |
| 15-Aug-2011 | 14:00 | 2.6 | ENE |
| 15-Aug-2011 | 15:00 | 2.7 | NE |
| 15-Aug-2011 | 16:00 | 2.3 | ENE |
| 15-Aug-2011 | 17:00 | 2 | SSE |
| 15-Aug-2011 | 18:00 | 1.9 | SSE |
| 15-Aug-2011 | 19:00 | 1.4 | SSE |
| 15-Aug-2011 | 20:00 | 1.6 | SE |
| 15-Aug-2011 | 21:00 | 1.5 | SSE |
| 15-Aug-2011 | 22:00 | 1.6 | SE |
| 15-Aug-2011 | 23:00 | 2.1 | SSE |
| 16-Aug-2011 | 0:00 | 1.8 | SW |
| 16-Aug-2011 | 1:00 | 1.8 | W |
| 16-Aug-2011 | 2:00 | 1.9 | W |
| 16-Aug-2011 | 3:00 | 1.9 | W |
| 16-Aug-2011 | 4:00 | 2.1 | NE |
| 16-Aug-2011 | 5:00 | 2.3 | NE |
| 16-Aug-2011 | 6:00 | 2 | N |
| 16-Aug-2011 | 7:00 | 2.2 | NE |
| 16-Aug-2011 | 8:00 | 2.2 | N |
| 16-Aug-2011 | 9:00 | 2.7 | ENE |
| 16-Aug-2011 | 10:00 | 2.8 | ENE |
| 16-Aug-2011 | 11:00 | 2.8 | ENE |
| 16-Aug-2011 | 12:00 | 3 | ENE |
| 16-Aug-2011 | 13:00 | 2.9 | NNE |
| 16-Aug-2011 | 14:00 | 2.7 | NNE |
| 16-Aug-2011 | 15:00 | 3 | ESE |
| 16-Aug-2011 | 16:00 | 3 | NE |
| 16-Aug-2011 | 17:00 | 2.3 | WSW |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 16-Aug-2011 | 18:00 | 2.2 | SE |
| 16-Aug-2011 | 19:00 | 2.1 | SE |
| 16-Aug-2011 | 20:00 | 1.7 | SE |
| 16-Aug-2011 | 21:00 | 1.8 | ENE |
| 16-Aug-2011 | 22:00 | 1.7 | NE |
| 16-Aug-2011 | 23:00 | 1.5 | ENE |
| 17-Aug-2011 | 0:00 | 1.6 | ENE |
| 17-Aug-2011 | 1:00 | 1.8 | ENE |
| 17-Aug-2011 | 2:00 | 2.1 | N |
| 17-Aug-2011 | 3:00 | 2 | N |
| 17-Aug-2011 | 4:00 | 2.1 | NNE |
| 17-Aug-2011 | 5:00 | 1.8 | ENE |
| 17-Aug-2011 | 6:00 | 1.5 | ENE |
| 17-Aug-2011 | 7:00 | 1.9 | E |
| 17-Aug-2011 | 8:00 | 2.2 | ENE |
| 17-Aug-2011 | 9:00 | 2.6 | E |
| 17-Aug-2011 | 10:00 | 3 | E |
| 17-Aug-2011 | 11:00 | 2.4 | NE |
| 17-Aug-2011 | 12:00 | 2.5 | ENE |
| 17-Aug-2011 | 13:00 | 2.7 | NE |
| 17-Aug-2011 | 14:00 | 2.8 | SE |
| 17-Aug-2011 | 15:00 | 2.9 | SSE |
| 17-Aug-2011 | 16:00 | 3.1 | E |
| 17-Aug-2011 | 17:00 | 2.7 | NE |
| 17-Aug-2011 | 18:00 | 2.4 | N |
| 17-Aug-2011 | 19:00 | 2.1 | NE |
| 17-Aug-2011 | 20:00 | 2.1 | NNE |
| 17-Aug-2011 | 21:00 | 1.9 | N |
| 17-Aug-2011 | 22:00 | 1.9 | NNE |
| 17-Aug-2011 | 23:00 | 1.7 | N |
| 18-Aug-2011 | 0:00 | 1.5 | NE |
| 18-Aug-2011 | 1:00 | 1.5 | NE |
| 18-Aug-2011 | 2:00 | 1.7 | NE |
| 18-Aug-2011 | 3:00 | 1.8 | SE |
| 18-Aug-2011 | 4:00 | 2.1 | SE |
| 18-Aug-2011 | 5:00 | 2 | E |
| 18-Aug-2011 | 6:00 | 2.1 | ESE |
| 18-Aug-2011 | 7:00 | 1.8 | NE |
| 18-Aug-2011 | 8:00 | 2.2 | NNE |
| 18-Aug-2011 | 9:00 | 1.9 | NE |
| 18-Aug-2011 | 10:00 | 2.2 | NE |
| 18-Aug-2011 | 11:00 | 2.6 | N |
| 18-Aug-2011 | 12:00 | 2.6 | ENE |
| 18-Aug-2011 | 13:00 | 2.6 | NNE |
| 18-Aug-2011 | 14:00 | 3.1 | ENE |
| 18-Aug-2011 | 15:00 | 3 | ENE |
| 18-Aug-2011 | 16:00 | 2.6 | ENE |
| 18-Aug-2011 | 17:00 | 2 | ENE |
| 18-Aug-2011 | 18:00 | 1.5 | ENE |
| 18-Aug-2011 | 19:00 | 1.3 | ENE |
| 18-Aug-2011 | 20:00 | 1.1 | E |
| 18-Aug-2011 | 21:00 | 1.1 | ENE |
| 18-Aug-2011 | 22:00 | 0.9 | NE |
| 18-Aug-2011 | 23:00 | 1.6 | NNE |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 19-Aug-2011 | 0:00 | 1.6 | ENE |
| 19-Aug-2011 | 1:00 | 1.6 | NE |
| 19-Aug-2011 | 2:00 | 1.6 | ENE |
| 19-Aug-2011 | 3:00 | 1.4 | ENE |
| 19-Aug-2011 | 4:00 | 1.7 | NE |
| 19-Aug-2011 | 5:00 | 1.5 | N |
| 19-Aug-2011 | 6:00 | 1.4 | NE |
| 19-Aug-2011 | 7:00 | 1.6 | ENE |
| 19-Aug-2011 | 8:00 | 2.1 | SSE |
| 19-Aug-2011 | 9:00 | 1.8 | NNE |
| 19-Aug-2011 | 10:00 | 2.3 | ENE |
| 19-Aug-2011 | 11:00 | 2.5 | NE |
| 19-Aug-2011 | 12:00 | 2.3 | ENE |
| 19-Aug-2011 | 13:00 | 2.4 | NE |
| 19-Aug-2011 | 14:00 | 2.5 | SSE |
| 19-Aug-2011 | 15:00 | 3 | NNW |
| 19-Aug-2011 | 16:00 | 2.7 | WNW |
| 19-Aug-2011 | 17:00 | 2.5 | WNW |
| 19-Aug-2011 | 18:00 | 1.9 | SE |
| 19-Aug-2011 | 19:00 | 1.6 | SE |
| 19-Aug-2011 | 20:00 | 0.7 | SSE |
| 19-Aug-2011 | 21:00 | 0.8 | SSE |
| 19-Aug-2011 | 22:00 | 1.4 | NNE |
| 19-Aug-2011 | 23:00 | 1.2 | NE |
| 20-Aug-2011 | 0:00 | 1.3 | NE |
| 20-Aug-2011 | 1:00 | 1.1 | NE |
| 20-Aug-2011 | 2:00 | 1.3 | ENE |
| 20-Aug-2011 | 3:00 | 1.1 | NE |
| 20-Aug-2011 | 4:00 | 1.1 | ESE |
| 20-Aug-2011 | 5:00 | 1.2 | NNE |
| 20-Aug-2011 | 6:00 | 1.3 | NNE |
| 20-Aug-2011 | 7:00 | 1.3 | ENE |
| 20-Aug-2011 | 8:00 | 2 | NNE |
| 20-Aug-2011 | 9:00 | 2.1 | NNE |
| 20-Aug-2011 | 10:00 | 2.4 | ESE |
| 20-Aug-2011 | 11:00 | 2.3 | NE |
| 20-Aug-2011 | 12:00 | 2.4 | NE |
| 20-Aug-2011 | 13:00 | 2.1 | NNE |
| 20-Aug-2011 | 14:00 | 2 | NNE |
| 20-Aug-2011 | 15:00 | 1.8 | NNE |
| 20-Aug-2011 | 16:00 | 1.5 | N |
| 20-Aug-2011 | 17:00 | 1.3 | ENE |
| 20-Aug-2011 | 18:00 | 1.2 | NE |
| 20-Aug-2011 | 19:00 | 1.3 | ESE |
| 20-Aug-2011 | 20:00 | 1.3 | ESE |
| 20-Aug-2011 | 21:00 | 1.4 | SSE |
| 20-Aug-2011 | 22:00 | 1.4 | SE |
| 20-Aug-2011 | 23:00 | 1.3 | SSE |
| 21-Aug-2011 | 0:00 | 1.3 | ESE |
| 21-Aug-2011 | 1:00 | 1.3 | ESE |
| 21-Aug-2011 | 2:00 | 1.3 | NNE |
| 21-Aug-2011 | 3:00 | 1.4 | N |
| 21-Aug-2011 | 4:00 | 1.3 | NNE |
| 21-Aug-2011 | 5:00 | 1.5 | NE |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 21-Aug-2011 | 6:00 | 1.7 | WNW |
| 21-Aug-2011 | 7:00 | 1.7 | NNE |
| 21-Aug-2011 | 8:00 | 1.6 | W |
| 21-Aug-2011 | 9:00 | 1.5 | WNW |
| 21-Aug-2011 | 10:00 | 1.9 | N |
| 21-Aug-2011 | 11:00 | 1.9 | ENE |
| 21-Aug-2011 | 12:00 | 2.3 | WNW |
| 21-Aug-2011 | 13:00 | 2.3 | NNE |
| 21-Aug-2011 | 14:00 | 2.4 | ENE |
| 21-Aug-2011 | 15:00 | 2.7 | WNW |
| 21-Aug-2011 | 16:00 | 2.1 | WNW |
| 21-Aug-2011 | 17:00 | 2.1 | WNW |
| 21-Aug-2011 | 18:00 | 1.6 | ENE |
| 21-Aug-2011 | 19:00 | 1.3 | ENE |
| 21-Aug-2011 | 20:00 | 1.1 | NNE |
| 21-Aug-2011 | 21:00 | 1 | NNE |
| 21-Aug-2011 | 22:00 | 1.1 | ENE |
| 21-Aug-2011 | 23:00 | 1.1 | ENE |
| 22-Aug-2011 | 0:00 | 1.1 | ENE |
| 22-Aug-2011 | 1:00 | 1.2 | ENE |
| 22-Aug-2011 | 2:00 | 1.1 | ESE |
| 22-Aug-2011 | 3:00 | 1 | NNE |
| 22-Aug-2011 | 4:00 | 1 | NE |
| 22-Aug-2011 | 5:00 | 1 | ENE |
| 22-Aug-2011 | 6:00 | 0.9 | NNE |
| 22-Aug-2011 | 7:00 | 1 | W |
| 22-Aug-2011 | 8:00 | 1.2 | W |
| 22-Aug-2011 | 9:00 | 1.3 | WNW |
| 22-Aug-2011 | 10:00 | 1.7 | WSW |
| 22-Aug-2011 | 11:00 | 2.1 | SW |
| 22-Aug-2011 | 12:00 | 1.9 | SW |
| 22-Aug-2011 | 13:00 | 2.1 | WSW |
| 22-Aug-2011 | 14:00 | 2 | WSW |
| 22-Aug-2011 | 15:00 | 2.1 | WSW |
| 22-Aug-2011 | 16:00 | 1.8 | SSW |
| 22-Aug-2011 | 17:00 | 1.8 | SSE |
| 22-Aug-2011 | 18:00 | 1.5 | S |
| 22-Aug-2011 | 19:00 | 1.2 | SSW |
| 22-Aug-2011 | 20:00 | 1.3 | E |
| 22-Aug-2011 | 21:00 | 1.5 | W |
| 22-Aug-2011 | 22:00 | 1.4 | SW |
| 22-Aug-2011 | 23:00 | 1.8 | WSW |
| 23-Aug-2011 | 0:00 | 1.8 | SSW |
| 23-Aug-2011 | 1:00 | 1.7 | NE |
| 23-Aug-2011 | 2:00 | 1.5 | ENE |
| 23-Aug-2011 | 3:00 | 1.7 | ENE |
| 23-Aug-2011 | 4:00 | 1.8 | ENE |
| 23-Aug-2011 | 5:00 | 1.9 | ENE |
| 23-Aug-2011 | 6:00 | 2.3 | ESE |
| 23-Aug-2011 | 7:00 | 2.2 | ESE |
| 23-Aug-2011 | 8:00 | 2.4 | NE |
| 23-Aug-2011 | 9:00 | 2.5 | NNE |
| 23-Aug-2011 | 10:00 | 3 | NNE |
| 23-Aug-2011 | 11:00 | 3 | NE |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 23-Aug-2011 | 12:00 | 3.1 | SSE |
| 23-Aug-2011 | 13:00 | 3 | SSE |
| 23-Aug-2011 | 14:00 | 2.9 | NE |
| 23-Aug-2011 | 15:00 | 3 | N |
| 23-Aug-2011 | 16:00 | 2.9 | ENE |
| 23-Aug-2011 | 17:00 | 2.8 | ENE |
| 23-Aug-2011 | 18:00 | 2.5 | NNE |
| 23-Aug-2011 | 19:00 | 1.9 | NE |
| 23-Aug-2011 | 20:00 | 1.9 | ENE |
| 23-Aug-2011 | 21:00 | 1.6 | N |
| 23-Aug-2011 | 22:00 | 1.5 | N |
| 23-Aug-2011 | 23:00 | 1.5 | E |
| 24-Aug-2011 | 0:00 | 1.8 | NE |
| 24-Aug-2011 | 1:00 | 1.8 | NE |
| 24-Aug-2011 | 2:00 | 2.2 | NE |
| 24-Aug-2011 | 3:00 | 2.2 | ENE |
| 24-Aug-2011 | 4:00 | 2.1 | ENE |
| 24-Aug-2011 | 5:00 | 2.3 | NE |
| 24-Aug-2011 | 6:00 | 1.9 | NE |
| 24-Aug-2011 | 7:00 | 1.7 | NE |
| 24-Aug-2011 | 8:00 | 2 | NE |
| 24-Aug-2011 | 9:00 | 2.3 | NE |
| 24-Aug-2011 | 10:00 | 2.9 | NE |
| 24-Aug-2011 | 11:00 | 2.9 | ESE |
| 24-Aug-2011 | 12:00 | 3.1 | NE |
| 24-Aug-2011 | 13:00 | 3 | ENE |
| 24-Aug-2011 | 14:00 | 3 | NE |
| 24-Aug-2011 | 15:00 | 3 | ENE |
| 24-Aug-2011 | 16:00 | 2.7 | NE |
| 24-Aug-2011 | 17:00 | 2.6 | NE |
| 24-Aug-2011 | 18:00 | 2.2 | NE |
| 24-Aug-2011 | 19:00 | 2.3 | NE |
| 24-Aug-2011 | 20:00 | 1.8 | ENE |
| 24-Aug-2011 | 21:00 | 1.4 | NE |
| 24-Aug-2011 | 22:00 | 1.6 | ENE |
| 24-Aug-2011 | 23:00 | 1.5 | NE |
| 25-Aug-2011 | 0:00 | 1.4 | ENE |
| 25-Aug-2011 | 1:00 | 1.9 | N |
| 25-Aug-2011 | 2:00 | 1.8 | NE |
| 25-Aug-2011 | 3:00 | 1.5 | E |
| 25-Aug-2011 | 4:00 | 1.7 | NE |
| 25-Aug-2011 | 5:00 | 1.6 | SSE |
| 25-Aug-2011 | 6:00 | 1.8 | E |
| 25-Aug-2011 | 7:00 | 1.4 | SE |
| 25-Aug-2011 | 8:00 | 2.1 | NW |
| 25-Aug-2011 | 9:00 | 2.6 | NE |
| 25-Aug-2011 | 10:00 | 2.2 | NE |
| 25-Aug-2011 | 11:00 | 3 | ENE |
| 25-Aug-2011 | 12:00 | 2.5 | NE |
| 25-Aug-2011 | 13:00 | 2.6 | NE |
| 25-Aug-2011 | 14:00 | 2.1 | NE |
| 25-Aug-2011 | 15:00 | 2.4 | NE |
| 25-Aug-2011 | 16:00 | 2.7 | NE |
| 25-Aug-2011 | 17:00 | 2.4 | NE |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 25-Aug-2011 | 18:00 | 1.6 | SSE |
| 25-Aug-2011 | 19:00 | 2.1 | ESE |
| 25-Aug-2011 | 20:00 | 2.1 | NE |
| 25-Aug-2011 | 21:00 | 2 | NNE |
| 25-Aug-2011 | 22:00 | 2.2 | NE |
| 25-Aug-2011 | 23:00 | 2.6 | SW |
| 26-Aug-2011 | 0:00 | 2.1 | SW |
| 26-Aug-2011 | 1:00 | 2.1 | WNW |
| 26-Aug-2011 | 2:00 | 2.1 | WNW |
| 26-Aug-2011 | 3:00 | 2.1 | SSW |
| 26-Aug-2011 | 4:00 | 2 | SSW |
| 26-Aug-2011 | 5:00 | 2.1 | W |
| 26-Aug-2011 | 6:00 | 1.6 | WNW |
| 26-Aug-2011 | 7:00 | 2.1 | WNW |
| 26-Aug-2011 | 8:00 | 1.7 | NE |
| 26-Aug-2011 | 9:00 | 2.4 | NE |
| 26-Aug-2011 | 10:00 | 2.2 | E |
| 26-Aug-2011 | 11:00 | 2.9 | ENE |
| 26-Aug-2011 | 12:00 | 3 | NNE |
| 26-Aug-2011 | 13:00 | 3.2 | NE |
| 26-Aug-2011 | 14:00 | 2.8 | ENE |
| 26-Aug-2011 | 15:00 | 2.8 | ENE |
| 26-Aug-2011 | 16:00 | 2.6 | N |
| 26-Aug-2011 | 17:00 | 2.5 | NE |
| 26-Aug-2011 | 18:00 | 2.1 | NE |
| 26-Aug-2011 | 19:00 | 1.9 | SSE |
| 26-Aug-2011 | 20:00 | 1.8 | SSE |
| 26-Aug-2011 | 21:00 | 2.1 | SSE |
| 26-Aug-2011 | 22:00 | 2 | SSE |
| 26-Aug-2011 | 23:00 | 2.2 | NE |
| 27-Aug-2011 | 0:00 | 2.3 | NE |
| 27-Aug-2011 | 1:00 | 2.1 | NE |
| 27-Aug-2011 | 2:00 | 2.1 | NE |
| 27-Aug-2011 | 3:00 | 2.3 | NE |
| 27-Aug-2011 | 4:00 | 2.1 | NE |
| 27-Aug-2011 | 5:00 | 2.3 | ENE |
| 27-Aug-2011 | 6:00 | 1.9 | NNE |
| 27-Aug-2011 | 7:00 | 2.6 | NNE |
| 27-Aug-2011 | 8:00 | 2.6 | N |
| 27-Aug-2011 | 9:00 | 2.5 | NNE |
| 27-Aug-2011 | 10:00 | 2.6 | ENE |
| 27-Aug-2011 | 11:00 | 3 | NE |
| 27-Aug-2011 | 12:00 | 3.4 | SE |
| 27-Aug-2011 | 13:00 | 3.2 | SE |
| 27-Aug-2011 | 14:00 | 3 | ESE |
| 27-Aug-2011 | 15:00 | 3 | SSE |
| 27-Aug-2011 | 16:00 | 2.8 | ENE |
| 27-Aug-2011 | 17:00 | 2.4 | ENE |
| 27-Aug-2011 | 18:00 | 2.1 | NE |
| 27-Aug-2011 | 19:00 | 2 | ESE |
| 27-Aug-2011 | 20:00 | 2.3 | E |
| 27-Aug-2011 | 21:00 | 2.2 | ENE |
| 27-Aug-2011 | 22:00 | 2.1 | ENE |
| 27-Aug-2011 | 23:00 | 1.8 | ENE |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 28-Aug-2011 | 0:00 | 1.9 | NNE |
| 28-Aug-2011 | 1:00 | 1.8 | ENE |
| 28-Aug-2011 | 2:00 | 1.9 | ENE |
| 28-Aug-2011 | 3:00 | 1.8 | ENE |
| 28-Aug-2011 | 4:00 | 1.8 | ENE |
| 28-Aug-2011 | 5:00 | 1.7 | NNE |
| 28-Aug-2011 | 6:00 | 1.5 | WSW |
| 28-Aug-2011 | 7:00 | 1.9 | W |
| 28-Aug-2011 | 8:00 | 2 | SW |
| 28-Aug-2011 | 9:00 | 2.2 | SSW |
| 28-Aug-2011 | 10:00 | 2.3 | W |
| 28-Aug-2011 | 11:00 | 2.6 | W |
| 28-Aug-2011 | 12:00 | 2.6 | WNW |
| 28-Aug-2011 | 13:00 | 2.4 | WNW |
| 28-Aug-2011 | 14:00 | 2.4 | WSW |
| 28-Aug-2011 | 15:00 | 2.8 | SW |
| 28-Aug-2011 | 16:00 | 2.6 | SSW |
| 28-Aug-2011 | 17:00 | 2.4 | SSW |
| 28-Aug-2011 | 18:00 | 2.1 | SSW |
| 28-Aug-2011 | 19:00 | 1.8 | WNW |
| 28-Aug-2011 | 20:00 | 1.5 | WNW |
| 28-Aug-2011 | 21:00 | 1.8 | WSW |
| 28-Aug-2011 | 22:00 | 1.4 | WNW |
| 28-Aug-2011 | 23:00 | 1.8 | WSW |
| 29-Aug-2011 | 0:00 | 1.9 | SW |
| 29-Aug-2011 | 1:00 | 2 | SW |
| 29-Aug-2011 | 2:00 | 2 | W |
| 29-Aug-2011 | 3:00 | 2.1 | W |
| 29-Aug-2011 | 4:00 | 1.8 | WNW |
| 29-Aug-2011 | 5:00 | 1.8 | WNW |
| 29-Aug-2011 | 6:00 | 1.8 | W |
| 29-Aug-2011 | 7:00 | 1.6 | W |
| 29-Aug-2011 | 8:00 | 1.5 | SSW |
| 29-Aug-2011 | 9:00 | 1.8 | SSW |
| 29-Aug-2011 | 10:00 | 2.2 | WSW |
| 29-Aug-2011 | 11:00 | 2.6 | W |
| 29-Aug-2011 | 12:00 | 2.6 | W |
| 29-Aug-2011 | 13:00 | 2.7 | WNW |
| 29-Aug-2011 | 14:00 | 2.6 | WNW |
| 29-Aug-2011 | 15:00 | 2.7 | WNW |
| 29-Aug-2011 | 16:00 | 2.7 | WNW |
| 29-Aug-2011 | 17:00 | 2.7 | WNW |
| 29-Aug-2011 | 18:00 | 2.2 | WSW |
| 29-Aug-2011 | 19:00 | 1.9 | WNW |
| 29-Aug-2011 | 20:00 | 1.6 | WNW |
| 29-Aug-2011 | 21:00 | 1.6 | WSW |
| 29-Aug-2011 | 22:00 | 1.6 | SSW |
| 29-Aug-2011 | 23:00 | 1.7 | WSW |
| 30-Aug-2011 | 0:00 | 1.4 | SW |
| 30-Aug-2011 | 1:00 | 1.7 | WSW |
| 30-Aug-2011 | 2:00 | 1.7 | WSW |
| 30-Aug-2011 | 3:00 | 1.8 | WSW |
| 30-Aug-2011 | 4:00 | 1.6 | SW |
| 30-Aug-2011 | 5:00 | 1.6 | SW |

Appendix C - Wind Data (Western Portal)

| Date | Time | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 30-Aug-2011 | 6:00 | 1.3 | SSW |
| 30-Aug-2011 | 7:00 | 1.3 | SW |
| 30-Aug-2011 | 8:00 | 1.5 | SW |
| 30-Aug-2011 | 9:00 | 1.7 | WSW |
| 30-Aug-2011 | 10:00 | 1.9 | WNW |
| 30-Aug-2011 | 11:00 | 2.2 | WNW |
| 30-Aug-2011 | 12:00 | 2.5 | WSW |
| 30-Aug-2011 | 13:00 | 2.5 | WNW |
| 30-Aug-2011 | 14:00 | 2.5 | WNW |
| 30-Aug-2011 | 15:00 | 2.7 | WSW |
| 30-Aug-2011 | 16:00 | 2.4 | WNW |
| 30-Aug-2011 | 17:00 | 2.1 | NNE |
| 30-Aug-2011 | 18:00 | 2.1 | N |
| 30-Aug-2011 | 19:00 | 1.6 | SSW |
| 30-Aug-2011 | 20:00 | 1.5 | SW |
| 30-Aug-2011 | 21:00 | 1.4 | WSW |
| 30-Aug-2011 | 22:00 | 1.5 | S |
| 30-Aug-2011 | 23:00 | 1.2 | WSW |
| 31-Aug-2011 | 0:00 | 2.1 | S |
| 31-Aug-2011 | 1:00 | 1.9 | WSW |
| 31-Aug-2011 | 2:00 | 1.9 | WSW |
| 31-Aug-2011 | 3:00 | 2.1 | SW |
| 31-Aug-2011 | 4:00 | 2.2 | SSW |
| 31-Aug-2011 | 5:00 | 2.3 | WSW |
| 31-Aug-2011 | 6:00 | 2.1 | WSW |
| 31-Aug-2011 | 7:00 | 2.1 | WSW |
| 31-Aug-2011 | 8:00 | 2.2 | WSW |
| 31-Aug-2011 | 9:00 | 2.9 | SSW |
| 31-Aug-2011 | 10:00 | 3 | SSW |
| 31-Aug-2011 | 11:00 | 2.8 | WSW |
| 31-Aug-2011 | 12:00 | 2.8 | WSW |
| 31-Aug-2011 | 13:00 | 2.2 | SSW |
| 31-Aug-2011 | 14:00 | 2.4 | SSW |
| 31-Aug-2011 | 15:00 | 2.3 | SW |
| 31-Aug-2011 | 16:00 | 2.2 | WSW |
| 31-Aug-2011 | 17:00 | 1.7 | W |
| 31-Aug-2011 | 18:00 | 1.7 | WSW |
| 31-Aug-2011 | 19:00 | 1.8 | WSW |
| 31-Aug-2011 | 20:00 | 1.7 | S |
| 31-Aug-2011 | 21:00 | 1.7 | SSW |
| 31-Aug-2011 | 22:00 | 1.2 | WSW |
| 31-Aug-2011 | 23:00 | 0.9 | SW |

**APPENDIX D
ENVIRONMENTAL MONITORING
SCHEDULES**

**Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Impact Air and Noise Monitoring Schedule for August 2011 (Eastern Portal)**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------|------------|
| | 1-Aug | 2-Aug | 3-Aug | 4-Aug | 5-Aug | 6-Aug |
| | | Noise Daytime (07:00-19:00) | | 1 hr TSP X 3 24 hrs TSP | | |
| 7-Aug | 8-Aug | 9-Aug | 10-Aug | 11-Aug | 12-Aug | 13-Aug |
| | | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 24 hrs TSP | | | |
| 14-Aug | 15-Aug | 16-Aug | 17-Aug | 18-Aug | 19-Aug | 20-Aug |
| | | 1 hr TSP X 3 24 hrs TSP | | Noise Daytime (07:00-19:00) | | |
| 21-Aug | 22-Aug | 23-Aug | 24-Aug | 25-Aug | 26-Aug | 27-Aug |
| | 1 hr TSP X 3 24 hrs TSP | Noise Daytime (07:00-19:00) | | | 1 hr TSP X 3 | |
| 28-Aug | 29-Aug | 30-Aug | 31-Aug | | | 24 hrs TSP |
| | | Noise Daytime (07:00-19:00) | | | | |

Air Quality Monitoring Station

AQ1 - True Light Middle School of HK

Noise Monitoring Station

NC1 - True Light Middle School of HK
NC2 - The Legend

**Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Impact Air and Noise Monitoring Schedule for August 2011 (Western Portal)**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------|------------|
| | 1-Aug | 2-Aug | 3-Aug | 4-Aug | 5-Aug | 6-Aug |
| | | Noise Daytime (07:00-19:00) | | 1 hr TSP X 3 24 hrs TSP | | |
| 7-Aug | 8-Aug | 9-Aug | 10-Aug | 11-Aug | 12-Aug | 13-Aug |
| | | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 24 hrs TSP | | | |
| 14-Aug | 15-Aug | 16-Aug | 17-Aug | 18-Aug | 19-Aug | 20-Aug |
| | | 1 hr TSP X 3 24 hrs TSP | | Noise Daytime (07:00-19:00) | | |
| 21-Aug | 22-Aug | 23-Aug | 24-Aug | 25-Aug | 26-Aug | 27-Aug |
| | 1 hr TSP X 3 24 hrs TSP | Noise Daytime (07:00-19:00) | | | 1 hr TSP X 3 | |
| 28-Aug | 29-Aug | 30-Aug | 31-Aug | | | 24 hrs TSP |
| | | Noise Daytime (07:00-19:00) | | | | |

Air Quality Monitoring Station

AQ2 - Outside Aegean Terrace (1 hour TSP)
AQ3 - Outside Site Office at Western Portal (24 hours TSP)

Noise Monitoring Station

NC3 - Outside Aegean Terrace

**Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Impact Noise Monitoring Schedule for August 2011 (Intake BR6, DG1, E5A, E7, MA14, PFLR1, PR1, THR2, W0, W5, W8 and P5)**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|--------------------------------|-----------|--------------------------------|--------|----------|
| | 1-Aug | 2-Aug | 3-Aug | 4-Aug | 5-Aug | 6-Aug |
| | | Noise Daytime (07:00-19:00) | | | | |
| 7-Aug | 8-Aug | 9-Aug | 10-Aug | 11-Aug | 12-Aug | 13-Aug |
| | | Noise Daytime (07:00-19:00) | | | | |
| 14-Aug | 15-Aug | 16-Aug | 17-Aug | 18-Aug | 19-Aug | 20-Aug |
| | | | | Noise Daytime (07:00-19:00) | | |
| 21-Aug | 22-Aug | 23-Aug | 24-Aug | 25-Aug | 26-Aug | 27-Aug |
| | | Noise Daytime (07:00-19:00) | | | | |
| 28-Aug | 29-Aug | 30-Aug | 31-Aug | | | |
| | | Noise Daytime (07:00-19:00) | | | | |

Noise Monitoring Station

Intake BR6 - Man Yuen Garden (NC4)
 Intake DG 1 - Blk D Villa Monte Rosa (NC5) and Rosaryhill School (NC6)
 Intake E5A - Buddhist Li Ka Shing Care & Attention Home for the Elderly (NC7)
 Intake E7 - Marymount Secondary School (NC8) and 117 Blue Pool Road (NC9)
 Intake MA14 - The Harbour View (NC10)
 Intake PFLR1 - Honey Court (NC11)
 Intake RR1 - Ying Wa Girl's School (NC12) and Peaksville Court (NC13)
 Intake THR2 - Hong Kong Japanese School (NC14)
 Intake W0 - Hong Kong Academy (NC15)
 Intake W5 - Raimondi College (NC16)
 Intake W8 - Hong Kong Institute of Technology (NC17) and Blk A, 80 Robinson Road (NC18)
 Intake P5 - Villa Veneto (NC19)

**Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Impact Ground Borne Constructon Noise Schedule for August 2011**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---------------|--------|--------------------------------|-----------|--------------------------------|--------|----------|
| | 1-Aug | 2-Aug | 3-Aug | 4-Aug | 5-Aug | 6-Aug |
| | | Noise Daytime (07:00-19:00) | | | | |
| 7-Aug | 8-Aug | 9-Aug | 10-Aug | 11-Aug | 12-Aug | 13-Aug |
| | | Noise Daytime (07:00-19:00) | | | | |
| 14-Aug | 15-Aug | 16-Aug | 17-Aug | 18-Aug | 19-Aug | 20-Aug |
| | | | | Noise Daytime (07:00-19:00) | | |
| 21-Aug | 22-Aug | 23-Aug | 24-Aug | 25-Aug | 26-Aug | 27-Aug |
| | | Noise Daytime (07:00-19:00) | | | | |
| 28-Aug | 29-Aug | 30-Aug | 31-Aug | | | |
| | | Noise Daytime (07:00-19:00) | | | | |

Noise Monitoring Station

GNC7 - Hong Villa

**Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Tentative Impact Air and Noise Monitoring Schedule for September 2011 (Eastern Portal)**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------|----------|
| | | | | 1-Sep | 2-Sep | 3-Sep |
| | | | | 1 hr TSP X 3 | | |
| | | | | | 24 hrs TSP | |
| 4-Sep | 5-Sep | 6-Sep | 7-Sep | 8-Sep | 9-Sep | 10-Sep |
| | Noise Daytime (07:00-19:00) | | 1 hr TSP X 3 | | | |
| | | | | 24 hrs TSP | | |
| 11-Sep | 12-Sep | 13-Sep | 14-Sep | 15-Sep | 16-Sep | 17-Sep |
| | 1 hr TSP X 3 | | | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 | |
| | | | 24 hrs TSP | | | |
| 18-Sep | 19-Sep | 20-Sep | 21-Sep | 22-Sep | 23-Sep | 24-Sep |
| | | | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 | | |
| | | 24 hrs TSP | | | | |
| 25-Sep | 26-Sep | 27-Sep | 28-Sep | 29-Sep | 30-Sep | |
| | | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 | | | |
| | 24 hrs TSP | | | | | |

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

Air Quality Monitoring Station

AQ1 - True Light Middle School of HK

Noise Monitoring Station

NC1 - True Light Middle School of HK
NC2 - The Legend

**Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Tentative Impact Air and Noise Monitoring Schedule for September 2011 (Western Portal)**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------|----------|
| | | | | 1-Sep | 2-Sep | 3-Sep |
| | | | | 1 hr TSP X 3 | 24 hrs TSP | |
| 4-Sep | 5-Sep | 6-Sep | 7-Sep | 8-Sep | 9-Sep | 10-Sep |
| | Noise Daytime (07:00-19:00) | | 1 hr TSP X 3 | 24 hrs TSP | | |
| 11-Sep | 12-Sep | 13-Sep | 14-Sep | 15-Sep | 16-Sep | 17-Sep |
| | 1 hr TSP X 3 | | 24 hrs TSP | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 | |
| 18-Sep | 19-Sep | 20-Sep | 21-Sep | 22-Sep | 23-Sep | 24-Sep |
| | | 24 hrs TSP | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 | | |
| 25-Sep | 26-Sep | 27-Sep | 28-Sep | 29-Sep | 30-Sep | |
| | 24 hrs TSP | Noise Daytime (07:00-19:00) | 1 hr TSP X 3 | | | |

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

Air Quality Monitoring Station

AQ2 - Outside Aegean Terrace (1 hour TSP)

AQ3 - Outside Site Office at Western Portal (24 hours TSP)

Noise Monitoring Station

NC3 - Outside Aegean Terrace

Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Tentative Impact Noise Monitoring Schedule for September 2011 (Intake BR6, DG1, E5A, E7, MA14, PFLR1, PR1, THR2, W0, W5, W8 and P5)

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------|----------|
| | | | | 1-Sep | 2-Sep | 3-Sep |
| | | | | | | |
| 4-Sep | 5-Sep | 6-Sep | 7-Sep | 8-Sep | 9-Sep | 10-Sep |
| | Noise Daytime (07:00-19:00) | | | | | |
| 11-Sep | 12-Sep | 13-Sep | 14-Sep | 15-Sep | 16-Sep | 17-Sep |
| | | | | Noise Daytime (07:00-19:00) | | |
| 18-Sep | 19-Sep | 20-Sep | 21-Sep | 22-Sep | 23-Sep | 24-Sep |
| | | | Noise Daytime (07:00-19:00) | | | |
| 25-Sep | 26-Sep | 27-Sep | 28-Sep | 29-Sep | 30-Sep | |
| | | Noise Daytime (07:00-19:00) | | | | |

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

Noise Monitoring Station

- Intake BR6 - Man Yuen Garden (NC4)
- Intake DG 1 - Blk D Villa Monte Rosa (NC5) and Rosaryhill School (NC6)
- Intake E5A - Buddhist Li Ka Shing Care & Attention Home for the Elderly (NC7)
- Intake E7 - Marymount Secondary School (NC8) and 117 Blue Pool Road (NC9)
- Intake MA14 - The Harbour View (NC10)
- Intake PFLR1 - Honey Court (NC11)
- Intake RR1 - Ying Wa Girl's School (NC12) and Peaksville Court (NC13)
- Intake THR2 - Hong Kong Japanese School (NC14)
- Intake W0 - Hong Kong Academy (NC15)
- Intake W5 - Raimondi College (NC16)
- Intake W8 - Hong Kong Institute of Technology (NC17) and Blk A, 80 Robinson Road (NC18)
- Intake P5 - Villa Veneto (NC19)

**Drainage Improvement in Northern Hong Kong Island - Hong Kong West Drainage Tunnel
Tentative Impact Ground Borne Constructon Noise Schedule for September 2011**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------|----------|
| | | | | 1-Sep | 2-Sep | 3-Sep |
| | | | | | | |
| 4-Sep | 5-Sep | 6-Sep | 7-Sep | 8-Sep | 9-Sep | 10-Sep |
| | Noise Daytime (07:00-19:00) | | | | | |
| 11-Sep | 12-Sep | 13-Sep | 14-Sep | 15-Sep | 16-Sep | 17-Sep |
| | | | | Noise Daytime (07:00-19:00) | | |
| 18-Sep | 19-Sep | 20-Sep | 21-Sep | 22-Sep | 23-Sep | 24-Sep |
| | | | Noise Daytime (07:00-19:00) | | | |
| 25-Sep | 26-Sep | 27-Sep | 28-Sep | 29-Sep | 30-Sep | |
| | | Noise Daytime (07:00-19:00) | | | | |

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

Noise Monitoring Station

GNC7 - Hong Villa

**APPENDIX E
1-HOUR TSP MONITORING RESULTS
AND GRAPHICAL PRESENTATION**

Appendix E - 1-hour TSP Monitoring Results

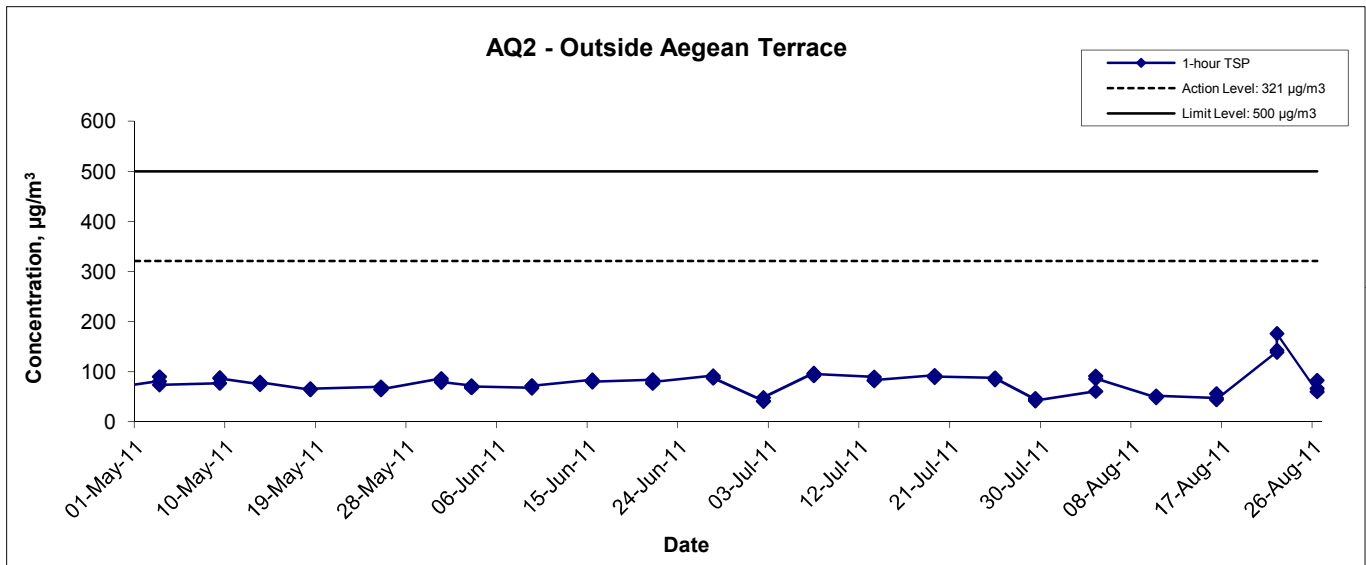
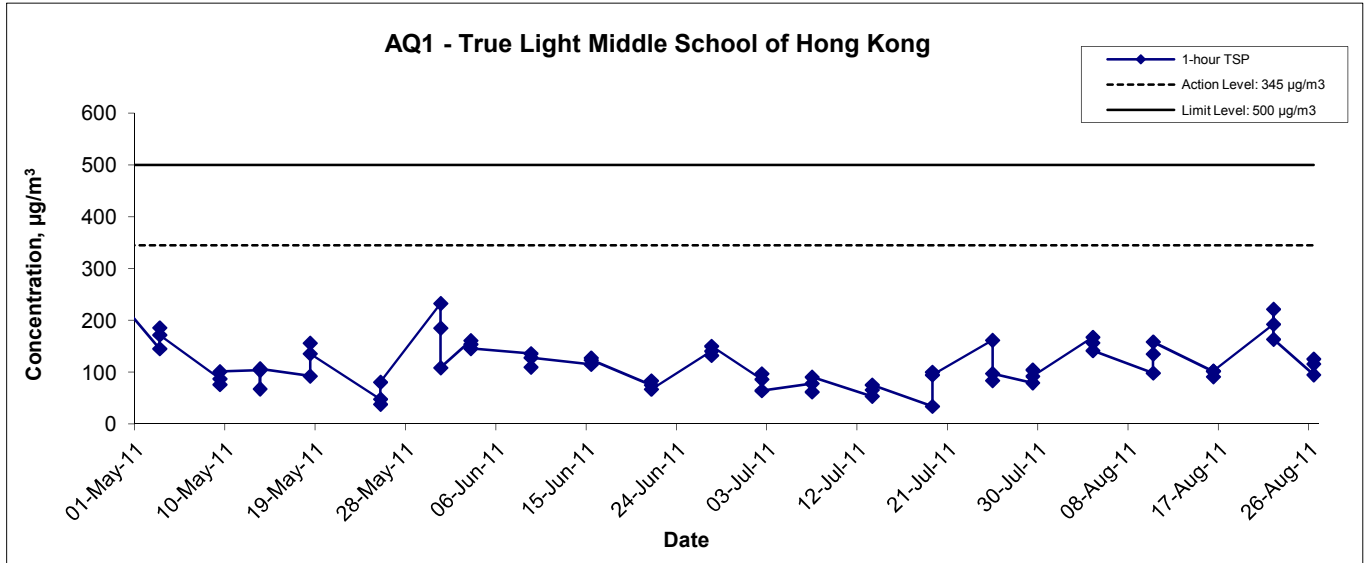
Station AQ1 (True Light Middle School of Hong Kong)

| Date | Sampling Time | Weather Condition | Air Temp. (K) | Atmospheric Pressure (Pa) | Filter Weight (g) | | Particulate weight (g) | Elapse Time | | Sampling Time (hrs.) | Flow Rate (m ³ /min.) | | Av. flow (m ³ /min) | Total vol. (m ³) | Conc. (µg/m ³) |
|-----------|---------------|-------------------|---------------|---------------------------|-------------------|--------|------------------------|-------------|--------|----------------------|----------------------------------|-------|--------------------------------|------------------------------|----------------------------|
| | | | | | Initial | Final | | Initial | Final | | Initial | Final | | | |
| 4-Aug-11 | 9:00 | Sunny | 302.4 | 755.7 | 3.3442 | 3.3564 | 0.0122 | 6743.3 | 6744.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.8 | 167.6 |
| 4-Aug-11 | 10:00 | Sunny | 302.6 | 755.5 | 3.3425 | 3.3539 | 0.0114 | 6744.3 | 6745.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.8 | 156.7 |
| 4-Aug-11 | 11:00 | Sunny | 302.8 | 755.3 | 3.3849 | 3.3952 | 0.0103 | 6745.3 | 6746.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.7 | 141.6 |
| 10-Aug-11 | 9:00 | Cloudy | 298.9 | 757.2 | 3.3798 | 3.3870 | 0.0072 | 6770.3 | 6771.3 | 1.0 | 1.22 | 1.22 | 1.22 | 73.2 | 98.4 |
| 10-Aug-11 | 10:00 | Cloudy | 299.1 | 757.1 | 3.3999 | 3.4098 | 0.0099 | 6771.3 | 6772.3 | 1.0 | 1.22 | 1.22 | 1.22 | 73.2 | 135.3 |
| 10-Aug-11 | 11:00 | Cloudy | 299.3 | 756.9 | 3.3999 | 3.4115 | 0.0116 | 6772.3 | 6773.3 | 1.0 | 1.22 | 1.22 | 1.22 | 73.2 | 158.6 |
| 16-Aug-11 | 9:00 | Sunny | 302.7 | 757.1 | 3.3617 | 3.3691 | 0.0074 | 6797.3 | 6798.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.8 | 101.6 |
| 16-Aug-11 | 13:00 | Cloudy | 306.3 | 754.9 | 3.4003 | 3.4069 | 0.0066 | 6798.3 | 6799.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.4 | 91.2 |
| 16-Aug-11 | 14:06 | Sunny | 306.5 | 754.7 | 3.3442 | 3.3516 | 0.0074 | 6799.3 | 6800.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.3 | 102.3 |
| 22-Aug-11 | 13:00 | Sunny | 303.7 | 757.3 | 3.3504 | 3.3644 | 0.0140 | 6824.3 | 6825.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.7 | 192.5 |
| 22-Aug-11 | 14:00 | Sunny | 303.8 | 757.2 | 3.4224 | 3.4385 | 0.0161 | 6825.3 | 6826.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.7 | 221.4 |
| 22-Aug-11 | 15:00 | Sunny | 303.6 | 757.1 | 3.4212 | 3.4331 | 0.0119 | 6826.3 | 6827.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.7 | 163.6 |
| 26-Aug-11 | 13:00 | Sunny | 305.0 | 753.5 | 3.3936 | 3.4005 | 0.0069 | 6851.3 | 6852.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.5 | 95.1 |
| 26-Aug-11 | 14:03 | Sunny | 305.2 | 753.4 | 3.3765 | 3.3849 | 0.0084 | 6852.3 | 6853.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.5 | 115.9 |
| 26-Aug-11 | 15:05 | Sunny | 305.6 | 753.2 | 3.3965 | 3.4056 | 0.0091 | 6853.3 | 6854.3 | 1.0 | 1.21 | 1.21 | 1.21 | 72.5 | 125.6 |
| | | | | | | | | | | | | | | Min | 91.2 |
| | | | | | | | | | | | | | | Max | 221.4 |
| | | | | | | | | | | | | | | Average | 137.8 |

Appendix E - 1-hour TSP Monitoring Results

| Station AQ2 (Outside Aegean Terrace) | | | |
|--------------------------------------|-------|---------|--|
| Date | Time | Weather | Particulate Concentration ($\mu\text{g}/\text{m}^3$) |
| 4-Aug-11 | 13:00 | Sunny | 60.8 |
| 4-Aug-11 | 14:00 | Sunny | 91.5 |
| 4-Aug-11 | 15:00 | Sunny | 86.1 |
| 10-Aug-11 | 13:00 | Cloudy | 48.4 |
| 10-Aug-11 | 14:00 | Cloudy | 49.6 |
| 10-Aug-11 | 15:00 | Cloudy | 51.9 |
| 16-Aug-11 | 9:00 | Sunny | 47.4 |
| 16-Aug-11 | 10:00 | Sunny | 56.3 |
| 16-Aug-11 | 11:00 | Sunny | 44.2 |
| 22-Aug-11 | 9:00 | Sunny | 139.1 |
| 22-Aug-11 | 10:00 | Sunny | 143.0 |
| 22-Aug-11 | 11:00 | Sunny | 175.9 |
| 26-Aug-11 | 9:00 | Sunny | 60.2 |
| 26-Aug-11 | 10:00 | Sunny | 66.6 |
| 26-Aug-11 | 11:00 | Sunny | 82.6 |
| | | Average | 80.2 |
| | | Maximum | 175.9 |
| | | Minimum | 44.2 |

1-hr TSP Concentration Levels



| | | | |
|--|----------------|-----------------------|--|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of 1-hour TSP Monitoring Results | Scale N.T.S | Project No. MA8001 | |
| | Date Aug 11 | Appendix E | |

**APPENDIX F
24-HOUR TSP MONITORING RESULTS
AND GRAPHICAL PRESENTATION**

Appendix F - 24-hour TSP Monitoring Results

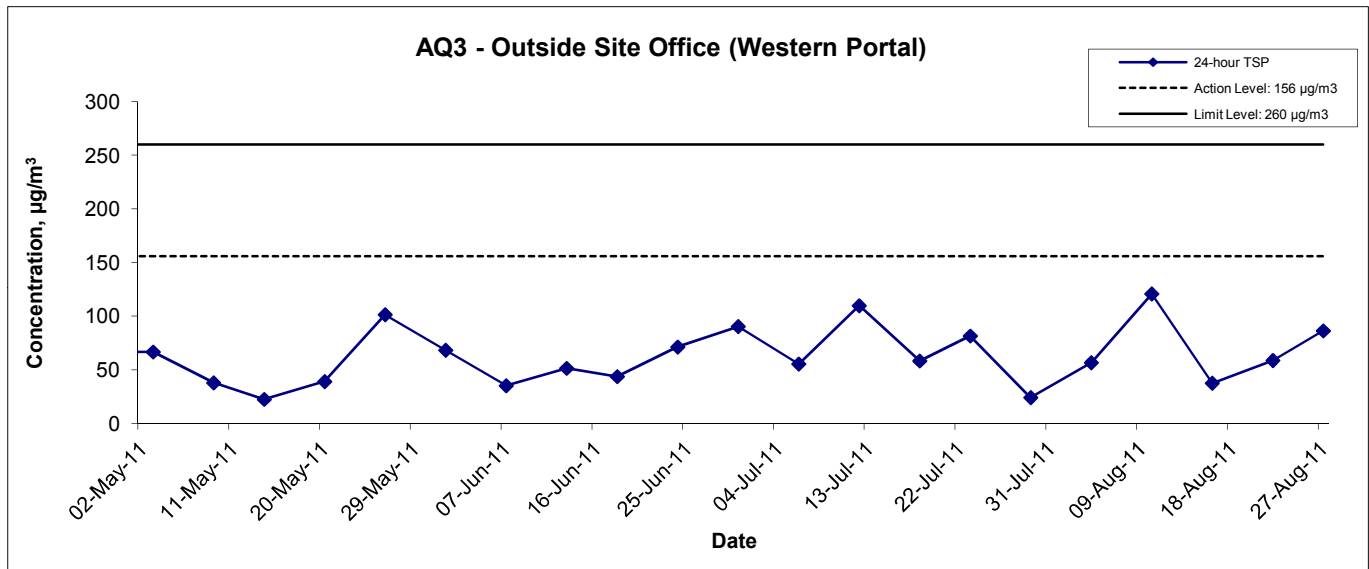
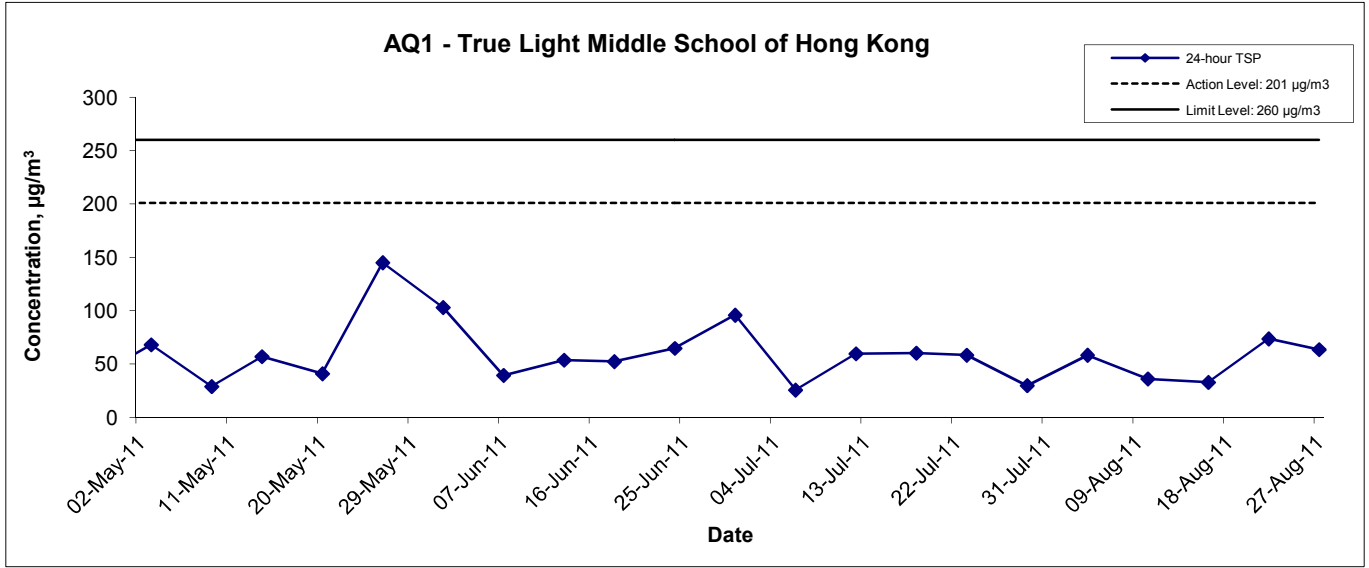
Station AQ1 - True Light Middle School of Hong Kong

| Start Date | Weather Condition | Air Temp. (K) | Atmospheric Pressure (Pa) | Filter Weight (g) | | Particulate weight (g) | Elapse Time | | Sampling Time(hrs.) | Flow Rate (m ³ /min.) | | Av. flow (m ³ /min) | Total vol. (m ³) | Conc. (µg/m ³) |
|------------|-------------------|---------------|---------------------------|-------------------|--------|------------------------|-------------|--------|---------------------|----------------------------------|-------|--------------------------------|------------------------------|----------------------------|
| | | | | Initial | Final | | Initial | Final | | Initial | Final | | | |
| 4-Aug-11 | Sunny | 305.1 | 754.1 | 3.3612 | 3.4623 | 0.1011 | 6746.3 | 6770.3 | 24.0 | 1.21 | 1.21 | 1.21 | 1738.9 | 58.1 |
| 10-Aug-11 | Sunny | 298.1 | 757.5 | 3.3429 | 3.4061 | 0.0632 | 6773.3 | 6797.3 | 24.0 | 1.22 | 1.22 | 1.22 | 1759.2 | 35.9 |
| 16-Aug-11 | Sunny | 306.6 | 754.5 | 3.3252 | 3.3820 | 0.0568 | 6800.3 | 6824.3 | 24.0 | 1.21 | 1.21 | 1.21 | 1735.8 | 32.7 |
| 22-Aug-11 | Sunny | 303.4 | 756.9 | 3.3789 | 3.5073 | 0.1284 | 6827.3 | 6851.3 | 24.0 | 1.21 | 1.21 | 1.21 | 1745.8 | 73.5 |
| 27-Aug-11 | Sunny | 304.7 | 757.3 | 3.3903 | 3.5010 | 0.1107 | 6854.3 | 6878.3 | 24.0 | 1.21 | 1.21 | 1.21 | 1745.4 | 63.4 |
| | | | | | | | | | | | | | Min | 32.7 |
| | | | | | | | | | | | | | Max | 73.5 |
| | | | | | | | | | | | | | Average | 52.8 |

Station AQ3 - Outside Site Office (Western Portal)

| Start Date | Weather Condition | Air Temp. (K) | Atmospheric Pressure (Pa) | Filter Weight (g) | | Particulate weight (g) | Elapse Time | | Sampling Time(hrs.) | Flow Rate (m ³ /min.) | | Av. flow (m ³ /min) | Total vol. (m ³) | Conc. (µg/m ³) |
|------------|-------------------|---------------|---------------------------|-------------------|--------|------------------------|-------------|---------|---------------------|----------------------------------|-------|--------------------------------|------------------------------|----------------------------|
| | | | | Initial | Final | | Initial | Final | | Initial | Final | | | |
| 4-Aug-11 | Sunny | 302.4 | 755.7 | 3.3467 | 3.4456 | 0.0989 | 10571.1 | 10595.1 | 24.0 | 1.21 | 1.21 | 1.21 | 1746.3 | 56.6 |
| 10-Aug-11 | Sunny | 298.9 | 757.2 | 3.3802 | 3.5923 | 0.2121 | 10595.1 | 10619.1 | 24.0 | 1.22 | 1.22 | 1.22 | 1756.2 | 120.8 |
| 16-Aug-11 | Sunny | 302.7 | 757.1 | 3.3283 | 3.3939 | 0.0656 | 10619.1 | 10643.1 | 24.0 | 1.21 | 1.21 | 1.21 | 1746.8 | 37.6 |
| 22-Aug-11 | Sunny | 302.9 | 757.2 | 3.3839 | 3.4864 | 0.1025 | 10643.1 | 10667.1 | 24.0 | 1.21 | 1.21 | 1.21 | 1746.5 | 58.7 |
| 27-Aug-11 | Sunny | 304.7 | 757.3 | 3.4179 | 3.5686 | 0.1507 | 10667.1 | 10691.1 | 24.0 | 1.21 | 1.21 | 1.21 | 1745.9 | 86.3 |
| | | | | | | | | | | | | | Min | 37.6 |
| | | | | | | | | | | | | | Max | 120.8 |
| | | | | | | | | | | | | | Average | 72.0 |

24-hr TSP Concentration Levels



| | | | |
|---|----------------|-----------------------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of 24-hour TSP Monitoring Results | Scale N.T.S | Project No. MA8001 | CINOTECH |
| | Date Aug 11 | Appendix F | |

**APPENDIX G
NOISE MONITORING RESULTS AND
GRAPHICAL PRESENTATION**

Appendix G - Noise Monitoring Results

| Location NC1 - True Light Middle School of Hong Kong | | | | | | | | |
|--|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 17:00 | Sunny | 71.8 | 75.5 | 62.4 | 70.0 | 69.7 | 67.6 |
| 9-Aug-11 | 15:30 | Cloudy | 69.3 | 71.6 | 65.8 | 70.0 | N/A | N/A |
| 18-Aug-11 | 16:55 | Sunny | 66.8 | 69.3 | 64.0 | 70.0 | N/A | N/A |
| 23-Aug-11 | 16:45 | Sunny | 69.8 | 72.7 | 63.1 | 70.0 | N/A | N/A |
| 30-Aug-11 | 16:45 | Sunny | 62.7 | 65.2 | 58.7 | 70.0 | N/A | N/A |

| Location NC2 - The Legend | | | | | | | | |
|---------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 13:00 | Sunny | 72.0 | 74.8 | 61.6 | 75.0 | N/A | N/A |
| 9-Aug-11 | 16:15 | Cloudy | 71.5 | 73.8 | 68.1 | | N/A | N/A |
| 18-Aug-11 | 16:10 | Sunny | 68.3 | 69.9 | 66.0 | | N/A | N/A |
| 23-Aug-11 | 13:00 | Sunny | 64.0 | 65.8 | 61.8 | | N/A | N/A |
| 30-Aug-11 | 16:00 | Sunny | 60.2 | 62.1 | 57.7 | | N/A | N/A |

| Location NC3 - Outside Aegean Terrace | | | | | | | | |
|---------------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 08:00 | Sunny | 52.7 | 54.6 | 48.4 | 75.0 | N/A | N/A |
| 9-Aug-11 | 08:00 | Sunny | 52.3 | 54.6 | 48.7 | | N/A | N/A |
| 18-Aug-11 | 08:00 | Sunny | 51.7 | 53.8 | 46.7 | | N/A | N/A |
| 23-Aug-11 | 08:00 | Sunny | 51.3 | 53.8 | 47.8 | | N/A | N/A |
| 30-Aug-11 | 08:00 | Sunny | 69.3 | 72.1 | 66.3 | | N/A | N/A |

| Location NC4 - Man Yuen Garden | | | | | | | | |
|--------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 13:00 | Sunny | 70.2 | 73.4 | 68.2 | 75.0 | N/A | N/A |
| 9-Aug-11 | 13:00 | Sunny | 70.2 | 73.9 | 67.3 | | N/A | N/A |
| 18-Aug-11 | 13:00 | Sunny | 71.4 | 74.6 | 67.5 | | N/A | N/A |
| 23-Aug-11 | 13:00 | Sunny | 72.3 | 74.1 | 67.8 | | N/A | N/A |
| 30-Aug-11 | 13:00 | Sunny | 67.4 | 69.3 | 65.8 | | N/A | N/A |

| Location NC5 - Bik D Villa Monte Rosa | | | | | | | | |
|---------------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 09:30 | Sunny | 66.9 | 69.8 | 63.2 | 75.0 | N/A | N/A |
| 9-Aug-11 | 09:40 | Sunny | 65.7 | 68.2 | 62.4 | | N/A | N/A |
| 18-Aug-11 | 09:40 | Sunny | 67.1 | 69.2 | 60.5 | | N/A | N/A |
| 23-Aug-11 | 09:40 | Sunny | 67.6 | 69.2 | 60.5 | | N/A | N/A |
| 30-Aug-11 | 09:40 | Sunny | 62.5 | 64.3 | 59.8 | | N/A | N/A |

| Location NC6 - Rosaryhill School | | | | | | | | |
|----------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 10:05 | Sunny | 67.2 | 70.1 | 64.5 | 70.0 | N/A | N/A |
| 9-Aug-11 | 10:15 | Sunny | 65.2 | 67.9 | 61.3 | 70.0 | N/A | N/A |
| 18-Aug-11 | 10:15 | Sunny | 64.2 | 66.5 | 60.1 | 70.0 | N/A | N/A |
| 23-Aug-11 | 10:15 | Sunny | 64.2 | 67.8 | 60.9 | 70.0 | N/A | N/A |
| 30-Aug-11 | 10:15 | Sunny | 62.8 | 64.5 | 59.6 | 70.0 | N/A | N/A |

| Location NC7 - Buddhist Li Ka Shing Care & Attention Home for the Elderly | | | | | | | | |
|---|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 16:15 | Sunny | 74.2 | 78.0 | 70.6 | 75.0 | N/A | N/A |
| 9-Aug-11 | 15:15 | Cloudy | 74.6 | 78.1 | 71.5 | | N/A | N/A |
| 18-Aug-11 | 15:25 | Sunny | 74.4 | 76.3 | 71.1 | | N/A | N/A |
| 23-Aug-11 | 16:00 | Sunny | 74.7 | 77.5 | 69.8 | | N/A | N/A |
| 30-Aug-11 | 08:45 | Sunny | 73.4 | 76.9 | 70.3 | | N/A | N/A |

Appendix G - Noise Monitoring Results

| Location NC8 - Marymount Secondary School | | | | | | | | |
|---|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 15:30 | Sunny | 69.7 | 71.0 | 67.0 | 70.0 | N/A | N/A |
| 9-Aug-11 | 14:10 | Sunny | 69.0 | 72.1 | 62.1 | 70.0 | N/A | N/A |
| 18-Aug-11 | 14:30 | Sunny | 68.8 | 70.3 | 64.1 | 70.0 | N/A | N/A |
| 23-Aug-11 | 15:15 | Sunny | 69.3 | 72.5 | 66.4 | 70.0 | N/A | N/A |
| 30-Aug-11 | 09:30 | Sunny | 68.3 | 70.8 | 66.0 | 70.0 | N/A | N/A |

| Location NC9 - 117 Blue Pool Road | | | | | | | | |
|-----------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 14:45 | Sunny | 68.6 | 71.1 | 64.5 | 75.0 | N/A | N/A |
| 9-Aug-11 | 14:45 | Sunny | 71.7 | 73.3 | 66.2 | | N/A | N/A |
| 18-Aug-11 | 13:50 | Sunny | 70.6 | 72.7 | 68.3 | | N/A | N/A |
| 23-Aug-11 | 14:30 | Sunny | 69.2 | 71.3 | 62.2 | | N/A | N/A |
| 30-Aug-11 | 13:00 | Sunny | 70.2 | 73.5 | 68.1 | | N/A | N/A |

| Location NC10 - The Harbour View | | | | | | | | |
|----------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 10:50 | Sunny | 72.3 | 75.4 | 69.2 | 75.0 | N/A | N/A |
| 9-Aug-11 | 11:20 | Sunny | 70.5 | 74.3 | 65.4 | | N/A | N/A |
| 18-Aug-11 | 11:20 | Sunny | 71.2 | 74.3 | 65.3 | | N/A | N/A |
| 23-Aug-11 | 11:20 | Sunny | 72.1 | 74.8 | 66.7 | | N/A | N/A |
| 30-Aug-11 | 11:20 | Sunny | 71.2 | 74.3 | 68.9 | | N/A | N/A |

| Location NC11 - Honey Court | | | | | | | | |
|-----------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 08:50 | Sunny | 67.2 | 69.3 | 61.4 | 75.0 | N/A | N/A |
| 9-Aug-11 | 08:00 | Sunny | 65.2 | 68.7 | 64.6 | | N/A | N/A |
| 18-Aug-11 | 08:50 | Sunny | 66.2 | 67.5 | 61.7 | | N/A | N/A |
| 23-Aug-11 | 08:50 | Sunny | 67.2 | 68.9 | 62.8 | | N/A | N/A |
| 30-Aug-11 | 08:50 | Sunny | 66.9 | 68.8 | 63.2 | | N/A | N/A |

| Location NC12 - Ying Wa Girl's School | | | | | | | | |
|---------------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 13:50 | Sunny | 68.2 | 71.2 | 64.8 | 70.0 | N/A | N/A |
| 9-Aug-11 | 13:50 | Sunny | 66.7 | 69.2 | 63.1 | 70.0 | N/A | N/A |
| 18-Aug-11 | 13:50 | Sunny | 68.1 | 70.2 | 63.8 | 70.0 | N/A | N/A |
| 23-Aug-11 | 13:50 | Sunny | 67.5 | 70.3 | 64.9 | 70.0 | N/A | N/A |
| 30-Aug-11 | 13:50 | Sunny | 65.8 | 67.9 | 63.1 | 70.0 | N/A | N/A |

| Location NC13 - Peakville Court | | | | | | | | |
|---------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 14:30 | Sunny | 64.2 | 67.8 | 60.6 | 75.0 | N/A | N/A |
| 9-Aug-11 | 14:30 | Sunny | 64.9 | 70.1 | 64.2 | | N/A | N/A |
| 18-Aug-11 | 14:30 | Sunny | 63.7 | 65.1 | 58.9 | | N/A | N/A |
| 23-Aug-11 | 14:30 | Sunny | 64.8 | 65.9 | 59.3 | | N/A | N/A |
| 30-Aug-11 | 14:30 | Sunny | 64.1 | 66.5 | 62.0 | | N/A | N/A |

Appendix G - Noise Monitoring Results

| Location NC14 - Hong Kong Japanese School | | | | | | | | |
|---|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 14:00 | Sunny | 67.2 | 68.6 | 65.2 | 70.0 | N/A | N/A |
| 9-Aug-11 | 13:30 | Sunny | 65.5 | 66.5 | 63.0 | 70.0 | N/A | N/A |
| 18-Aug-11 | 13:00 | Sunny | 64.9 | 67.2 | 61.5 | 70.0 | N/A | N/A |
| 23-Aug-11 | 13:45 | Sunny | 69.2 | 75.3 | 67.7 | 70.0 | N/A | N/A |
| 30-Aug-11 | 13:50 | Sunny | 64.1 | 66.7 | 62.5 | 70.0 | N/A | N/A |

| Location NC15 - Hong Kong Academy | | | | | | | | |
|-----------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 18:00 | Sunny | 66.7 | 69.2 | 64.8 | 70.0 | N/A | N/A |
| 9-Aug-11 | 17:50 | Sunny | 66.9 | 68.2 | 64.3 | 70.0 | N/A | N/A |
| 18-Aug-11 | 17:35 | Sunny | 67.8 | 68.1 | 62.3 | 70.0 | N/A | N/A |
| 23-Aug-11 | 15:35 | Sunny | 68.7 | 70.5 | 62.8 | 70.0 | N/A | N/A |
| 30-Aug-11 | 17:35 | Sunny | 65.7 | 67.1 | 61.4 | 70.0 | N/A | N/A |

| Location NC16 - Raimondi College | | | | | | | | |
|----------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 15:20 | Sunny | 67.2 | 68.9 | 57.4 | 70.0 | N/A | N/A |
| 9-Aug-11 | 15:20 | Sunny | 64.2 | 67.3 | 60.9 | 70.0 | N/A | N/A |
| 18-Aug-11 | 15:20 | Sunny | 63.9 | 67.8 | 64.9 | 70.0 | N/A | N/A |
| 23-Aug-11 | 15:20 | Sunny | 63.8 | 67.5 | 63.2 | 70.0 | N/A | N/A |
| 30-Aug-11 | 15:20 | Sunny | 66.1 | 69.3 | 63.5 | 70.0 | N/A | N/A |

| Location NC17 - Hong Kong Institute of Technology | | | | | | | | |
|---|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 16:10 | Sunny | 68.2 | 73.6 | 64.3 | 70.0 | N/A | N/A |
| 9-Aug-11 | 16:10 | Sunny | 68.7 | 73.2 | 65.2 | 70.0 | N/A | N/A |
| 18-Aug-11 | 16:10 | Sunny | 69.7 | 72.5 | 66.9 | 70.0 | N/A | N/A |
| 23-Aug-11 | 16:10 | Sunny | 70.5 | 73.1 | 66.2 | 70.0 | 65.9 | 68.7 |
| 30-Aug-11 | 16:10 | Sunny | 67.3 | 70.1 | 64.2 | 70.0 | N/A | N/A |

| Location NC18 - Blk A, 80 Robinson Road | | | | | | | | |
|---|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 16:50 | Sunny | 69.2 | 73.6 | 65.2 | 75.0 | N/A | N/A |
| 9-Aug-11 | 16:50 | Sunny | 68.2 | 72.8 | 65.3 | | N/A | N/A |
| 18-Aug-11 | 16:50 | Sunny | 71.8 | 74.5 | 67.5 | | N/A | N/A |
| 23-Aug-11 | 16:50 | Sunny | 72.3 | 74.5 | 67.8 | | N/A | N/A |
| 30-Aug-11 | 16:50 | Sunny | 65.4 | 68.1 | 61.7 | | N/A | N/A |

| Location NC19 - Villa Veneto | | | | | | | | |
|------------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 09:00 | Sunny | 64.2 | 66.4 | 61.5 | 75.0 | N/A | N/A |
| 9-Aug-11 | 14:15 | Cloudy | 64.6 | 66.7 | 61.2 | | N/A | N/A |
| 18-Aug-11 | 09:40 | Sunny | 68.5 | 70.3 | 66.1 | | N/A | N/A |
| 23-Aug-11 | 09:00 | Sunny | 63.4 | 66.1 | 59.8 | | N/A | N/A |
| 30-Aug-11 | 14:40 | Sunny | 69.9 | 72.2 | 67.1 | | N/A | N/A |

| Location GNC7 - Hong Villa | | | | | | | | |
|----------------------------|-------|---------|-----------------------|-----------------|-----------------|-------------|---|---|
| Date | Time | Weather | Unit: dB (A) (30-min) | | | | | |
| | | | Measured Noise Level | | | Limit Level | Corresponding Baseline Level ⁽¹⁾ | Corrected Measured Noise Level ⁽²⁾ |
| | | | L _{eq} | L ₁₀ | L ₉₀ | | | |
| 2-Aug-11 | 10:30 | Sunny | 60.2 | 59.7 | 53.4 | 75.0 | N/A | N/A |
| 9-Aug-11 | 13:10 | Cloudy | 56.1 | 57.5 | 51.0 | | N/A | N/A |
| 18-Aug-11 | 11:00 | Sunny | 63.7 | 65.2 | 61.6 | | N/A | N/A |
| 23-Aug-11 | 10:00 | Sunny | 56.4 | 55.7 | 51.3 | | N/A | N/A |
| 30-Aug-11 | 14:00 | Sunny | 56.7 | 57.6 | 51.4 | | N/A | N/A |

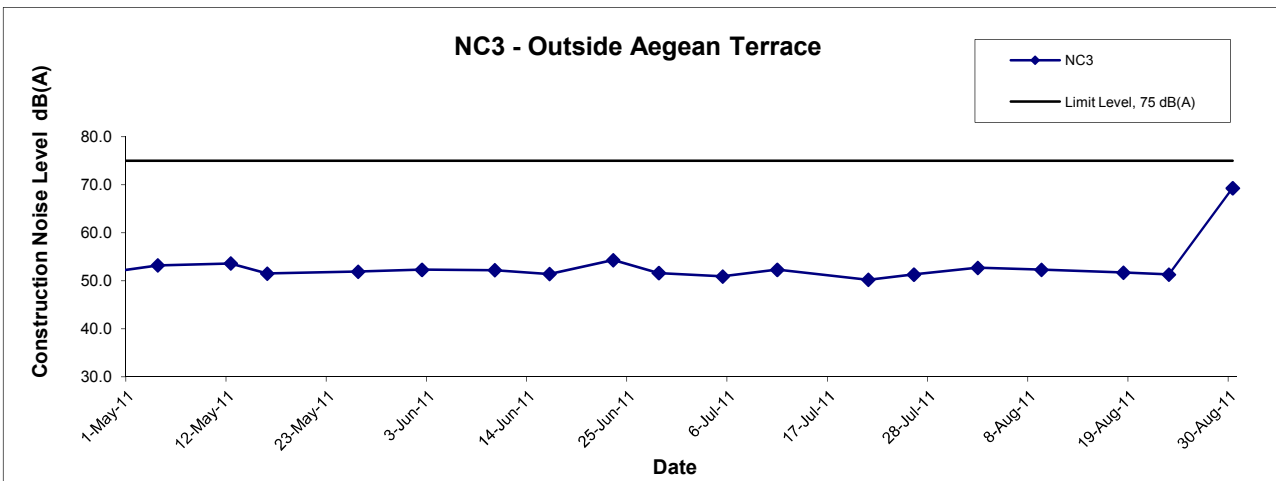
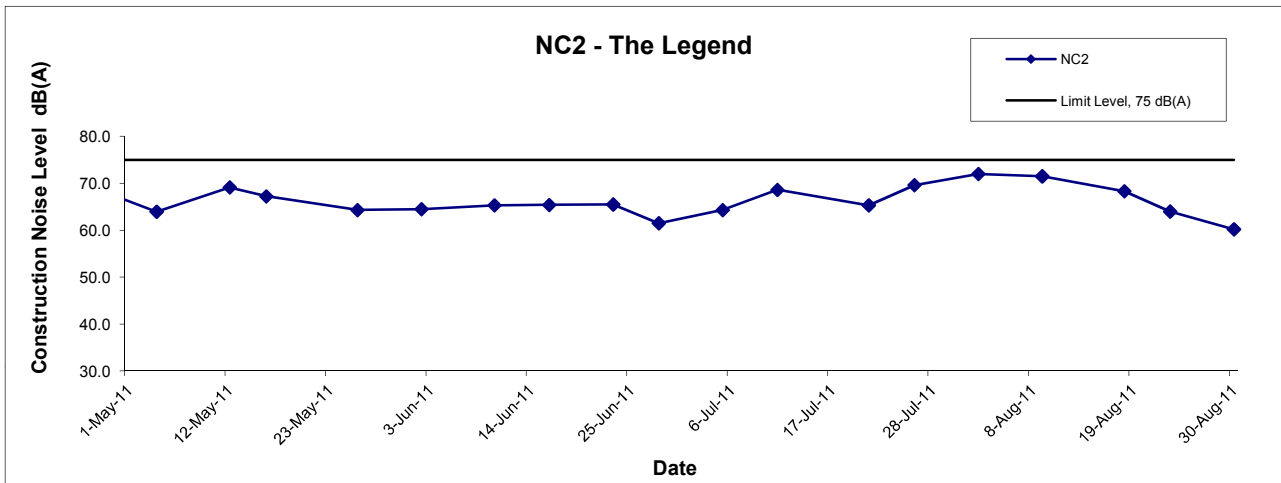
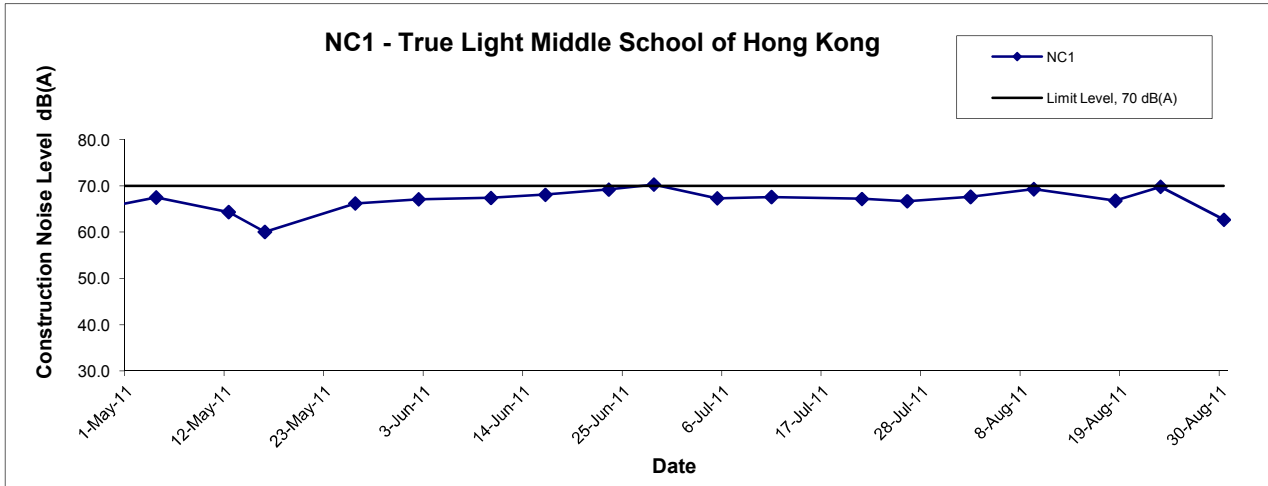
Note:

(1) The corresponding baseline noise levels were derived from the baseline monitoring results at the corresponding stations and time period.

(2) The corrected measured noise levels will be adopted when the measured noise levels exceed the noise limit level. The correction would take into account the effect of the background/baseline noise levels. The baseline noise level corresponding to that particular monitoring time period will be used for such correction.

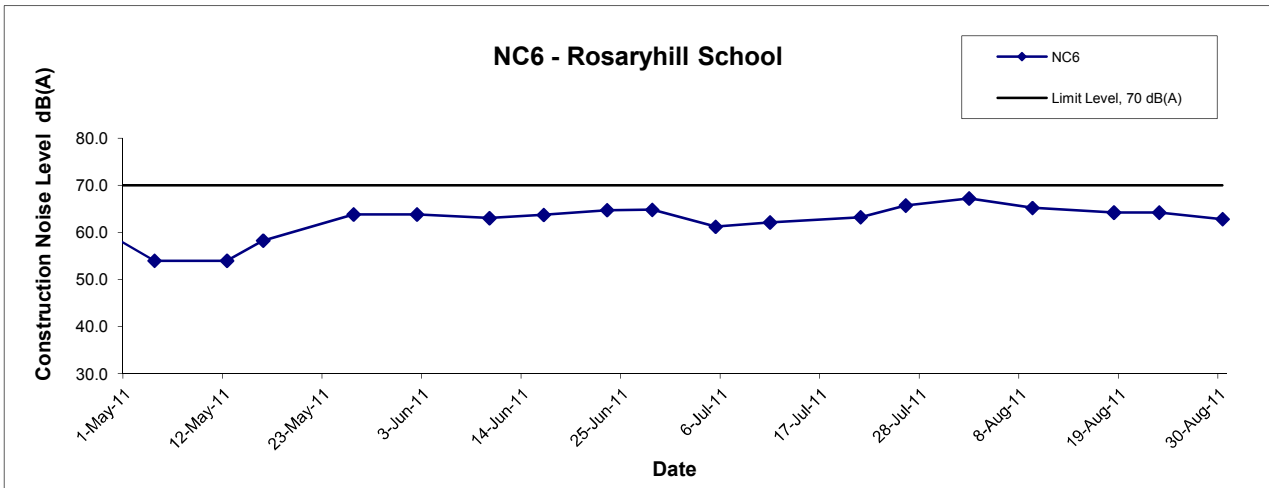
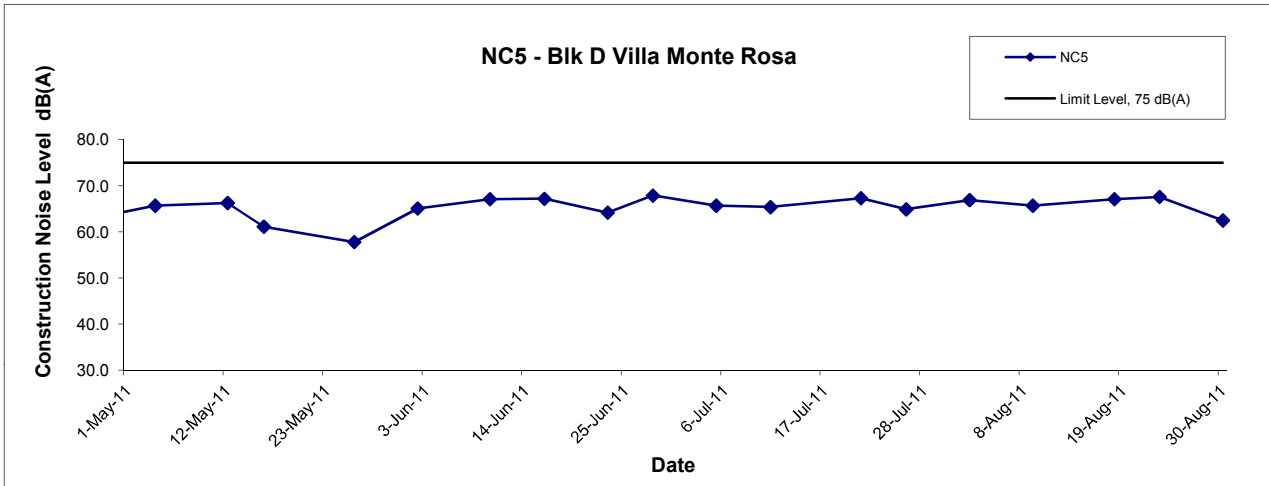
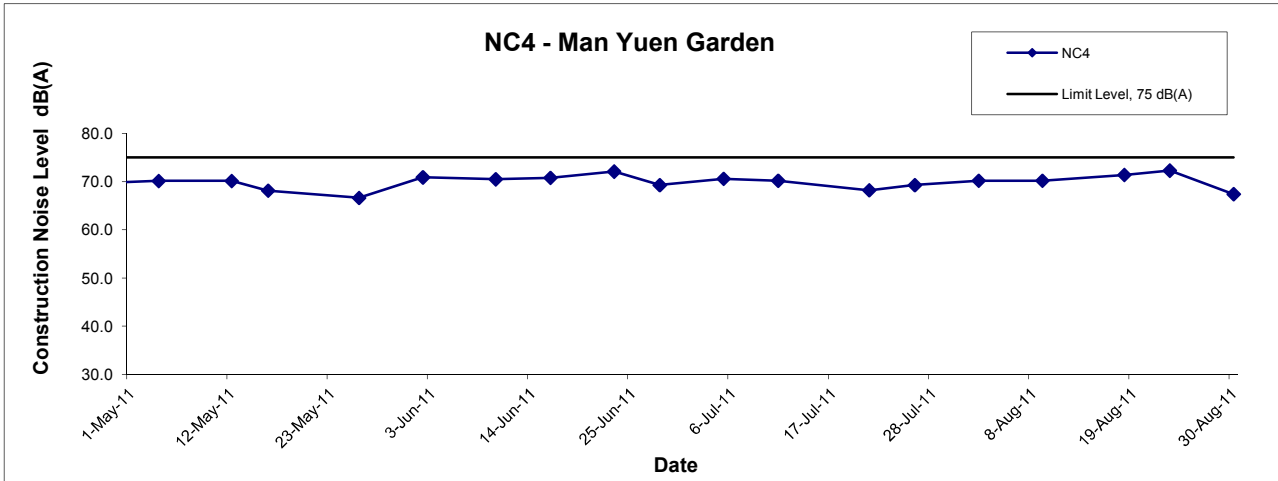
(3) N/A – Not applicable (Measured Noise Level ≤ Limit Level)

Noise Levels



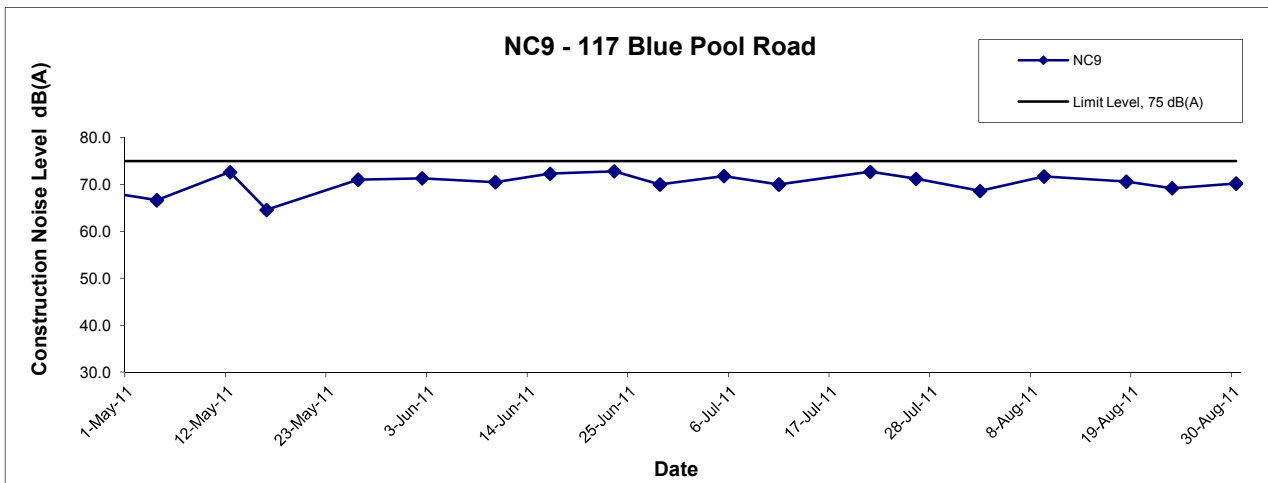
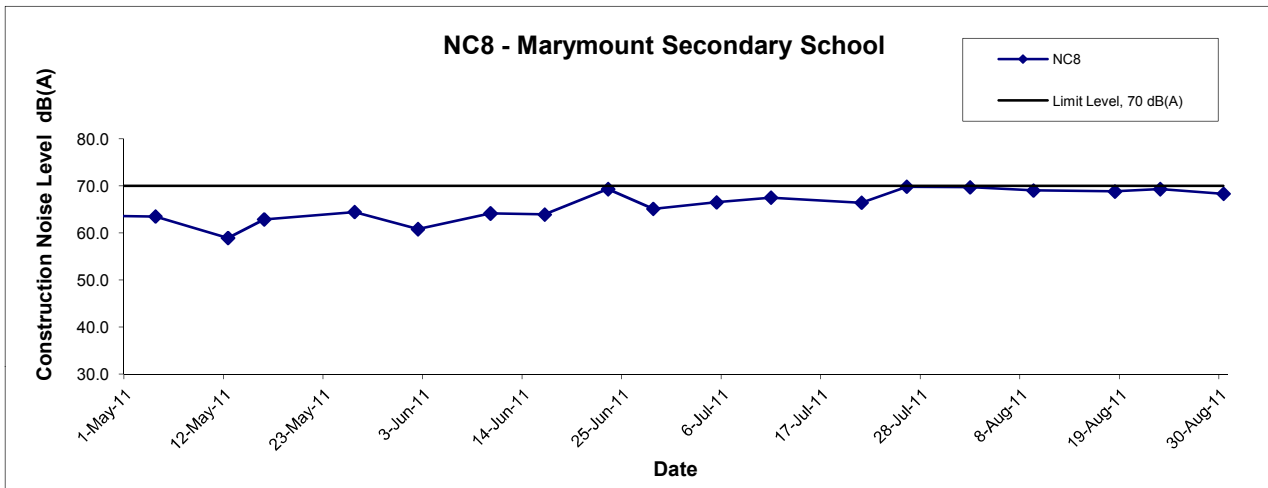
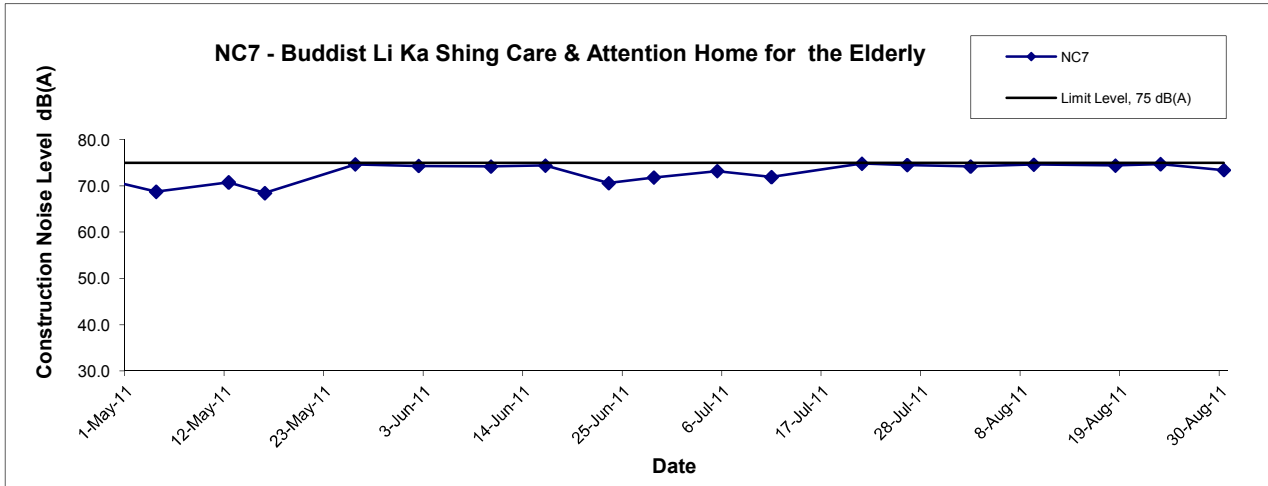
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|--|-------|--------|-------------|--------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Construction Noise Monitoring Results | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix | G | |

Noise Levels



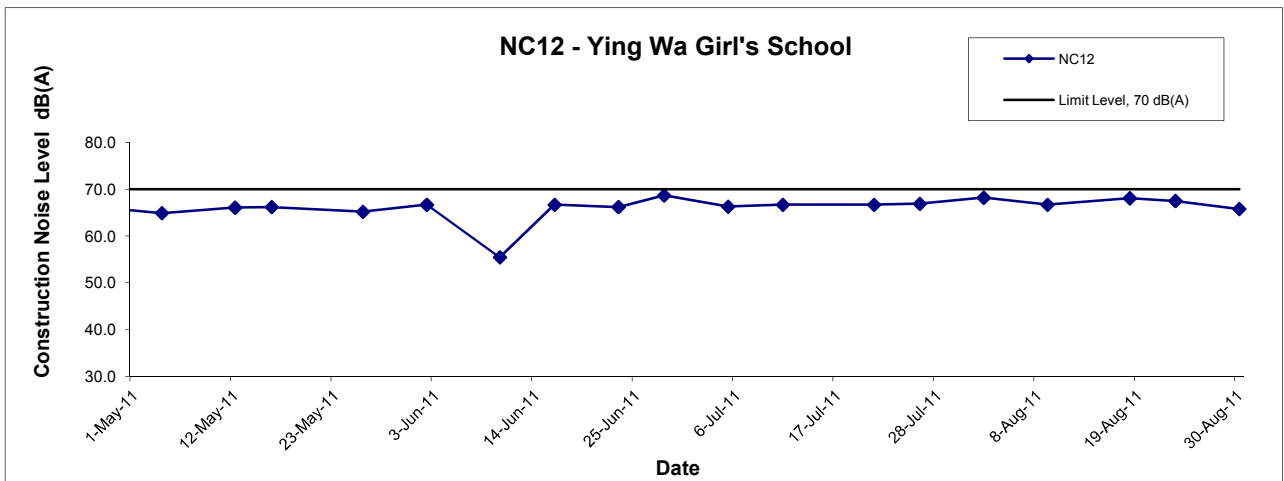
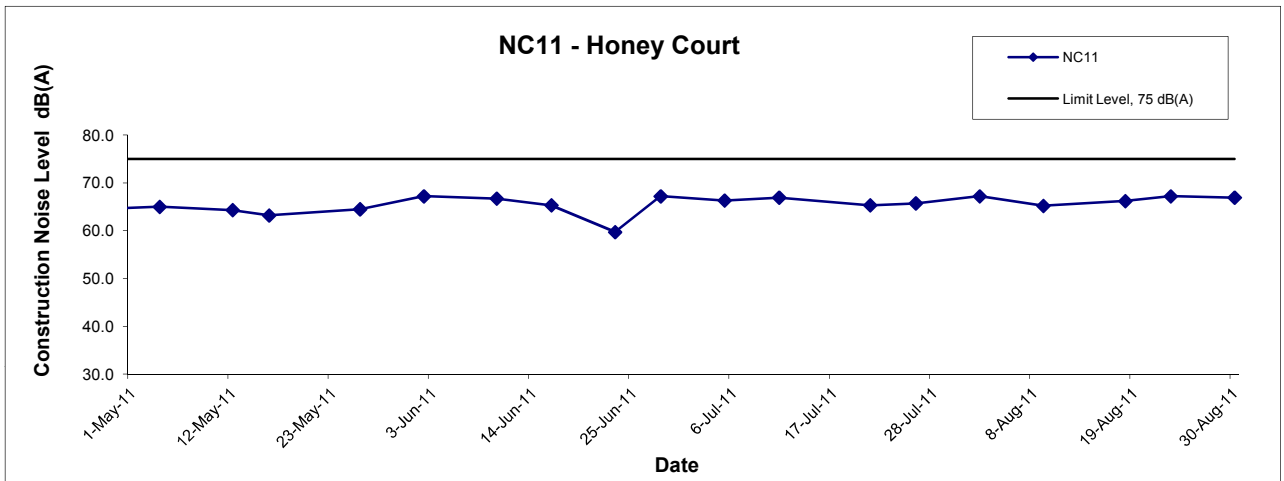
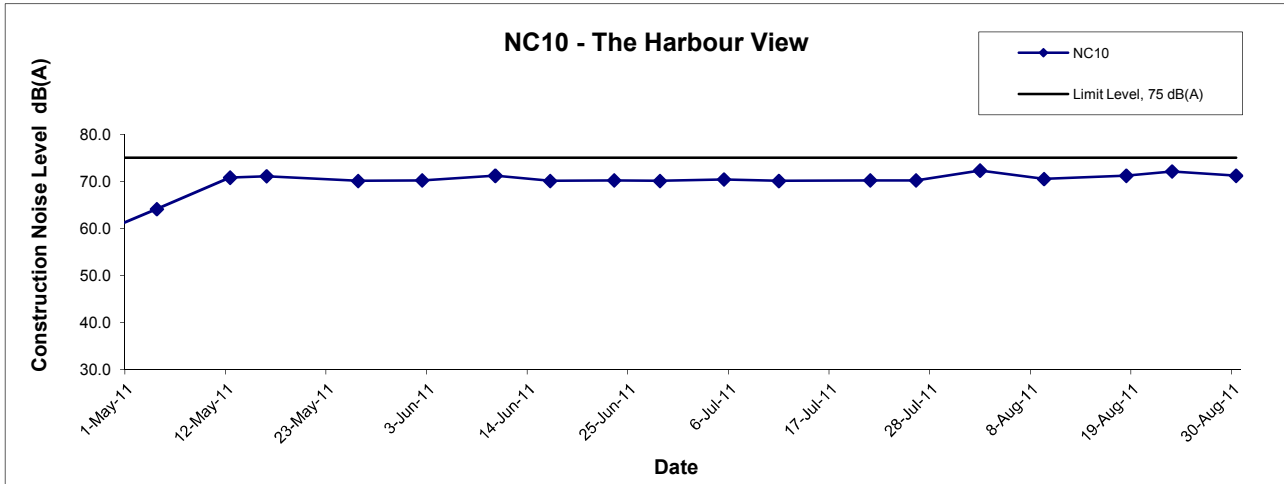
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|--|-------|--------|-------------|--------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Construction Noise Monitoring Results | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix | G | |

Noise Levels



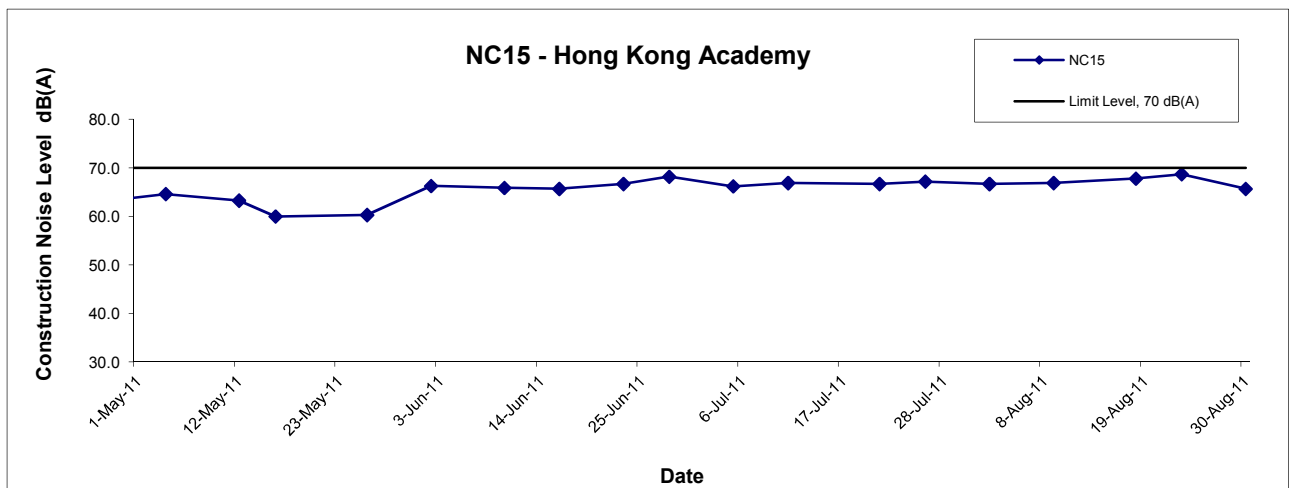
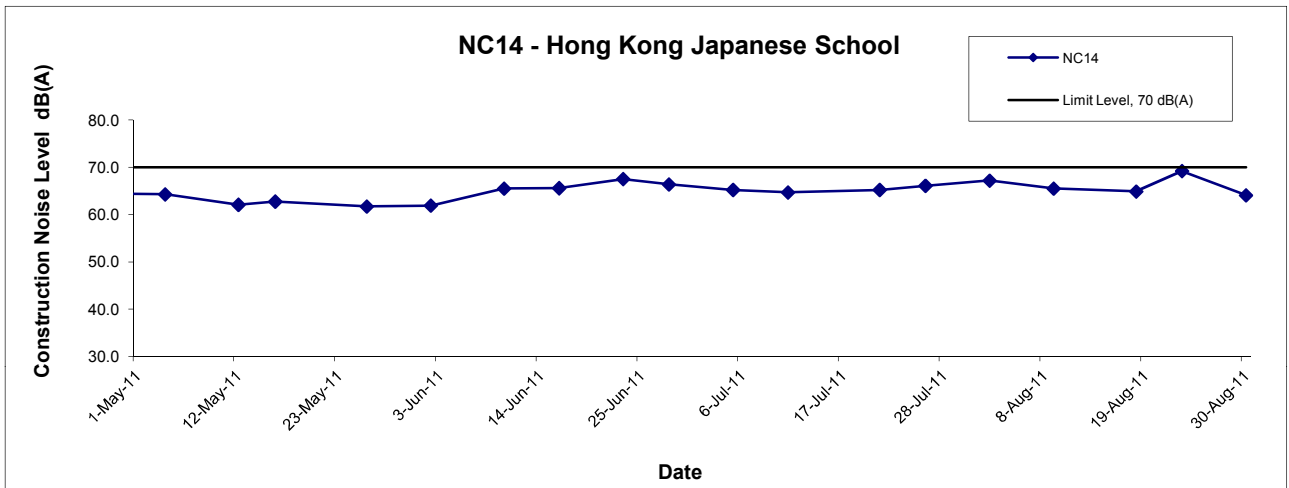
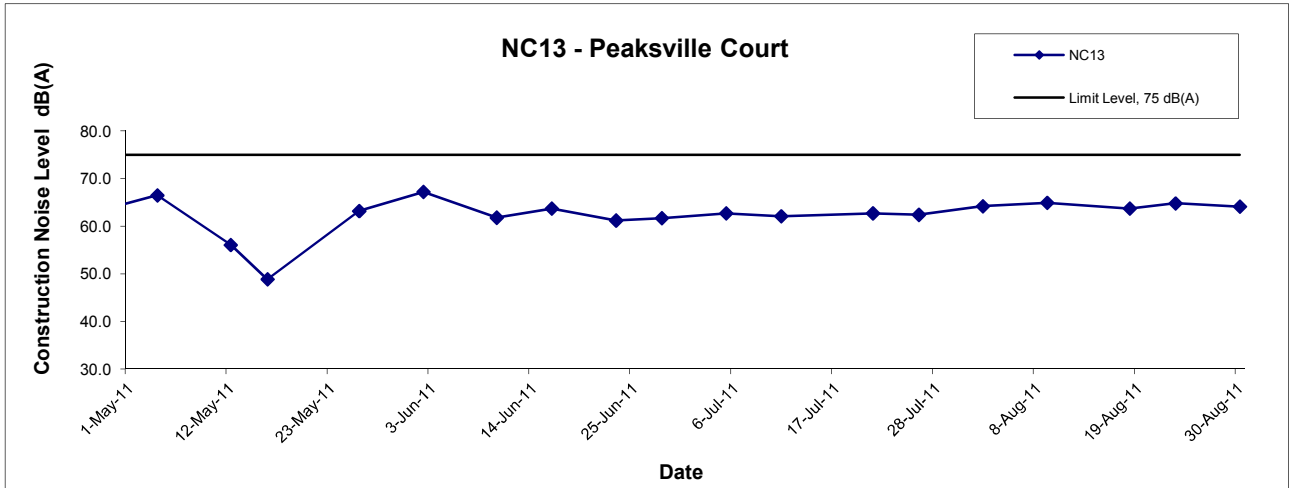
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|--|-------|--------|-------------|--------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Construction Noise Monitoring Results | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix | G | |

Noise Levels



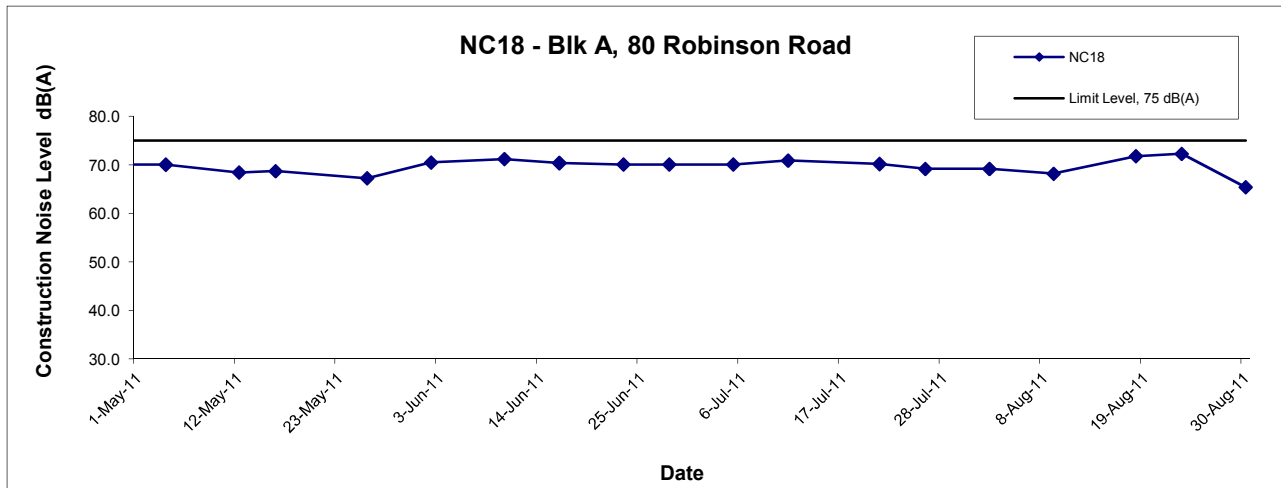
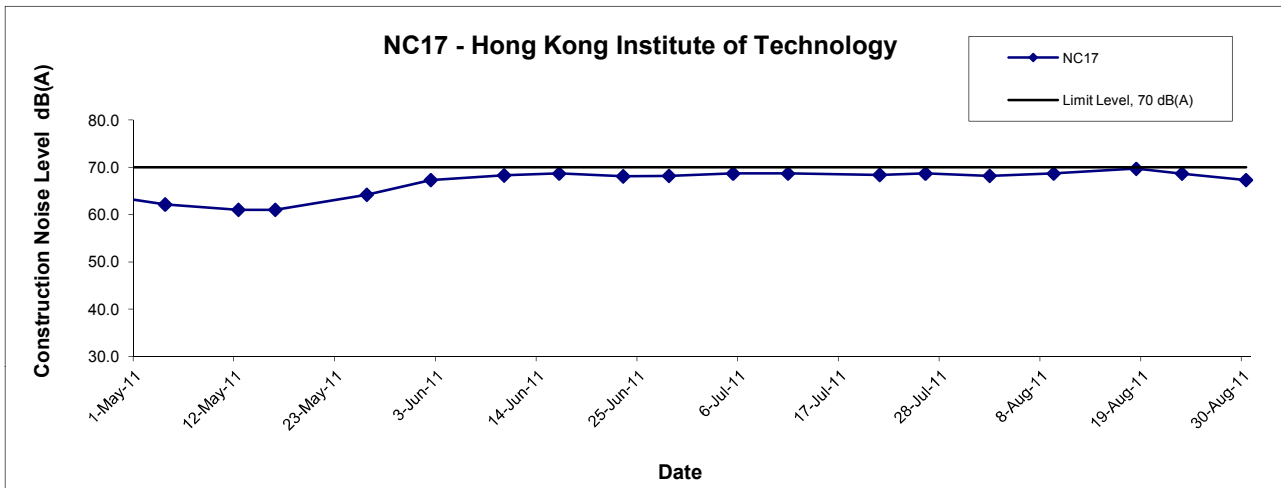
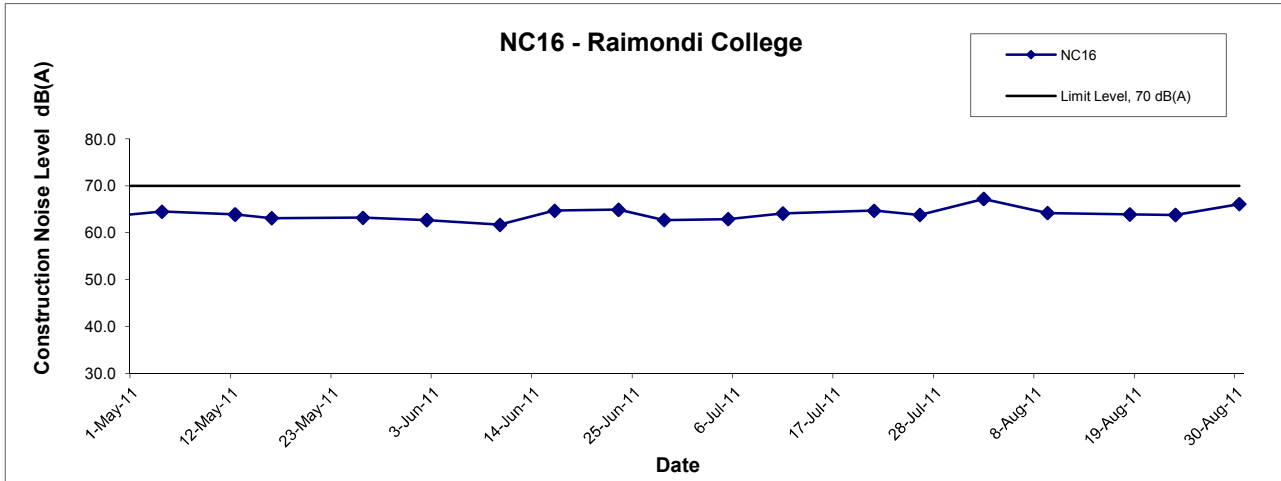
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|--|-------|--------|-------------|--------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Construction Noise Monitoring Results | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix | G | |

Noise Levels



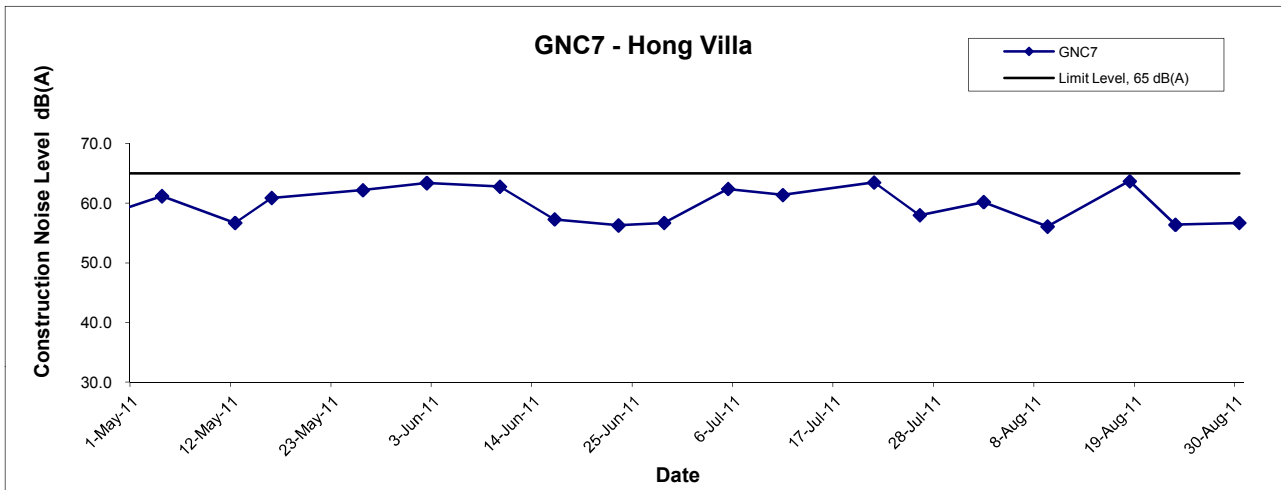
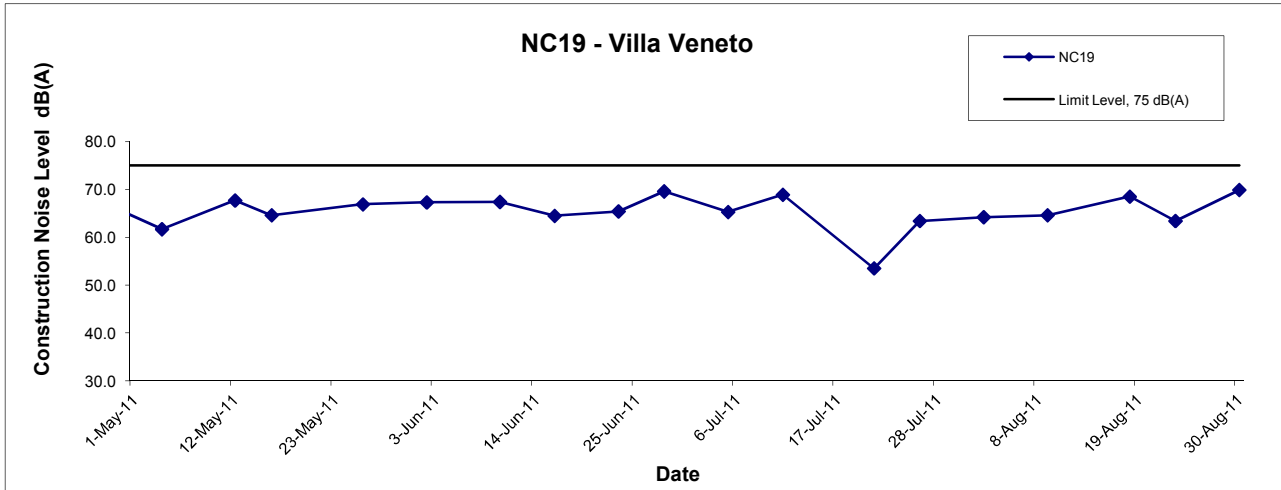
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|--|-------|--------|-------------|--------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Construction Noise Monitoring Results | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix | G | |

Noise Levels



| | | | | | |
|--|-------|--------|-------------|--------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Construction Noise Monitoring Results | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix | G | |

Noise Levels



| | | | | | |
|--|-------|--------|-------------|--------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Construction Noise Monitoring Results | Scale | N.T.S | Project No. | MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix | G | |

**APPENDIX H
SUMMARY OF EXCEEDANCE**

**Contract No. DC/2007/10 – Design and Construction of Hong Kong West Drainage Tunnel
Exceedance Report**

Eastern Portal

- (A) Exceedance Report for Air Quality (1 hour TSP)
(NIL in the reporting month)**
- (B) Exceedance Report for Air Quality (24 hours TSP)
(NIL in the reporting month)**
- (C) Exceedance Report for Construction Noise
(One Action Level exceedance was recorded for the complaint received on 11 August 2011)**

Western Portal

- (D) Exceedance Report for Air Quality (1 hour TSP)
(NIL in the reporting month)**
- (E) Exceedance Report for Air Quality (24 hours TSP)
(NIL in the reporting month)**
- (F) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake DG1

- (G) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake E5A

- (H) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake E7

- (I) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake MA14

- (J) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake PFLR1

- (K) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake RR1

- (L) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake THR2

- (M) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake W0

- (N) Exceedance Report for Construction Noise
(One Action Level exceedance was recorded for the complaint received on 9 August 2011)**

Intake W5

- (O) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake P5

- (P) Exceedance Report for Construction Noise
(One Action Level exceedance was recorded for the complaint received on 25 August 2011)**

Intake W8

- (Q) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake BR6

- (R) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake CR1

- (S) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake GL1

- (T) Exceedance Report for Construction Noise
(NIL in the reporting month)**

Intake W10

- (U) Exceedance Report for Construction Noise
(One Action Level exceedance was recorded for the complaint received on 24 August 2011)**

Intake BR5

- (V) Exceedance Report for Construction Noise
(One Action Level exceedance was recorded for the complaint received on 26 August 2011)**

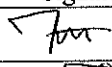

**APPENDIX I
SITE AUDIT SUMMARY**

Weekly Site Inspection Record Summary

Inspection Information

| | |
|----------------------------|---------------|
| Checklist Reference Number | 110804 |
| Date | 4 August 2011 |
| Time | 08:30 – 17:00 |

| Ref. No. | Non-Compliance | Related Item No. |
|------------|---|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| | • No environmental deficiency was identified during site inspection. | |
| | B. Air Quality | |
| 110804-001 | • Dark smoke emission was observed from the hydraulic breaker at Western Portal. The Contractor was reminded to provide the mitigation measure, to avoid dark smoke emission. | D14 |
| | C. Noise | |
| | • No environmental deficiency was identified during site inspection. | |
| | D. Waste / Chemical Management | |
| 110804-002 | • Oil stain was observed near the site boundary at Western Portal. The Contractor was reminded to clear the oil stain, to avoid directing to the sea. | F9 |
| | E. Ecology | |
| | • No environmental deficiency was identified during site inspection. | |
| | F. Marine Ecology | |
| | • No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| 110804-R03 | • The ponding water should be cleared at Intake PFLR1. | B15 |
| 110804-R04 | • To clear the oil stain at Intake PFLR1 and BR6. | F9 |
| 110804-R05 | • Clear the deposited silt along the u-channel at Intake MBD2. | B14 |
| | H. Others | |
| | • Follow-up on previous audit section (Ref. No.:110728), all environmental deficiencies were improved/ rectified by the Contractor. | |

| | Name | Signature | Date |
|-------------|--------------------|---|---------------|
| Recorded by | TY Yeung |  | 4 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 4 August 2011 |

Weekly Site Inspection Record Summary (For Western Portal Only)

Inspection Information

| | |
|----------------------------|-------------------------|
| Checklist Reference Number | 110802 |
| Date | 2 August 2011 (Tuesday) |
| Time | 09:35-10:15 |

| Ref. No. | Non-Compliance | Related Item No. |
|----------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| | • No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| | • No environmental deficiency was identified during site inspection. | |
| | H. Others | |
| | • NIL | |



| | Name | Signature | Date |
|-------------|--------------------|---|---------------|
| Recorded by | Chiu King Wai |  | 2 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 2 August 2011 |

Weekly Site Inspection Record Summary

Inspection Information

| | |
|----------------------------|----------------|
| Checklist Reference Number | 110811 |
| Date | 11 August 2011 |
| Time | 08:30 – 17:00 |

| Ref. No. | Non-Compliance | Related Item No. |
|------------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| 110811-002 | • One compartment of sedimentation tank was observed full of deposited concrete and mud. The Contractor was reminded to clear it as soon as possible. | B9 |
| | B. Air Quality | |
| | • No environmental deficiency was identified during site inspection. | |
| | C. Noise | |
| | • No environmental deficiency was identified during site inspection. | |
| | D. Waste / Chemical Management | |
| 110811-001 | • Oil stain was observed to be disposed at Intake BR6, MA17 and TP789. The Contractor was reminded to properly clear it, to avoid directing to the public by surface runoff during rain. | F9 |
| | E. Ecology | |
| | • No environmental deficiency was identified during site inspection. | |
| | F. Marine Ecology | |
| | • No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| 110811-R03 | • Grease water should be cleared as chemical waste properly within gully at Intake M3 and along the u-channel at Intake W3 respectively. | B8ii. |
| 110811-R04 | • The air compressor at Intake M3 should be pasted with valid noise label. | E8 |
| 110811-R05 | • Clear the deposited mud along the u-channel at the entrance of Intake TP5. | F9 |
| 110811-R06 | • Clear the stagnant water within the sludge holding tank at Intake W0 and the drip tray at Intake HR1 respectively. | B15 |
| | H. Others | |
| | • Follow-up on previous audit section (Ref. No.: 110804), all environmental deficiencies were improved/ rectified by the Contractor. | |

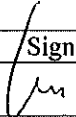

| | Name | Signature | Date |
|-------------|--------------------|---|----------------|
| Recorded by | TY Yeung |  | 11 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 11 August 2011 |

Weekly Site Inspection Record Summary (For Western Portal Only)

Inspection Information

| | |
|----------------------------|----------------------------|
| Checklist Reference Number | 110810 |
| Date | 10 August 2011 (Wednesday) |
| Time | 16:35-17:00 |

| Ref. No. | Non-Compliance | Related Item No. |
|----------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| | • No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| | • No environmental deficiency was identified during site inspection. | |
| | H. Others | |
| | • NIL | |

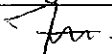

| | Name | Signature | Date |
|-------------|--------------------|---|----------------|
| Recorded by | Chiu King Wai |  | 10 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 10 August 2011 |

Weekly Site Inspection Record Summary

Inspection Information

| | |
|----------------------------|----------------|
| Checklist Reference Number | 110818 |
| Date | 18 August 2011 |
| Time | 08:30 – 17:00 |

| Ref. No. | Non-Compliance | Related Item No. |
|------------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| 110818-O01 | <ul style="list-style-type: none"> The stagnant silty water was observed within H-pile of Intake W5. The Contractor was reminded to clear it as soon as possible, to avoid mosquito breeding. | B15 |
| | B. Air Quality | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | C. Noise | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | D. Waste / Chemical Management | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | E. Ecology | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | F. Marine Ecology | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| 110818-R02 | <ul style="list-style-type: none"> Provide drip tray at underneath the oil drum at Intake MA15 and MBD2. | F3i. |
| 110818-R03 | <ul style="list-style-type: none"> To paste the valid noise label on the air compressor at Intake M3. | E8 |
| 110818-R04 | <ul style="list-style-type: none"> Clear the general refuse along the u-channel at Intake B2. | F1i.&F1iii. |
| 110818-R05 | <ul style="list-style-type: none"> Clear the discarded oil drum as chemical waste at Intake B2. | F2ii. |
| 110818-R06 | <ul style="list-style-type: none"> The u-channel at Intake MBD2 should be maintained functioning properly at all the time. | B9 |
| | H. Others | |
| | <ul style="list-style-type: none"> Follow-up on previous audit section (Ref. No.: 110811), all environmental deficiencies were improved/ rectified by the Contractor except item 110811 - R04. Follow-up action is needed and remarked as 110818- R03. Intake THR2 was not inspected during the site inspection. Follow-up actions are needed for all outstanding items. | |



| | Name | Signature | Date |
|-------------|--------------------|---|----------------|
| Recorded by | TY Yeung |  | 18 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 18 August 2011 |

Weekly Site Inspection Record Summary (For Western Portal Only)

Inspection Information

| | |
|----------------------------|--------------------------|
| Checklist Reference Number | 110816 |
| Date | 16 August 2011 (Tuesday) |
| Time | 15:10-15:40 |

| Ref. No. | Non-Compliance | Related Item No. |
|----------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| | • No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| | • No environmental deficiency was identified during site inspection. | |
| | H. Others | |
| | • NIL | |

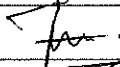

| | Name | Signature | Date |
|-------------|--------------------|---|----------------|
| Recorded by | Chiu King Wai |  | 16 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 16 August 2011 |

Weekly Site Inspection Record Summary

Inspection Information

| | |
|----------------------------|----------------|
| Checklist Reference Number | 110825 |
| Date | 25 August 2011 |
| Time | 08:30 – 17:30 |

| Ref. No. | Non-Compliance | Related Item No. |
|------------|---|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| 110825-O01 | <ul style="list-style-type: none"> The three compartments of sedimentation tank were observed almost silty at Intake MA17 and THR2. The Contractor was reminded to remove the deposited silt regularly, so that the tanks can be functioned properly. | B9 |
| | B. Air Quality | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | C. Noise | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | D. Waste / Chemical Management | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | E. Ecology | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | F. Marine Ecology | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| 110825-R02 | <ul style="list-style-type: none"> To clear the stagnant water within the H-pile of Intake PFLR1 and wheel washing bay of Intake E5B respectively. | B15 |
| 110825-R03 | <ul style="list-style-type: none"> Provide valid noise label on the air compressor at Intake HKU1. | E8 |
| 110825-R04 | <ul style="list-style-type: none"> To clear the discarded leaves along the u-channel at Intake PFLR1. | B9 |
| 110825-R05 | <ul style="list-style-type: none"> Ensure sprinkler to be provided at jetty of Western Portal. | D11 |
| | H. Others | |
| | <ul style="list-style-type: none"> Follow-up on previous audit section (Ref. No.:110818), all environmental deficiencies were improved/ rectified by the Contractor except item 110811 – O02. Follow-up action is needed and remarked as 110825- O01. Intake B2 was not inspected during the site inspection. Follow-up actions are needed for all outstanding items. | |

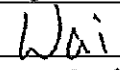

| | Name | Signature | Date |
|-------------|--------------------|---|----------------|
| Recorded by | TY Yeung |  | 25 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 25 August 2011 |

Weekly Site Inspection Record Summary (For Western Portal Only)

Inspection Information

| | |
|----------------------------|-------------------------|
| Checklist Reference Number | 110822 |
| Date | 22 August 2011 (Monday) |
| Time | 15:35-16:00 |

| Ref. No. | Non-Compliance | Related Item No. |
|----------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| | • No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| | • No environmental deficiency was identified during site inspection. | |
| | H. Others | |
| | • NIL | |



| | Name | Signature | Date |
|-------------|--------------------|---|----------------|
| Recorded by | Lam Ka Wai |  | 22 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 22 August 2011 |

Weekly Site Inspection Record Summary

Inspection Information

| | |
|----------------------------|----------------|
| Checklist Reference Number | 110831 |
| Date | 31 August 2011 |
| Time | 14:00 – 18:00 |

| Ref. No. | Non-Compliance | Related Item No. |
|------------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | A. Water Quality | |
| 110831-O01 | <ul style="list-style-type: none"> Stagnant water should be avoided at Eastern Portal and H-pile of E7. The Contractor was reminded to clear the stagnant water or spray larvicide regularly. | B15 |
| | B. Air Quality | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | C. Noise | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | D. Waste / Chemical Management | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | E. Ecology | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | F. Marine Ecology | |
| | <ul style="list-style-type: none"> No environmental deficiency was identified during site inspection. | |
| | G. Reminders | |
| 110831-R02 | <ul style="list-style-type: none"> Clear the general refuse at Eastern Portal regularly. | E1i. |
| 110831-R03 | <ul style="list-style-type: none"> Clear the grease water as chemical waste within the drip tray at underneath the oil drum of Intake E5A. | B15 |
| | H. Others | |
| 110831-F04 | <ul style="list-style-type: none"> Intake HKU1, MA17, THR2, B2, PFLR1 and Western Portal were not inspected during the site inspection. Follow-up actions are needed for all outstanding items. | |

| | Name | Signature | Date |
|-------------|--------------------|---|----------------|
| Recorded by | TY Yeung |  | 31 August 2011 |
| Checked by | Dr. Priscilla Choy |  | 31 August 2011 |

Contract No. DC/2007/10
Design and Construction of Hong Kong West Drainage Tunnel

Weekly Site Inspection Record Summary (For Western Portal Only)

Inspection Information

| | |
|----------------------------|--------------------------|
| Checklist Reference Number | 110830 |
| Date | 30 August 2011 (Tuesday) |
| Time | 08:05-08:35 |

| Ref. No. | Non-Compliance | Related Item No. |
|----------|--|------------------|
| - | None identified | - |
| Ref. No. | Remarks/Observations | Related Item No. |
| | <i>A. Water Quality</i> | |
| | • No environmental deficiency was identified during site inspection. | |
| | <i>G. Reminders</i> | |
| | • No environmental deficiency was identified during site inspection. | |
| | <i>H. Others</i> | |
| | • NIL | |

| | Name | Signature | Date |
|-------------|--------------------|------------|----------------|
| Recorded by | Lam Ka Wai | <i>Wai</i> | 30 August 2011 |
| Checked by | Dr. Priscilla Choy | <i>WFC</i> | 30 August 2011 |

**APPENDIX J
ENVIRONMENTAL MITIGATION
IMPLEMENTATION SCHEDULE (EMIS)**

Appendix J - Summary of Environmental Mitigation Implementation Schedule

| Types of Impacts | Mitigation Measures | Status |
|---|---|--------|
| Construction Dust | <i>Dust Mitigation Measures</i> | |
| | <ul style="list-style-type: none"> The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. Effective dust suppression measures should be installed to minimize air quality impacts, at the boundary of the site and at any sensitive receivers. | ^ |
| | <ul style="list-style-type: none"> No blasting shall be carried out when the strong wind signal or tropical cyclone warning signal No. 3 or higher is hoisted (unless prior permission of the Commissioner of Mines is obtained). | ^ |
| | <ul style="list-style-type: none"> Effective water sprays shall be used during the delivery and handling of all raw sand, aggregate and other similar materials, when dust is likely to be created, to dampen all stored materials during dry and windy weather. Watering of exposed surfaces shall be conducted as often as possible depending on the circumstances. | ^ |
| | <ul style="list-style-type: none"> A watering programme of once every 2 hours in normal weather conditions, and hourly in dry/windy conditions. | ^ |
| | <ul style="list-style-type: none"> Any stockpile of dusty material cannot be immediately transported out of the Site shall be either: a) covered entirely by impervious sheeting; b) placed in an area sheltered on the top and the three sides; or c) sprayed with water or a dust suppression chemical so as to maintain the entire surface wet. | * |
| | <ul style="list-style-type: none"> Should a conveyor system be used, the Contractor shall implement the following precautionary measures. Conveyor belts shall be fitted within windboards. Conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors under control of the Contractor, and carrying materials which have the potential to create dust, shall be totally enclosed and fitted with belt cleaners. | ^ |
| | <ul style="list-style-type: none"> Any dusty materials being discharged to vehicle from a conveying system at fixed transfer point, three-sided roofed enclosed with a flexible curtain across the entry shall be provided. Exhaust fans shall be provided for this enclosure and vented via a suitable fabric filter system. | ^ |
| | <ul style="list-style-type: none"> The heights from excavated spoils are dropped should be minimise to reduce the fugitive dust arising from unloading/loading. | ^ |
| | <ul style="list-style-type: none"> The Contractor shall confine haulage and delivery vehicles to designated roadways inside the site. If in the opinion of the Engineer, any motorising vehicle is causing dust nuisance, the Engineer may require that the vehicle be restricted to a maximum speed of 15km per hour while within the site area. | ^ |
| <ul style="list-style-type: none"> Areas within the site where there is a regular movement of vehicles shall have an approved hard surface, be kept clear of loose surface materials and / or be regularly watered. | ^ | |
| <ul style="list-style-type: none"> Wheel cleaning facilities shall be installed for both portals and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer prior to construction of the facility. Such wheel cleaning facilities shall be usable prior to any earthwork excavation activity on site. The Contractor shall provide a hard-surfaced road between any cleaning facility and the public road. | ^ | |
| <ul style="list-style-type: none"> Chemical wetting agents shall only be used on completed cuts and fills to reduce wind erosion. | N/A | |

Remarks: ^ Compliance of mitigation measure; X Non-compliance of mitigation measure;
 N/A Not Applicable at this stage; • Non-compliance but rectified by the contractor;
 * Recommendation was made during site audit but improved/rectified by the contractor;
 # Non-compliance but rectified/improved by the contractor and awaiting IEC's further comment.

| Types of Impacts | Mitigation Measures | Status |
|------------------|---|--|
| | <ul style="list-style-type: none"> • No vehicle exhausts shall be directed towards the ground or downwards to minimize dust nuisance. • Ventilation system, equipped with proprietary filters, should be provided to ensure the safe working environment inside the tunnel. Particular attention should be paid to the location and direction of the ventilation exhausts. The exhausts should not be allowed to face any sensitive receivers directly. Consideration should also be given to the location of windows, doors and direction of prevailing winds in relation to the nearby sensitive receivers. • In the event of any spoil or debris from construction works being deposited on adjacent land, or stream, or any silt being washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Engineers. <p>In addition, based on the <i>Air Pollution Control (Construction Dust) Regulation</i>, any works involved regulatory and notifiable works, such as stockpiling, loading and unloading of dusty materials, shall take precautions to suppress dust nuisance.</p> <ul style="list-style-type: none"> • The working area of any excavation or earthmoving operation shall spray with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet; • Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies; and • Any stockpile of dusty materials (greater than 20m³) shall be either covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides; and sprayed with water or a dust suppression chemical so as to maintain the entire surface wet. • Other suitable dust control measures as stipulated in <i>Air Pollution Control (Construction Dust) Regulation</i>, where appropriate, should be adopted. | <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> |

Remarks: ^ Compliance of mitigation measure; X Non-compliance of mitigation measure;
N/A Not Applicable at this stage; • Non-compliance but rectified by the contractor;
* Recommendation was made during site audit but improved/rectified by the contractor;
Non-compliance but rectified/improved by the contractor and awaiting IEC's further comment.

| Types of Impacts | Mitigation Measures | Status |
|----------------------------------|---|---|
| <p>Construction Noise</p> | <p><u>Air borne noise</u></p> <p>In general, potential construction noise impact can be minimized or avoided by imposing a combination of the following mitigation measures:</p> <ul style="list-style-type: none"> • Noisy equipment and activities should be sited by the Contractor as far from close-proximity sensitive receivers as practical. Prolonged operation of noisy equipment close to dwellings should be avoided. • The Contractor should minimise construction noise exposure to the schools (especially during examination periods). The Contractor should liaise with the school and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the works contract and to avoid noisy activities during these periods. • Noisy plant or processes should be replaced by quieter alternatives. Silenced diesel and gasoline generators and power units, as well as silenced and super-silenced air compressor, can be readily obtained. • Noisy activities should be scheduled to minimise exposure of nearby sensitive receivers to high levels of construction noise. For example, noisy activities can be scheduled for midday, or at times coinciding with periods of high background noise (such as during peak traffic hours). • Idle equipment should be turned off or throttled down. Noisy equipment should be properly maintained and used no more often than is necessary. • The power units of non-electric stationary plant and earth-moving plant should be quietened by vibration isolation and partial or full acoustic enclosures for individual noise-generating components. • Construction activities should be planned so that parallel operation of several sets of equipment close to a given receiver is avoided, thus reducing the cumulative impacts between operations. The numbers of operating items of powered mechanical equipment should be minimised. Noise can be reduced by increasing the distance between the operating equipment and the NSRs or by reducing the number of items of equipment and/or construction activity in the area at any one time. • The use of quiet plant working methods can further reduce noise level. Quiet plant is defined as Powered Mechanical Equipment (PME) whose actual sound power level is less than the value specified in the TMs for the same piece of equipment. To allow the Contractor some flexibility to select equipment to suit his needs, it is considered too restrictive to specify which specific items of silenced equipment to be used for the construction operations. It should be noted that various types of silenced equipment can be found in Hong Kong and are readily available on the market. BS 5228 also provides examples of quiet construction plant and their SWL. • Construction plant should be properly maintained (well-greased, damage and worn parts promptly replaced) and operated. Construction equipment often has silencing measures built in or added on, e.g. bulldozer silencers, compressor panels, and mufflers. Silencing measures should be properly maintained and utilised. Rubber or damping materials should be introduced between metal panels to avoid rattle and reverberation of noise. • Equipment known to emit sound strongly in one direction should be oriented so that the noise is directed away from nearby NSRs. • Materials stockpile and other structures (such as site offices) should be effectively utilised to shield construction noise. Noise | <p>^</p> <p>*</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> |

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| | <p>can also be reduced by construction of temporary noise barriers which screen the lower floors from viewing the sites. Temporary noise barriers should be installed at active parts of construction areas where construction equipment is being operated in close proximity to NSRs.</p> <ul style="list-style-type: none"> • It is noted that under the WBTC No. 19/2001, all construction sites are required to use metallic site hoarding can be slightly modified (with the addition of steel backings) into temporary noise barriers. These barriers should be gap free and have a surface mass density of at least 7kg/m². • All hand-held percussive breakers and air compressors should comply the Noise Control (Hand-held Percussive Breakers) Regulations respectively under the NCO (Ordinance No. 75/88, NCO Amendment 1992 No.6). <p>The Contractor shall devise, arrange methods of working and carry out the works in such manner as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these measures are implemented properly.</p> <p><u>Level 2 Use of Barriers</u></p> <p>Level 2 mitigation measures include providing movable barriers for sites which have sufficient space for installation, full enclosures during the drilling activities at Eastern Portal and at muck pit areas for Eastern portals and cantilever-typed high rise noise barrier for intake W5 (P) and W8.</p> <p>Before construction of the full enclosure at muck pit area, the use of full enclosure noise barrier (Stage A) for the drilling activities at the Eastern Portal area is required. A full enclosure for the muck pit area will then be constructed at this later stage (Stage B). The full enclosure shall be gap free apart from necessary entrance/exits, which shall face towards the entrance of eastern portal to minimize the amount of noise generated from affecting the nearest RNSRs especially school (True Light Middle School of Hong Kong).</p> <p>5m high cantilever-typed hoarding barrier to be built at W5 (P) and W8. These enclosures/barriers should have no gaps and have a superficial surface density of at least 10kg/m². Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period. To schedule the noise barrier erection and dismantling to the non sensitive periods of school to avoid adverse impact to W8/3.</p> <p>Movable barriers of 3 to 5m height with a small cantilevered upper portion and skid footing to be located within about 5 m or more for mobile equipment such that the line of sight is blocked. To provide purposes-built noise barriers or screens constructed of appropriate materials (minimum superficial density of 10kg/m²) located close to the operating PME.</p> <p>Pre-drilling following by chemical splitting instead of using large excavator mounted breaker should be used as mitigation measure for rock breaking and rock drilling.</p> | <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> |

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| | <p>No construction activity is recommended during the examination period.</p> <p><u>Ground borne noise</u></p> <p>The noise level should be measured on the ground floor inside the nearest building during the TBM construction work in the daytime. If the daytime monitored ground borne noise exceeds the relevant evening/night ground borne noise criteria, evening/night construction work would not be carried out for the concerned tunnel section. Evening/night time construction work is subject to CNP application under the control of NCO.</p> <p>Public relationship strategy with 24-hour hotline system.</p> | <p>^</p> <p>^</p> |

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| Water Quality | <u>Precautionary measures for construction work near natural streams</u> | |
| | <p>The government provides guidelines (ETWB TCW NO. 5/2005 and DSD TC 2/2004) are providing guidelines to minimize impacts when there is construction work carried out at near natural streams course. Relevant mitigation measures for the intakes are summarised as follows:</p> | |
| | <ul style="list-style-type: none"> • Temporary site access to the work sites should be carefully planned and located to minimize disturbance caused to the substrates of streams/streams and riparian vegetation by construction plant. | ^ |
| | <ul style="list-style-type: none"> • Locations well away from the rivers/streams for temporary storage of materials (e.g equipment, filling materials, chemicals and fuel) and temporary stockpile of construction debris and spoil should be identified before commencement of works. | ^ |
| | <ul style="list-style-type: none"> • Proposed works site areas inside, or in the proximity of, natural rivers and streams should be temporarily isolated to prevent adverse impacts on the stream water qualities. | ^ |
| <ul style="list-style-type: none"> • Stockpiling of construction materials, if necessary, should be completely properly covered and located away from any natural stream/river. | ^ | |
| <ul style="list-style-type: none"> • Construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby rivers/streams by rain and local runoff. | * | |
| <u>Construction of temporary berthing point at the Western Portal</u> | | |
| <p>A refuse collection vessel shall be provided to collect refuse or materials lost into the sea.</p> | ^ | |
| <p>The respective areas of the marine works will be completely enclosed by the silt curtain. The curtain shall be extended from water surface down to the seabed where it is anchored using sinker blocks. The Contractor shall inspect the silt curtain on regular basis to ensure its integrity and it is serviceable for all times.</p> | N/A | |

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| | <p>Transfer of armour rock onto the seabed from barge at the temporary pier location should be conducted by careful grabbing and unloading to the seabed (to minimize sediment migration).</p> <p>The conveyor belt should be completely covered and muddy effluent from the temporary barge should be contained, treated and disposed. Where there is transfer of excavated wastes, the Contractor should provide appropriate measures to ensure that the waste is free from floatables, putrescibles, organic wastes and toxic materials and when required a refuse collection vessel be provided to collect float refuse.</p> <p><u>Construction of stilling basin at Western Portal outfall</u></p> <p>All construction for the basin should be carried out inside the temporary cofferdam which is a temporary watertight enclosure built in the water and pumped dry to expose the bottom so that construction of stilling basin can be undertaken.</p> <p>During the dewatering process, appropriate desilting/sedimentation devices should be provided on site for treatment before discharge. The Contractor should ensure discharge water from the sedimentation tank meet the WPCO/TM requirements before discharge.</p> <p>The cofferdam will remain on site until after the construction of stilling basin has been completed. The coffer dam shall be regularly inspected and maintained to ensure no spillage of waste or wastewater into the sea. Conveyance of dredged materials from the coffer dam shall be carried out cautiously to avoid spillage into the sea.</p> <p>The filled material for the stilling basin should be contained inside the temporary cofferdam. The top level of the cofferdam shall be constructed higher than the final backfilled level.</p> <p>The Contractor shall be responsible for the design, installation and maintenance of the silt curtains to minimize the impacts on the water quality and the protection of water quality. The design and specification of the silt curtains shall be submitted by the Contractor to the Engineer for approval.</p> <p>Silt curtains shall be formed from tough, abrasion resistant, permeable membranes, suitable for the purpose, supported on floating booms in such a way as to ensure that the sediment plume shall be restricted to within the limit of the works area. The silt curtain shall be formed and installed in such a way that tidal rise and fall are accommodated, with the silt curtains always extending from the surface to the bottom of the water column and held with anchor blocks. The removal and reinstallation of such curtains during typhoon conditions shall be as agreed with the Director of Marine Department. The contractor shall regularly inspect the silt curtains and check that they are moored and marked to avoid danger to marine traffic. Any damage to the silt curtain shall be repaired by the Contractor promptly and the works shall be stopped until the repair is fixed to the satisfaction of the Engineer.</p> | <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>N/A</p> <p>N/A</p> |

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| | <p>Transfer of rock fill material (armor rock) from the barge onto the site location should be conducted by grabbing and placement on the seabed to minimize sediment migration. No free dropping of the material will be allowed.</p> <p>Prior to the construction of armor rock based panel, a silt curtain shall also be installed prior to carry out any marine works as a preventive mitigation measure.</p> <p><u>Construction of TBM tunnel at both portals and intakes</u></p> <p>Recycled water will be used at the cutter face for cooling purposes. Used water will be collected and discharged to a settling tank for settlement. Excess water from the settling tank will be transferred to the water treatment plant on site where the addition of flocculants will assist in settlement of solids. The Contractor should ensure discharge water from the sedimentation tank meet the WPCO/TM requirements before discharge.</p> <p>During the drilling process, all flushing water will be recycled for use. Discharge of the treated water to nearby drainage system shall be allowed provided that it has been treated to a level meeting with statutory requirements.</p> <p>Water flow at streams should be maintained by a temporary diversion system during the construction phase of intakes and manhole drop shafts.</p> <p><u>General Construction Activities and Workforce</u></p> <p>A. Surface runoff</p> <p>Effluent produced from construction activities are subjected to WPCO control. Effluent produced from sites should be diverted away from stream courses. Construction works near stream course should be scheduled in the dry season as far as practical to avoid excessive site runoff discharge.</p> <p>Under the <i>Water Pollution Control Ordinance</i> (WPCO), turbid water from construction sites must be treated to minimize the solids content before being discharged into storm drains. The suspended solids load can be reduced by directing the runoff into temporary sand traps or other silt-removal facilities, and other good and appropriate site management practices. Advice on the handling and disposal of construction site discharge is provided in the ProPECC Paper (PN 1/94) on Construction Site Drainage.</p> <p>A drainage system layout should be prepared by the Contractor for each of the works areas (portals and intakes), detailing the facilities and measures to manage pollution arising from surface runoff from those works areas. The drainage layout and an associated drainage management plan to reduce surface runoff sediments and pollutants entering watercourses, should be submitted to the Engineer for approval and to EPD for agreement.</p> | <p>^</p> <p>N/A</p> <p>^</p> <p>^</p> <p>^</p> <p>*</p> <p>*</p> <p>*</p> |

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| | <p>The system should be capable of handling stormwater from the site and directing it to sediment removal facilities before discharge. If oil and grease is used on the site or brought to the site, the stormwater should pass through oil interceptors before discharge. The interceptors should have a bypass to prevent washout in heavy storms.</p> <p>A temporary channel system or earth bunds or sand barriers should be provided in works areas on site to direct stormwater to silt-removal facilities. Stockpiled materials, if susceptible to erosion of rain or wind, should be covered with tarpaulins (or/similar fabric) or hydroseedings as far as practicable especially during the wet season.</p> <p>Silt removal facilities should be checked and the deposited silt and grit should be removed regularly to ensure these facilities are in good working condition and to prevent blockages.</p> <p>Vehicle washing areas should be drained into a settlement basin to settle out the suspended solid before discharge to storm water drains. The water should be recycled on site whenever possible. It is suggested that the wash water from the wheel wash basin is either reused for road watering or pumped to the on-site settling tanks for treatment. Water used for dust depression purposes should be minimized and an alternative soil holding agent should be considered.</p> <p>B. Spillage, Oil and Solvents Any contractor generating waste oil or other chemicals as a result of his activities should register as a chemical waste producer and provide a safe storage area for chemicals on site. Oil interceptors need to be regularly inspected and cleaned to avoid wash-out of oil during storm conditions. A bypass should be provided to avoid overload of the interceptor's capacity.</p> <p>Any spillage should be cleaned up immediately and the resulting contaminated absorbent material should be properly managed according to Waste Disposal Regulations. Spills should be contained to avoid spreading and contaminating the water resources.</p> <p>Oil and fuels should be used and stored properly in designated area. All fuel tanks and storage areas should be provided with locks and be sited on within sealed areas within surrounded by bunds of with a capacity equal to 110% of the storage capacity of the largest tank.</p> <p>Good housekeeping practices are required to minimize careless spillage and keep the work space in a tidy and clean condition. Appropriate training, including safety codes and relevant manuals, should be given to the personnel who regularly handle the chemicals on site.</p> | <p>^</p> <p>*</p> <p>*</p> <p>^</p> <p>^</p> <p>*</p> <p>^</p> |

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| | <p>C. On-Site Effluent Generation</p> <p>Sewage arising from the additional population of workers on site should be collected in a suitable storage facility (chemical mobile toilets). Most of the work site locations are close to the public sewerage system, and therefore the use of septic tanks isare, therefore, not encouraged. Portable toilets should be used coupled with tickering away services provided by a licensed collector. They should be positioned at appropriate locations across the site to ensure no direct discharge of foul water off-site.</p> <p>D. Protection of Existing Flora and Fauna</p> <p>The Contractor should provide details of the plant and operation plans at each site for approval by the Engineer before commencing construction. The plans should include how the existing flora and fauna will be protected. Locations required for groundwater levels monitoring are Eastern Portal, PFLR1(P), THR2(P), TP5, TP789 and W12.</p> <p>The construction and demolition of the temporary pier may create short term impacts on the local marine water quality. The situation will be restored once the work is finished by proper phasing of the works programme and implementation of the adequate mitigation measures (e.g. silt curtain) the impacts will be minimized.</p> <p><u>Maintaining Baseflow in Downstream Watercourses</u></p> <p>The final design will be developed during the detailed design stage. The exact base flow rates to be maintained at each of the intakes will be subject to detailed site investigation at design stage.</p> <ul style="list-style-type: none"> • Purpose of the by-pass device is to maintain the base-flow of the affected stream course. • The by-pass system comprises an approach link and a trapezoidal channel. • The approach link is section with inclined profiled surface at a gradient of 1 in 100. It is used to direct the base flow to the bypass trapezoidal channel at its down stream end during the normal days. • The trapezoidal channel is sized such that it could handle the base flow in the affected stream course which is estimated to be no more than 20 l/s. • Whenever the flow in the stream course exceeding the base flow rate, the excessive flow will overflow into the intake structure via the bottom rack structure. The bottom rack structure has bar screen on the top and inclined channel at the bottom. The top level of the bar screen is level with the by-pass channel with an aim to receive the overflow from the by-pass channel. • The by-pass channel is designed requiring minimum maintenance. However, it is recommended that the maintenance authority carry out regular maintenance inspection prior to onset of seasons and after significant rainstorm event to prevent blockage of the by-pass and bottom rack structure. | <p>^</p> <p>^</p> <p>^</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> |

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| Waste/Chemical | <u>General</u> A proper waste management plan should be implemented to promote waste minimisation at source. Where waste generation is unavoidable then the potential for recycling or reuse should be explored and opportunities taken. If wastes cannot be recycled then the recommended disposal routes should be followed. | ^ |
| | All waste materials shall be segregated into categories covering: <ul style="list-style-type: none"> • Excavated material or construction waste suitable for reuse on-site • Excavated material or construction waste suitable for public filling areas • Remaining C&D waste for landfill • Chemical waste, and • General refuse | ^ ^ ^ ^ ^ |
| | Proper segregation and disposal of construction waste should be implemented. Separate containers for inert and non-inert wastes should be provided. The inert waste should be taken to public filling area and the non-inert waste should be transported to strategic landfills. | ^ |
| | A trip-ticket system on the solid waste transfer/disposal operations should be included as one of the contractual requirements (ETWB TCW No. 31/2004). The Independent Environmental Checker (IEC) should be responsible for auditing this system. | ^ |
| | IEC should also be responsible for auditing the well-documented record system which includes: (i) quantity of waste generation, (ii) quantity of recycled material, (iii) quantity of disposed material, (iv) disposal methods and (v) sites should be implemented during construction phase. | ^ |
| | Regular cleaning and maintenance of the waste storage area should be conducted throughout the construction stage. | ^ |
| | <u>Excavated spoil</u> Control measures for soil temporarily stockpiled on-site should be taken in order to minimize the noise, generation of dust, pollution of water and visual impact. Key impacts include: | ^ |

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| Terrestrial Ecology | <p>During the detailed design stage, the following issues should also be considered as possible to further minimise the impacts:</p> <ul style="list-style-type: none"> • Adjustment of site boundary to minimise temporary loss of natural stream habitat during construction. • Adjustment of site boundary to minimise use of mixed woodland as temporary works area. In particular, the woodland habitat in temporary works area of the Eastern Portal will be avoided, thereby greatly reducing the area of temporary loss of woodland habitat. • Minimizing felling of large trees. • About 20% of trees within the works area will be transplanted. The individual of <i>Artocarpus hypargyreus</i> recorded within the temporary works area of HKU1, if to be encroached, would also be transplanted. | <p>^</p> <p>^</p> <p>^</p> <p>^</p> |
| | <p>Standard site practices including the following, should be enforced to minimise the disturbance to the surroundings:</p> <ul style="list-style-type: none"> • Treat any damage that may occur to large individual trees in the adjacent area using materials and methods appropriate for tree surgery. • Reinstate work sites/disturbed areas immediately after completion of the construction works, in particular, through on-site tree/shrub planting along the woodland and shrubland section within the temporary works area. Tree/shrub species used should make reference from those in the surrounding area. • Regularly check the work site boundaries to ensure that they are not exceeded and that no damage occurs to surrounding areas. | <p>^</p> <p>^</p> <p>^</p> |
| | <p>A total of 1.02 ha would be replanted with woodland species, reaching almost a 1.5:1 ratio for compensatory planting. Tree/shrub species used should be based on those in the surrounding areas, including those which are commonly recorded during the baseline surveys.</p> | <p>^</p> |
| | <p>A low-flow channel would be provided within the channelised section to maintain a deeper water depth in the expanded channel, in particular during dry season as well as a basin at the end of the channelised section to provide living space for aquatic life. Step chute in the form of a series of descending water pools would be constructed between the low flow channel and the undisturbed stream course. There would also be openings for aquatic fauna between each chute step (pool). These could work like a “ladder” to help avoid isolating the aquatic fauna in the channelised section from natural habitats.</p> | <p>^</p> |
| | <p>Measures are also needed to maintain the flow of all affected streams/nullahs during the construction stages. Temporary bypass should be provided if the stream/nullah flows will be cut off by the construction works. After the construction works are finished, sections of temporary loss should be reinstated. Construction materials, wastes, and equipment should be cleared from the sites.</p> | <p>^</p> |

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| | <p>Surveys of amphibians at E4(P), PFLR1(P), W12(P), MB16, E5(B)(P), TP789(P) and P5(P) prior to commencement of construction is recommended. Frogs, including Hong Kong Cascade Frog and Lesser Spiny Frog, and tadpoles found at work areas of these proposed intake points will be collected and translocated to nearby streams that will not be affected by the project. These procedures should be performed by experienced herpetologists. A detailed translocation proposal will be submitted during the detailed design stage.</p> <p>Measures should also be taken to avoid runoff to streams and marine habitats. Stream/channel which could potentially be affected during construction should be prevented from sedimentation by erection of sediment barriers. Site runoff should be desilted by siltation traps in streams/channels or diverted, to reduce the potential for suspended sediments, organics and other contaminants to enter the local stream environment.</p> | <p>^</p> <p>^</p> |
| Marine Ecology | <p>Silt curtains will be deployed during the construction and demolition of the temporary berthing point. Deployment of silt curtains around the berthing point area would effectively avoid adverse water quality impacts due to barge filling. No significant ecological impact is anticipated.</p> <p>The invert of the stilling basin would be at -5.4 mPD. A cofferdam in the form of pipe-pile wall is to be constructed outside the stilling basin prior to the construction of basin. The cofferdam will be dewatered to provide a working area for construction of the stilling basin. The boulders from the seawall will then be removed by landbased grabs.</p> <p>Although the speed of the working vessels to be used in the Project (mainly barges) would not be high, a speed limit for marine traffic is proposed as a precautionary measure. A speed limit of 10 knots should be strictly enforced in the works area, in particular in the waters between the outfall location and the navigation channel in East Lamma Channel.</p> | <p>N/A</p> <p>^</p> <p>^</p> |

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| Landscape and Visual | The proposed landscape and visual mitigation measures during the construction phase include: | |
| | CM1 - Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where practical. | ^ |
| | CM2 - Existing trees to be retained on site should be carefully protected during construction. The detailed proposal for any trees felling and transplantation is subject to Lands Department's approval on tree felling application at the detailed design stage. | ^ |
| | CM3 - Trees unavoidably affected by the works should be transplanted where practical. | ^ |
| | CM4 - Compensatory tree planting should be provided to compensate for felled trees. | ^ |
| | CM5 - The extent of disturbance on the existing stream course should be minimized. Any temporary works areas within the stream course shall be reinstated after construction. | ^ |
| | CM7 – Control of night-time lighting | ^ |
| | CM8 – Erection of decorative screen hoarding | ^ |

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| Cultural Heritage | <p>The Cultural Heritage Impact Assessment has identified the following resources which will require mitigation measures during the construction stage;</p> | |
| | <p><u>Haw Par Mansion (including boundary wall and gate)</u> A condition survey must be undertaken by a qualified professional prior to the commencement of construction works for the tunnel portal in order to assess the structural integrity of the mansion, wall and gate (with special attention paid to any fragile architectural features). A report containing description of the types of construction, identification of fragile elements, an appraisal of the condition and a photographic record must be prepared. The report must also provide an assessment indicating whether further precautionary measures will be necessary during the construction phase, and if so provide details for sufficient protective measures, including monitoring for vibration control to ensure that no damage to the structure and fabric of the house, wall and gate results from the construction works. The report must be submitted to AMO for approval before construction activities commence. Upon approval the appropriate monitoring and precautionary measures shall be put into place.</p> | ^ |
| | <p>A buffer zone with a minimum width of 3 metres and an obstruction free access point must be maintained between the boundary wall/gate and the temporary works area (during construction works associated for both the tunnel portal and the permanent vehicle access ramp). This is to enable access for routine maintenance works on the wall and to ensure that the wall is not damaged by machinery operation or related construction activities. The temporary works area will be enclosed by standard DSD site hoarding.</p> | ^ |
| | <p><u>Former Explosive Magazine of Victoria Barracks</u> A condition survey must be undertaken by a qualified professional prior to the commencement of construction works in order to assess the structural integrity of the retaining wall and the extent of damage from cracks and vegetation growth. A report containing a description of the wall's construction materials, identification of fragile and/or endangered elements, an appraisal of the condition and a photographic record of the retaining wall must be prepared. The report must also provide an assessment indicating whether further precautionary measures will be necessary during the construction phase, and if so provide details for sufficient protective measures, such as monitoring for vibration control, to ensure that no damage to the retaining wall results from the construction works. The report must be submitted to AMO for approval before construction activities commence. Upon approval the appropriate monitoring and precautionary measures shall be put into place.</p> <p>A buffer zone with a minimum width of 3 metres and an obstruction free access point must be maintained between the retaining wall and the temporary works area (for the duration of the construction phase). The works area will be enclosed by standard DSD site hoarding.</p> | ^ |

Remarks: ^ Compliance of mitigation measure; X Non-compliance of mitigation measure;
N/A Not Applicable at this stage; • Non-compliance but rectified by the contractor;
* Recommendation was made during site audit but improved/rectified by the contractor;
Non-compliance but rectified/improved by the contractor and awaiting IEC's further comment.

| Types of Impacts | Mitigation Measures | Status |
|-----------------------|---|---------------------|
| Fisheries | <p>Silt curtain will be deployed during the construction and demolition of the temporary berthing point. With the deployment of silt curtains around the berthing point area, adverse water quality impact associated with the filling would not be anticipated. No significant fisheries impact is anticipated.</p> <p>The invert of stilling basin will be found at -5.4 mPD. A cofferdam in the form of pipe-pipe wall is to be constructed outside the stilling basin prior to the construction of basin. The cofferdam will be dewatered to provide a working space for the construction of stilling basin. The boulders from the seawall will then be removed by landbased grabs.</p> | <p>N/A</p> <p>^</p> |
| Hazard to Life | <p>There will be no overnight storage of explosives for this project. Transportation of explosives to site for the construction of adit will be undertaken on a daily basis. The contractor is required to destroy any unused explosives before nightfall. If contractor wishes to set up magazines for overnight storage of explosives, it is necessary to carry out risk assessment and seek the relevant approval following the EIAO process.</p> | <p>^</p> |

Remarks: ^ Compliance of mitigation measure; X Non-compliance of mitigation measure;
 N/A Not Applicable at this stage; • Non-compliance but rectified by the contractor;
 * Recommendation was made during site audit but improved/rectified by the contractor;
 # Non-compliance but rectified/improved by the contractor and awaiting IEC's further comment.

**APPENDIX K
EVENT ACTION PLANS**

Appendix K - Event Action Plans

Event/Action Plan for Air Quality

| EVENT | ACTION | | | |
|--|---|---|---|---|
| | ET | IEC | SUPERVISING OFFICER'S REPRESENTATIVE | CONTRACTOR |
| ACTION LEVEL | | | | |
| 1.Exceedance for one sample | <ol style="list-style-type: none"> 1. Identify the source and investigate the causes and propose remedial measures 2. Inform Supervising Officer's Representative & IEC 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily | <ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2.Check Contractor's working methods | <ol style="list-style-type: none"> 1.Notify Contractor | <ol style="list-style-type: none"> 1.Rectify any unacceptable practice 2.Amend working methods if appropriate |
| 2.Exceedance for two or more consecutive samples | <ol style="list-style-type: none"> 1. Identify the source 2. Inform Supervising Officer's Representative & IEC 3. Repeat measurements to confirm findings 4. Increase monitoring frequency to daily 5. Discuss with Supervising Officer's Representative & IEC for remedial actions required 6. If exceedance continues, arrange meeting with Supervising Officer's Representative & IEC 7. If exceedance stops, cease additional monitoring | <ol style="list-style-type: none"> 1. Checking monitoring data submitted by ET 2. Check Contractor's working methods 3. Discuss with ET, IEC and Contractor on proposed remedial actions 4. Advise the Supervising Officer's Representative & ET on the effectiveness of the proposed remedial measures 5. Supervise the implementation of the remedial measures | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Ensure remedial actions properly implemented | <ol style="list-style-type: none"> 1. Submit proposals for remedial actions to Supervising Officer's Representative within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate |
| LIMIT LEVEL | | | | |
| 1.Exceedance for one sample | <ol style="list-style-type: none"> 1. Identify source,,investigate the causes and propose remedial measures 2. Inform Supervising Officer's Representative & IEC and EPD 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Assess effectiveness of Contractor's remedial actions and keep EPD and Supervising Officer's Representative & IEC informed of the results | <ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Check Contractor's working methods 3. Discuss with ET and Contractor on proposed remedial actions 4. Advise the Supervising Officer's Representative on the effectiveness of the proposed remedial measures 5. Supervise the implementation of the remedial measures | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Ensure remedial actions properly implemented | <ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to Supervising Officer's Representative within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate |
| 2.Exceedance for two or more consecutive samples | <ol style="list-style-type: none"> 1. Identify source 2. Inform Supervising Officer's Representative, IEC and EPD the causes & actions taken for the exceedances 3. Repeat measurement to confirm findings | <ol style="list-style-type: none"> 1. Discuss amongst Supervising Officer's Representative, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions to assure their effectiveness and advise the | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be | <ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to Supervising Officer's Representative within 3 working |

| | | ACTION | | |
|---------------------|--|--|--|---|
| EVENT | ET | IEC | SUPERVISING OFFICER'S REPRESENTATIVE | CONTRACTOR |
| ACTION LEVEL | | | | |
| | 4. Increase monitoring frequency to daily 5. Investigate the causes of exceedance 6. Arrange meeting with & IEC and Supervising Officer's Representative to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep ER, IEC and EPD informed of the results 8. If exceedance stops, cease additional monitoring | Supervising Officer's Representative accordingly 3. Supervise the implementation of the remedial measures | implemented 4. Ensure remedial measure are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated | days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated |

Event/Action Plan for Construction Noise

| EVENT | ACTION | | | |
|--------------|---|---|--|--|
| | ET | IEC | SUPERVISING OFFICER'S REPRESENTATIVE | Contractor |
| Action Level | <ol style="list-style-type: none"> 1. Notify IEC, Supervising Officer's Representative and Contractor 2. carry our investigation by reviewing all the relevant monitoring data and the corresponding construction activities. Exceedances should also be confirmed by immediate verification in the field as far as practical. 3. Report the results of investigation to the IEC, Supervising Officer's Representative and Contractor 4. Discuss with the Contractor and formulate remedial measures 5. increase monitoring frequency to check mitigation effectiveness | <ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET 2. Review the proposed remedial measures by the Contractor and advise the Supervising Officer's Representative & ET accordingly 3. Supervise the implementation of remedial measures | <ol style="list-style-type: none"> 1. Confirm receipt of notification of complaint in writing 2. Notify Contractor 3. require Contractor to proposed remedial measures for analyzed noise problem 4. Ensure remedial measures are properly implemented | <ol style="list-style-type: none"> 1. Identify practicable measures to minimize the noise impact. Submit noise mitigation proposals to ET, IEC and ET. 2. Implement noise mitigation proposals |
| Limit Level | <ol style="list-style-type: none"> 1. Notify IEC, Supervising Officer's Representative, EPD and Contractor 2. Identify the source(s) of impact by reviewing all the relevant monitoring data and the corresponding construction activities. Exceedances should also be confirmed by immediate verification in the field as far as practical. 3. Repeat measurement to confirm findings 4. Increase monitoring frequency 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. inform IEC, Supervising Officer's Representative and EPD the cause & actions taken for the exceedances 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and Supervising Officer's Representative informed of the results 8. If exceedance stops, cease additional monitoring. | <ol style="list-style-type: none"> 1. Discuss amongst Supervising Officer's Representative, ET, and Contractor on the potential remedial actions 2. Review Contractor's remedial actions to assure their effectiveness and advise the Supervising Officer's Representative & ET accordingly 3. Supervise the implementation of the remedial measures | <ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analyzed noise problem 4. Ensure remedial measures are properly implemented 5. If exceedance continuous, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is aborted | <ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Identify practicable measures to minimize the noise impact. Submit proposals for remedial actions to Supervising Officer's Representative within three working days of notification 3. Implement the agreed proposals 4. Resubmit proposal if problem still not under control 5. Stop the relevant portion of works as determined by the Supervising Officer's Representative until the exceedance is abated |

Event/Action Plan for Water Quality

| EVENT | ACTION | | | |
|--|--|---|---|---|
| | ET | IEC | SUPERVISING OFFICER'S REPRESENTATIVE | CONTRACTOR |
| ACTION LEVEL | | | | |
| Action level being exceeded by one sampling day | <ol style="list-style-type: none"> 1. Repeat in situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and Supervising Officer's Representative; 4. Check monitoring data, all plant, equipment and Contractor's working methods. 5. Discuss mitigation measures with IEC and Contractor 6. Repeat measurement on next day of exceedance. | <ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures. Review proposals on mitigation measures submitted by Contractor and advise the Supervising Officer's Representative accordingly; and 2. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented. | <ol style="list-style-type: none"> 1. Inform the Supervising Officer's Representative and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and Supervising Officer's Representative; 6. Implement the agreed mitigation measures. |
| Action level being exceeded by more than one consecutive sampling days | <ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Supervising Officer's Representative and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance. | <ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures. Review proposals on mitigation measures submitted by Contractor and advise the Supervising Officer's Representative accordingly; and 2. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented. 3. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Inform the Supervising Officer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and Supervising Officer's Representative within 3 working days; 6. Implement the agreed mitigation measures. |
| LIMIT LEVEL | | | | |
| Limit level being exceeded by one sampling day | <ol style="list-style-type: none"> 1. Repeat measurement on next of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, Supervising Officer's Representative and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Supervising Officer's Representative and Contractor. | <ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working methods. 2. Discuss with ET and Contractor on possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the Supervising Officer's Representative accordingly; | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Discuss with IEC, ET and Contractor on the proposed mitigation. 3. Request Contractor to view the working methods. 4. Ensure mitigation measures are properly implemented. | <ol style="list-style-type: none"> 1. Inform the Supervising Officer's Representative and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET, IEC and Supervising Officer's Representative and propose mitigation measures to Supervising Officer's Representative and IEC within 3 working days; |

| EVENT | ACTION | | | |
|---|---|--|--|--|
| | ET | IEC | SUPERVISING OFFICER'S REPRESENTATIVE | CONTRACTOR |
| | | | | 5. Implement the agreed mitigation measures. |
| Limit level being exceeded by more than one consecutive sampling days | <ol style="list-style-type: none"> 1. Repeat measurement on next of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, Supervising Officer's Representative and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Supervising Officer's Representative and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. | <ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working methods. 2. Discuss with ET and Contractor on possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the Supervising Officer's Representative accordingly; 4. Supervise the implementation of mitigation measures. | <ol style="list-style-type: none"> 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level | <ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Discuss with ET, IEC and Supervising Officer's Representative and propose mitigation measures to Supervising Officer's Representative and IEC within 3 working days; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; 5. As directed by the Supervising Officer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level. |

**APPENDIX L
COMPLAINT LOG**

APPENDIX L – COMPLAINT LOG

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|---------------|---|---|--------|
| Com-2008-05-003 | Construction site at Eastern Portal | 22 May 2008 | The complaint was lodged by a complainant on 22 May 2008 regarding noise nuisance generated from the construction activities at the construction site of Eastern Portal | <p>According to the Contractor, only one excavator and one generator were operated for the excavation works around 8 am on 22 May 2008 at the Eastern portal. No other construction activities were conducted.</p> <p>In response to the complaint, The Contractor agreed to reschedule their current works activities, with immediate effect from 23 May 2008, that only site preparation works without noise nuisance to the nearby residents will be carried out from 7:00 am to 8:00 am at the Eastern Portal area.</p> <p>Base on the information collected and the monitoring results, the complaint was considered not justifiable since (1) no exceedance of the noise monitoring results was recorded in May and (2) no non-compliance or observation on noise was recorded.</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|--|---------------|--|--|--------|
| Com-2008-05-004 | Construction site at Western Portal (Marine Works) | 31 May 2008 | The complaint was lodged by one of the local resident on 31 May 2008 regarding the noise nuisance generated from the marine works at Western Portal. | According to the Contractor, only two derrick barges and one tug boat were operated for the seabed formation works around 18:00 hrs on 31 May 2008 at the Western Portal. No other construction activities were conducted. Base on the information collected and the monitoring results, the complaint was considered not justifiable since (1) no exceedance of the noise monitoring results was recorded in May and (2) no non-compliance or observation on noise was recorded. | Closed |
| Com-2008-07-007 | Construction site at Eastern Portal | 2 July 2008 | The complaint was lodged by a resident of The Legend on 2 July 2008 regarding noise nuisance generated from the construction activities at the construction site of Eastern Portal | According to the Contractor, only one generator and one drilling rig (Jumbo) were operated for the preparation works around 7:30a.m on 2 July 2008 at the Eastern portal. Construction noise was found from other construction site (Gammon Construction Limited) adjacent to Eastern Portal area. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|----------|----------|---------------|----------------------|---|--------|
| | | | | <p>In response to the complaint, The Contractor review his forthcoming operations within the Eastern Portal site as previous they agreed, reschedule their current works activities, with immediate effect from 23 May 2008, that only site preparation works without noise nuisance to the nearby residents will be carried out from 7:00 am to 8:00 am at the Eastern Portal area.</p> <p>Additional noise monitoring was conducted on 16 and 17 July 2008 during the drilling rig (Jumbo), excavator and wheel loader were operated for drilling works.</p> <p>Base on the information collected and the monitoring results, the complaint was considered not justifiable since (1) no exceedance of the noise monitoring results was recorded in June and July 2008 and additional noise monitoring (2) no non-compliance or observation on noise was recorded.</p> | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|-----------------|---|--|--------|
| COM-2008-10-011 | Construction site at Western Portal | 11 October 2008 | The complaint was lodged by one of the resident of Victoria Road on 11 October regarding about the noise nuisance generated from the construction works at Western Portal | <p>According to the Contractor, excavation works and marine works including sheet piling works were also conducted at the time of complaint at Western Portal</p> <p>Additional noise monitoring was conducted on 15 October 2008, drilling works, excavation works and marine works including sheet piling works were also conducted. The construction noise levels measured during the construction works were well below the construction noise limit of 75 dB(A)</p> <p>The Contractor agreed to reschedule the starting time of the construction works to 8:15am on every Saturday that without noise nuisance from the construction works to the nearby residents will be carried out from 7:00 am to 8:15 am at the Western Portal area.</p> <p>Base on the information collected, the noise level measured at outside Aegean Terrace during the construction works at Western Portal site were well below the construction</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|---------------------------------|-----------------|--|--|--------|
| | | | | noise limit of 75 dB(A). Also, the Contractor has implemented the remedial measure that reschedule the starting time of the construction works to 8:15am on every Saturday immediately after receiving the complaint to minimize the noise nuisance to the nearby residents. | |
| COM-2008-10-012 | Construction site at Intake TP5 | 15 October 2008 | The complaint was lodged by a complainant on 15 October 2008 regarding about the noise generated from the GI works, which starts from 8:30 hrs to 17:30 hrs next to Aigburth at May Road. | According to the information provided by the Contractor, only rotary type drill rigs and water pumps were operated for the GI works at the time of complaint at Intake TP5. | Closed |
| COM-2008-10-013 | Construction site at Intake TP5 | 31 October 2008 | The complaint was lodged by a complainant on 31 October 2008 regarding the black smoke is emitted and noise is generated from the machine at the site (Intake TP5), he needed to close the windows to prevent the black smoke from entering his flat and to attenuate the noise. | Additional site inspection and noise monitoring at the podium of the Valverde at May Road were conducted on 3 Nov 2008 and 24 Oct, 5 Nov, 7 Nov 2008 respectively. The Contractor agreed to reschedule the starting time of the construction works to 9:30am on every Saturday and 8:00 on normal weekdays that | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|------------------|--|---|--------|
| COM-2008-11-015 | Construction site at Intake TP5 | 4 November 2008 | The complaint was lodged by a complainant on 4 November regarding the noise nuisance generated from the construction works at Intake TP5. | without noise nuisance to the nearby residents will be carried out from 7:00 am to 8:00 am at Intake TP5. Acoustic insulating materials have been applied for enclosing water pump and rotary type drill rigs to minimize the noise nuisance to the nearest residents. Base on the information collected, the noise level measured at the podium of the Valverde at May Road were well below the construction noise limit of 75 dB(A) after the Contractor has implemented the remedial measure. | |
| COM-2008-11-016 | Construction site at Western Portal | 17 November 2008 | The complaint was lodged by a complainant on 17 November 2008 regarding dust nuisance arising from the soil nailing works at the roadside slope of Cyberport | According to the information provided by the Contractor, soil nailing works were conducted and some plant equipments i.e air compressor and generator were operated at the time of complaint at Western Portal. Base on the regular air quality monitoring in November 2008 at Outside Aegean Terrace (AQ2) and Outside The Site Office at Western | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|------------------|---|---|--------|
| | | | Road. | Portal (AQ3), the dust levels measured at AQ2 for 1 hour TSP and at AQ3 for 24 hour TSP were well below the Action Level (321µg/m ³ for 1 hour TSP and 156µg/m ³ for 24 hour TSP). Also, the Contractor has implemented the dust suppression measures to prevent dust nuisance from the construction activities including soil nailing works. | |
| COM-2008-11-019 | Construction site at Western Portal | 29 November 2008 | The complaint was lodged by a complainant on 1 December 2008 regarding noise nuisance at Western Portal at 08:30 hrs approx on 29 November 2008 and 00:30 on 1 December 2008. | <p>According to the information provided by The Contractor, no construction works was carried out at the temporary jetty at the time of complaint (00:30 on 1 December 2008) at Western Portal.</p> <p>However, base on the regular noise monitoring at Outside Aegean Terrace (NC3), the noise level measured during the construction works at Western Portal site were well below the construction noise limit of 75 dB(A).</p> | Closed |
| | Construction site at Western Portal | | | The complaint was considered not justifiable as Construction Noise Permit (CNP) – CNP No. GW-RS0827-08 has been granted from | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|---|------------------|---|---|--------|
| COM-2008-12-020 | | 28 December 2008 | The complaint was lodged by a complainant on 28 December 2008 regarding the excavator was found working within Western Portal works area on Sunday. | EPD for carrying out the construction works at Hong Kong West Drainage Tunnel (Western Portal), Cyberport Road, Cyberport, Hong Kong (DSD Contract No. DC/2007/10) between 1 December 2008 at 1900 hours and 28 February 2009 at 2400 hours. The powered mechanical equipment can be operated during the hours as below: a) Any day not being a general holiday between 1900 – 2300 hours b) General holiday (including Sundays) between 0700 – 1900 hours | |
| COM-2009-01-021 | Muddy Water Discharged into Sea at Western Portal | 21 January 2009 | Muddy water was observed from discharging into the sea at Western Portal Site | Base on the information collected, the muddy water discharged into the sea is considered due to the operations of excavation of stilling basin and poor condition of the silt curtain. The Contractor agreed to review their current provisions to prevent any muddy water from discharging into the sea again and close check the | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|--------------------|-------------------------------------|-----------------|--|---|--------|
| | | | | condition of the silt curtain. | |
| COM-2009-01-022(A) | Construction site at Western Portal | 12 January 2009 | The complaint was lodged by a complainant, the assistant of Southern District Councillor about the resident in Baguio Villa near Victoria Road, the complainant concerns on the noisy activities carried out at Western Portal site. | Base on the information collected, the noise level measured at outside Aegean Terrace during the construction works at Western Portal site were well below the construction noise limit of 75 dB(A). Aegean Terrace is at location close to the major site activities compared with Baguio Vila. Also, The Contractor agreed to reschedule their current works activities, no noisy work will be carried out at Western Portal Site before 8:00a.m. | Closed |
| COM-2009-01-022(B) | | 21 January 2009 | The complaint was lodged by resident of Aegean Terrace at Sassoon Road about the noise nuisance generated from Western Portal Site. | | |
| COM-2009-01-022(C) | | 21 January 2009 | The complaint was lodged by the resident in Baguio Villa near Victoria Road about noisy works at Western Portal Site. | | |
| COM-2009-02-023 | Construction site at Eastern Portal | 7 February 2009 | Complaint of Construction Noise at Early Morning (07:45hrs) at Eastern Portal | Based on the information collected, the construction noise at about 07:45hrs on 7 February 2009 was due to the checking of the backhole by the sub-contractor. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|------------------------------|---|--|--------|
| | | | Site | The Contractor was reminded to strengthen their site supervision and provide sufficient site-specific environmental training for sub-contractor to ensure that such situation would not be recurred. | |
| COM-2009-03-025 | Construction site at Western Portal | 2 March 2009 4 March 2009 | Complaint of noise generated by midnight works and night-time lighting at Western Portal Site | Base on the information collected, the regular noise monitoring was conducted during the construction works at the restricted hours. The noise measurement results were well below the construction noise limit of 65dB(A) for the period of 0700-2300 hrs on holiday; and 1900-2300 hrs on all other days and baseline level during the night time. | Closed |
| COM-2009-03-026 | | 7 March 2009 | Complaint of pipe hitting noise at midnight at Western Portal Site. | | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|---------------|--|--|--------|
| | | | | mitigation measures for Visual during the construction by controlling the night-time lighting so that the residual visual impacts can be accepted. | |
| COM-2009-04-028 | Construction site at Western Portal | 7 April 2009 | Complaint of noise generated from the construction works conducted till 11:00pm at Western Portal of the Hong Kong West Drainage Tunnel. | According to the information provided by The Contractor, TBM, conveyor belt, ventilation fan, tower crane and cherry picker were operated for the construction works on 7 April 2009 before 11:00pm and only TBM works with conveyor belt and ventilation fan were operated on 10 April 09 (Sunday). No operation of derrick barge on 10 April 09. | Closed |
| COM-2009-04-029 | | 10 April 2009 | Complaint of noise generated by TBM works at Western Portal. | <p>According to the photos taken on 8 April 2009, misplacement of plant was observed at Western Portal Site. Upon advice, The Contractor immediately moved the fan properly.</p> <p>Based on the information collected, the construction noise levels measured were well below the construction noise limit of 75 dB(A) for the period of 0700-1900 hrs on normal weekdays, 65 dB(A) for the</p> | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|----------|----------|---------------|----------------------|---|--------|
| | | | | <p>period of 0700-2300 hrs on holiday; and 1900-2300 hrs on all other days and baseline level for the period of 2300-0700 hrs of next day. The ground borne noise levels measured were also well below the construction ground borne noise standards (i.e. 65 dB(A) – Daytime (except General Holiday and Sundays) and 55 dB(A) – Daytime during general holidays and Sunday and all days during Evening (1900 to 2300 hrs). No exceedances of noise level have been recorded in March and April 2009.</p> <p>The Contractor was advised to strictly follow the conditions of the permit to avoid any misplacement of plants in the future. Also, The Contractor should take sufficient noise mitigation measures to minimize the environmental impact on the nearby community as recommended in the approved EIA report.</p> <p>In addition, DNJV already arranged tailors made training for the Production Team including the</p> | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|----------|----------|---------------|----------------------|---|--------|
| | | | | <p>senior management and foreman to explain the conditions and requirements listed on the CNP and delegated one Engineer to ensure all construction activities and PME's to be used are fully complying with CNP and legislation requirements before the commencement of the construction activities during the restricted hour.</p> | |
| | | | | <p>Base on the information collected, regular noise Monitoring was conducted during the night time to check the noise levels are complying with the construction noise criteria. The noise levels measured at NC3 during the construction works at night time were well below the construction noise limit.</p> <p>The Contractor was reminded to strengthen their site supervision by delegated Engineer to ensure all construction activities and PME's to be used are fully complying with CNP and legislation requirements and implement necessary noise mitigation measures as</p> | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|---------------|--|---|--------|
| | | | | recommended in the Approved EIA report to minimize and avoid the construction noise impact to the residents nearby especially during the restricted hours. | |
| COM-2009-04-030 | Construction site at Western Portal | 30 April 2009 | Complaint of Construction Noise Generated at Night at Western Portal. | According to the site activities diaries, TBM chainage, TBM excavation, installation of segment ring, pea gravel & mortar injection and installation cables & pipes at gantries were the activities conducted in the night of 30 April 2009. In accordance with the night time visit on 15 May 2009, the noise levels at Aegean Terrace was not high but with occasionally sound of locomotive and tower crane operations. No exceedance of noise level was recorded since the commencement of the project works at Western Portal Site. The noise levels measured at NC3 during the construction works were well below the construction noise limit. The Contractor will continue | Closed |
| COM-2009-05-031 | | 4 May 2009 | Complaint of low frequency noise emitted from the construction site at Western Portal. | | |
| | | 11 May 2009 | Complaint of Construction Noise nuisance generated from the Western Portal Site from day to night. | | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|---|---------------|--|---|--------|
| | | | | implementing their mitigation measures (e.g. Instruct workers not to shout during work in the evening; no horn signal of locomotive after 6:55 pm). | |
| COM-2009-05-032 | Construction site at Eastern Portal | 13 May 2009 | The complaint was lodged by a resident regarding the Construction Noise Nuisance from the construction works that were carried out from early morning till night time at Eastern Portal Site Area. | Based on the information collected, the noise levels measured at NC1/NC1a and NC2 during the construction works were well below the construction noise limit or baseline level. The Contractor is also committed to implement sufficient noise mitigation measures as recommended in the approved EIA report to minimize the nuisance caused to the nearby residents especially during the restricted hours. | Closed |
| COM-2009-06-035 | Hong Kong West Drainage Tunnel Construction Site at Cyberport | 3 June 2009 | EPD received a public complaint raised by local resident regarding the transportation and disposal of construction wastes from Hong Kong West Drainage Tunnel Construction Site at Cyberport on 3 June 2009. | Base on the information collected, alternative disposal ground is proposed by The Contractor and they have been submitted the relevant information and sought the approval from Supervising Officer. The Contractor also maintains the daily record with details of each disposal trip from the Site and the disposal ground. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|----------------|---|---|--------|
| COM-2009-06-037 | Construction site at Eastern Portal | 23 June 2009 | The few noise complaints were lodged by a resident of The Legend and Ronsdale Garden regarding the Construction Noise Nuisance from the construction works at Eastern Portal Site Area since 7:00a.m and in the afternoon. | Based on the information collected, the noise levels measured at NC1 and NC2 during the construction works were well below the construction noise limit or baseline level. In response to the complaints, the head of hydraulic breaker has been wrapped with sound proof materials and movable noise barriers were provided for rock excavation to reduce noise. The Contractor is also committed to implement sufficient noise mitigation measures as recommended in the approved EIA report to minimize the nuisance caused to the nearby residents. | Closed |
| COM-2009-06-038 | | | The complaint was raised by a representative of Goodwell Property Management, she wrote on behalf of the Estate Owner Committe of Legend at Tai Hang about noise nuisance arising from the excacvation works at Eastern Portal site portion. The Committe requested the Contractor to provide mitigation measures to mininise the impact. | | |
| COM-2009-08-040 | Construction site at Intake PFLR1 | 26 August 2009 | The complaint was relating to the noise generated from the construction activities of breaking of the existing boundary wall of Pokfulam Road Playground by use of | Noise monitoring results conducted on 1 September 2009 at NC11 - Honey Court for the Intake PFLR1 was submitted and no exceedance was recorded. In addition, based on the regular site inspection conducted | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|-------------------|---|--|--------|
| | | | the hand-held electric breaker. | <p>at Intake PFLR1, no observation/non-compliance on air quality was identified. The environmental conditions of the site will be continuously reviewed and monitored.</p> <p>DNJV had installed tarpaulin shielding and cover to mitigate not only the potential emission of exhausted smoke, but also the visual impact to the residents nearby.</p> | |
| COM-2009-09-042 | Construction site at Eastern Portal | 21 September 2009 | The complaint was raised by a resident of The Legend regarding poor housekeeping and construction noise nuisance from the Eastern Portal Site Area. | <p>Based on the information gathered in the Investigation, the Contractor had taken action immediately to rectify the complaint of poor housekeeping. The white site office was painted green in harmony with the surrounding environment and the site was maintained in a clean and tidy condition. All materials required for temporary works were stored in an orderly manner.</p> <p>Regarding the complaint of construction noise impact, the noise levels measured at The Legend</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|----------------------|---|---|--------|
| | | | | <p>(NC2) during the construction works in the normal working hours were well below the construction noise limit level.</p> <p>Nevertheless, the Contractor is also committed to implementing sufficient noise mitigation measures as recommended in the approved EIA report to minimize the nuisance caused to the nearby residents and provide training for the workers to increase awareness of their environmental responsibilities.</p> | |
| COM-2009-10-044 | Construction site at Eastern Portal | 6 and 7 October 2009 | The complaint was raised by a resident of The Legend and Ronsdale Garden regarding the construction noise nuisance from the Eastern Portal Site Area. | Based on the information gathered in the Investigation, the noise levels measured (additional noise monitoring) at The Legend (NC2) and Ronsdale Garden during the construction works including rock breaking works and soil nailing works were ranged from 68.4dB(A) to 75.3 dB(A) in the normal working hours. | Closed |
| COM-2009-10-045 | | | | | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------------------------------|-------------------------|---|--|--------|
| | | | | <p>recommended in the approved EIA report to minimize the nuisance caused to the nearby residents and provide training for the workers to increase awareness of their environmental responsibilities.</p> <p>It is recommended to increase the construction noise monitoring frequency for Eastern Portal Site to check the mitigation effectiveness.</p> | |
| COM-2009-11-054 | Construction site at Western Portal | 23 and 29 November 2009 | The complaint was raised by a resident of Aegean Terrace regarding the construction noise nuisance from the Western Portal Site Area. | <p>Base on the information collected, the noise levels measured at NC3 during the construction works were well below the construction noise limit.</p> <p>Nevertheless, the Contractor is also committed to implement sufficient noise mitigation measures as recommended in the approved EIA report, Clause 5.4.15 to minimize/avoid the nuisance caused to the nearby residents.</p> | Closed |
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| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
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| COM-2009-12-059 | Construction site at Intake MB16 | 27 November 2009 | The complaint was received on 2 November 2009 regarding the dust nuisance caused by the works at the Construction Site at Mount Butler Road near Clementi Road (Intake MB16). EPD subsequently issued a notice of complaint. | <p>Based on the information collected, the Contractor has implemented the dust suppression measures to prevent dust nuisance from the construction activities.</p> <p>During the site inspection in November 2009, slope improvement works including soil nailing works were observed from other construction site adjacent to DNJV's construction works at Mount Butler Road.</p> | Closed |
| COM-2009-12-061 | Construction site at Intake PFLR1 | 23 and 28 December 2009 | Two public complaints were received from the resident of Pok Fu Lam Road on 23rd and 28th December 2009 respectively about the construction noise nuisance from the construction site at Intake PFLR 1. | <p>Based on the information gathered in the Investigation, the noise levels measured at Honey Court (NC11) during the construction works were well below the construction noise limit.</p> <p>The location of the designated noise monitoring station (NC11 – Honey Court) is at location close to the construction site compared with Pok Fu Lam Height.</p> <p>In addition, a large scale innovation works being undertaken at a resident building adjacent to the Pok Fu Lam Height was observed during the</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|--|-------------------------------------|---|--|---|--------|
| | | | | routine site inspection. The innovation works included hammering and drilling on the outer walls of the building and contributed significantly to the noisy environment. | |
| COM-2010-01-062 | Construction site at Western Portal | 3 January 2010 | The public complaint was received from the resident of Bel-Air through the project hotline on 3rd January 2010 about “wooning” sound heard after midnight, and he suspected that the sound was coming the construction sites at Cyberport. | Base on the information collected, the noise levels measured at NC3 during the construction works were well below the baseline level. The location of the designated noise monitoring station (NC3 – Outside Aegean Terrace) is at location close to the construction site compared with Bel-Air. The Contractor will continue implementing the existing noise mitigation measures at the Western Portal to minimize the environmental impact to the nearby residents. | Closed |
| COM-2010-01-063 COM-2010-01-066(1), (2) and (3) | Intake MB16 | 20 January 2010 23, 25, 27 January and 2 February 2010 | The first complaint was raised by the resident at No. 58 Mount Butler Road about the noise and vibration generated from the works on 20 January 2010. Three complaints were raised | Based on the EIA assessment results, No. 58 Mount Butler Road and Amber Lodge are not the potential ground borne noise sensitive receivers as they are not within the influence zone near the Main Tunnel alignments from Cyberport to Tai Hang and the alignments of the adits. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------------|-----------------|---|--|--------|
| | | | by the resident of Amber Lodge through the Project Hotline regarding the low frequent vibration from underground on 23, 25, 27 January and 2 February 2010. | The additional ground borne noise levels measured at inside Amber Lodge during the TBM works were well within the construction ground borne noise standards. The Contractor volunteered to stop the operation of the East TBM between midnight and 07:00 hours in Week 6 and 7 after which the machine has moved far away from these premises | |
| COM-2010-02-073 | Western Portal | 3 February 2010 | Complaint of noise generated by the operation of plants, rock falling and flash lighting within Western Portal site area. | Base on the regular noise monitoring, the noise levels measured at NC3 during the construction works were well below the baseline level. The Contractor will continue implementing the existing noise mitigation measures at the Western Portal to minimize the environmental impact to the nearby residents. | Closed |
| COM-2010-03-080 | Intake PFLR1 | 1 March 2010 | The public complaint was received from the resident of Honey Court referred by a DC member on 1st March 2010 about the construction | Based on the information gathered in the Investigation, the noise levels measured at Honey Court (NC11) in February and March 2010 were ranged from 62.3 dB(A) to 74.7 | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|--------------|---------------|--|--|--------|
| | | | noise nuisance from the construction site at Intake PFLR 1 | <p>dB(A). The noise levels were marginally below the 75dB (A) limit level.</p> <p>The contractor was reminded to implement necessary mitigation measures to curb inducing contribution to the surrounding noise environment.</p> | |
| COM-2010-03-081 | Intake TP789 | 5 March 2010 | The complaint was received from Kerry Management Ltd. on 5th March 2010 about the construction noise complaints raised by some tenants of Tavistock. They complained about the noisy activities being carried out at Intake TP789 on Saturday. | <p>Based on the information gathered in the investigation, the noise levels measured at Tregunter Path near Tavistock were below the construction noise limit and the Contractor has already implemented the noise mitigation measures to reduce noise impact to the residents arising from the construction works.</p> <p>Nevertheless, we reminded the Contractor to closely monitor the effective implementation of the existing noise mitigation measures at Intake TP789. Review the effectiveness of the implemented noise mitigation measures from time to time during different construction phases.</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-------------------------------------|----------------|-------------------------------|---|---|--------|
| COM-2010-03-082 and COM-2010-03-087 | Western Portal | 6 March 2010 15 March 2010 | Two public complaints were received from the residents of Bel-Air at Western Portal on 6th and 15th March 2010 about the Construction Noise and Dust Nuisance from Hong Kong West Drainage Tunnel Construction Site at Cyberport (i.e. Western Portal Site) respectively. | Based on the information collected, the noise and air quality levels measured at NC3 and AQ2/AQ3 during the construction works were below the noise and air quality criteria respectively. Also, the Contractor has implemented appropriate environmental mitigation measures on site to reduce noise and dust impact to the residents arising from the construction works. Nevertheless, the Contractor was reminded to review the effectiveness of the implemented noise and air quality mitigation measures from time to time during different construction phases. | Closed |
| COM-2010-04-094 | Western Portal | 9 April 2010 | The public complaint was received by EPD hotline on 9 th April 2010 regarding construction dust nuisance from the Hong Kong West Drainage Tunnel construction site at Cyberport (i.e. Western Portal Site) | Based on the information collected, the air quality levels measured at AQ2 and AQ3 during the construction works were below the air quality criteria. Also, the Contractor has implemented appropriate dust mitigation measures on site to reduce dust impact to the residents arising from the construction works. Although the air quality levels measured at AQ2 and | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|------------------|---------------|---|--|--------|
| | | | | <p>AQ3 were below the air quality criteria, we advised the Contractor to maintain the existing air quality mitigation measures, to reduce the environmental impact on the nearby residents.</p> <p>Nevertheless, the Contractor was reminded to review the existing measures if such measures are enough and appropriate to suit the site condition from time to time during different construction phases to minimize the dust nuisance.</p> | |
| COM-2010-04-097 | Intake TP789/TP4 | 22 April 2010 | The complaint was received from resident of Tregunter Tower on 22 nd April 2010 about the noisy activities being carried out at Intake TP789/TP4 in the morning. | <p>Based on the information gathered in the investigation, the noise levels measured at Tregunter Path near Tavistock were below the construction noise limit and the Contractor has further improved the noise mitigation measures to reduce noise impact to the residents arising from the noise generation works.</p> <p>The Contractor agreed to reschedule the starting time of the noisy works to 9:00am on in the morning that no noisy works such as rock breaking</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------------|---------------|---|--|--------|
| | | | | will be conducted before 9:00am. In addition, enclosures consist of noise absorption blankets have been applied for enclosing Intakes construction areas to minimize the noise nuisance to the nearest residents. | |
| COM-2010-04-100 | Western Portal | 30 April 2010 | The public complaint was received from the resident of Bel-Air on 30 th April 2010 regarding the dust nuisance generated during loading / unloading operation from two barges at pier of Cyberport. Dark smoke was also emitted from the two barges. | Based on the information collected, the air quality levels measured at AQ2 and AQ3 during the construction works were below the air quality criteria. The Contractor has taken initiative to minimize dust nuisance to the nearby residents by implementation of additional mitigation measures as below: <ul style="list-style-type: none"> - To plan the installation of 3-sided curtain-like enclosure at the conveyor discharge point to the barge. - Mechanical cover closed even for empty trucks leaving the Site. - Written advice to subcontractor on the subject of dust suppression and speeding of vehicles. - Toolbox training to drivers on the new measures. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|---------------------|----------------|---------------|--|---|--------|
| COM-2010-05-105 | Western Portal | 7 May 2010 | The second complaint was received via EPD Hotline on 7 May 2010. The anonymous complainant concerned about the dark smoke emitted from the barges on 4 May 2010 and many dump trucks parking outside the Western Portal Site on 5, 6 and 7 May 2010. | Based on the information collected, the air quality levels measured at AQ2 and AQ3 during the construction works were below the air quality criteria. | Closed |
| COM-2010-05-105 (2) | | 17 May 2010 | The complaint was received via EPD Hotline on 17 May 2010. The anonymous complainant complaint about the open stockpile of dusty materials without covered entirely. | <p>Although the air quality levels measured at AQ2 and AQ3 were below the air quality criteria, we advised the Contractor to maintain the existing air quality mitigation measures and review the existing measures if such measures are enough and appropriate to suit the site condition from time to time during different construction phases to minimize the dust nuisance.</p> <p>Other suitable dust control measures as stipulated in the Air Pollution Control (Construction Dust) Regulation, where appropriate, should be adopted.</p> <p>Nevertheless, the Contractor is also committed to take sufficient dust mitigation measures as recommended in the approved EIA report including</p> | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------------|---------------|--|---|--------|
| | | | | installation of 3-sided curtain-like enclosure at the conveyor discharge point to the barge to minimize the dust nuisance on the nearby residents. | |
| COM-2010-06-113 | Intake PFLR1 | 2 June 2010 | The complaint was received by DSD on 2 June 2010 regarding siren sound was generated from the site throughout the day which caused nuisance. | The noise source was generated from the alert system of the backhoe during operation. The backhoe was removed off site on 3 June 2010. | Closed |
| | Western Portal | 15 June 2010 | A public complaint was received by EPD hotline on 15th June 2010 complained about the construction works from Hong Kong West Drainage Tunnel construction site at Cyberport (i.e. Western Portal Site) affect their health of respiratory system | Based on the information collected, the air quality levels measured at AQ2 and AQ3 during the construction works were below the Action Level (321µg/m ³ for 1 hour TSP and 156µg/m ³ for 24 hour TSP). Also, the Contractor has implemented appropriate dust mitigation measures, such as providing water sprays on exposed surface, covering dusty materials and placing dust generation works in an area sheltered on the top and three sides etc on site to reduce dust impact to the residents arising from the construction works. | Closed |
| COM-2010-07-121 | Western Portal | 15 July 2010 | Cyberport Management Office lodged a complaint in | DNJV has delivered the reply letter to Cyberport Management Office on | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|---------------------|----------------|---------------|--|---|--------|
| | | | writing regarding the sands and mud left by the dump trucks on Cyberport road | <p>26 July 2010 stating the following:- The stain is not mud or debris. It is liquid of granite powder. Stain on the road was caused by heavy rainstorm which brings moisture to granite powder in trucks.</p> <p>The trucks have been equipped with tailor-made tanks to receive the liquid of granite powder. To prevent reoccurrence, DNJV will reinforce checking of these tanks and other truck conditions at work site to ensure no dripping before departure.</p> <p>In this regard, the Contractor was reminded that all vehicles and plant should be cleaned before leaving the construction site to ensure no earth, mud and debris or other wastes is deposited on roads. Proper maintenance of the tailor-made tanks equipped at the trucks is also needed to avoid any leakage.</p> | |
| COM-2010-07-123 (1) | Eastern Portal | 2 August 2010 | The complaint was received through the Project Hotline regarding the noise generated from construction vehicles. | Based on the information collected, the noise levels measured at NC1/NC1a and NC2 during the construction works were well below | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|----------------------------|---------------------|----------------|---|---|--------|
| COM-2010-07-123 (2) | | 2 August 2010 | The complaint was received by DSD concerning the noise generated from construction site at 19:00. | the construction noise limit or baseline level. The Contractor is also committed to implement sufficient noise mitigation measures as recommended in the approved EIA report to minimize the nuisance caused to the nearby residents especially during the restricted hours. | |
| COM-2010-08-125 | | 3 August 2010 | The complaint was received by DSD concerning the noise generated from construction site until 8:00 pm every night. | | |
| COM-2010-08-124 | Intake TP789/TP4 | 2 August 2010 | The complaint was received by DSD regarding the construction works at Tregunter Path is extremely noisy and diminishes the ability of residents of the neighborhood to enjoy outdoor facilities | Based on the information gathered in the investigation, the noise levels at Tregunter Tower was within the construction noise limit of 75dB(A). The Contractor has taken initiative to minimize noise nuisance to the nearby residents by implementation of mitigation measures continuously as below: - Properly maintained and operated the construction plant (well-greased, damage and worn parts promptly replaced) - To install noise absorption blankets at the appropriate area to mitigate noise generated by the works. | Closed |
| COM-2010-08-124 (con'd) | | 5 August 2010 | The complaint was received by DSD regarding the construction works at Tregunter Path is extremely noisy and diminishes the ability of residents of the neighborhood to enjoy outdoor facilities | | |
| COM-2010-08-129 | | 12 August 2010 | The complaint was raised by the resident of Tregunter Path for the noisy works which | | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|---------------------|----------------|-----------------|--|--|--------|
| | | | was carried out after 18:00hrs at Intake TP4 | - To arrange the construction working period at Tregunter Path starting from 13th August 2010 as below: Monday – Friday: 08:00hrs to 18:00hrs Saturday: 08:30hrs to 18:00hrs Sunday and Public Holiday: No Works | |
| COM-2010-08-129 | | 12 August 2010 | The complaint was received from Protech Property Management Limited (the building manager of Tregunter Tower, 14 Tregunter Path, Mid-Levels, Hong Kong) regarding the noisy construction works at Tregunter Path | | |
| COM-2010-08-129 (2) | | 13 August 2010 | The complaint was received by RSS concerning the noisy work from the construction site on Saturday | | |
| COM-2010-10-151 | Eastern Portal | 15 October 2010 | A complaint was received from the resident of The Legend through the supervising officer on 15th October 2010 about the construction dust nuisance from Eastern Portal Site Area. | Based on the information gathered in the investigation, no exceedance of air quality level was recorded at AQ1 since the commencement of the project works for Eastern Portal Site. The potential source of air quality impact arising from the removal of tunneling spoils from the tunnel portals as well as the vehicular emissions is minimized as all TBM excavation works have been completed since 5 October 2010. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------------|-----------------|--|---|--------|
| COM-2010-10-154 | Eastern Portal | 18 October 2010 | <p>A complaint was received from the resident of Ronsdale Garden through the DSD on 18th October 2010 about the construction noise nuisance from Eastern Portal Site Area.</p> <p>According to the complainant, the noise seems to be generated by a pump.</p> | <p>Based on the information gathered in the investigation, the noise levels measured at The Legend (NC2) and outside True Light Middle School of Hong Kong (NC1) were well below the limit level.</p> <p>The Contractor agreed to terminate the operation of pump during the evening (1900 – 2300) and night (2300 – 0700) time since end of October 2010 and committed to implementing sufficient noise mitigation measures as recommended in the approved EIA report to minimize the nuisance caused to the nearby residents.</p> | Closed |
| COM-2010-10-155 | Intake RR1 | 11 October 2010 | <p>A letter from the Property Management of Peakville Court - Hong Yip Service Company Ltd was received by DNJV on 11th October 2010 about the construction noise nuisance and wastewater generated from Intake RR1 Site Area.</p> | <p>Based on the information gathered in the investigation, the noise levels measured at Peakville Court (NC13) and Ying Wa Girl's School (NC12) were below the baseline/limit level.</p> <p>In addition, water runoff was observed leaked out to the public road from the site area according to the regular site inspection.</p> <p>The Contractor will seal the bottom of barriers with concrete or provided</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|--------------------|----------------|-----------------|---|---|--------|
| | | | | with sandbag as early as possible. | |
| COM-2010-11-160 | Intake TP789 | 5 November 2010 | The complaint was received from Kerry Property Management and advised that some complaints from the residents of Tavistock about low frequency noise generated by the power pack within Site Portion TP789. | Based on the information gathered in the investigation, the noise levels measured at near Intake TP789 were below the limit level after the Contractor implement noise mitigation measures for the noise generation activities. | Closed |
| COM-2010-11-160(2) | Intake TP789 | 9 November 2010 | Some residents complained the low frequency noise after the addition of sound proof sheets on the power pack at Intake TP789. | | |
| COM-2010-11-163 | Western Portal | 6 November 2010 | A complaint was received from a complainant regarding noise nuisance caused by spoils dropping directly from conveyor belt into barge (rock hitting sound) at Western Portal. | Based on the information gathered in the investigation, the noise levels measured at NC3 were below the limit level. | Closed |
| COM-2010-11-163(2) | Western Portal | 7 November 2010 | A complaint was received from a complainant regarding noise nuisance caused by spoils dropping from conveyor belt into storage basin (rock hitting sound). The complainant also | | |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|------------|-------------------------|--|---|--------|
| | | | complained the noise of ventilation fans at the Western Portal area. | | |
| COM-2010-11-164 | Intake TP5 | 10 November 2010 | Kerry Property Management Services received several complaints from the residents of Valverde on 10 November 2010 morning regarding working noise emitted from the Intake TP5 work site in early morning (before 7:30am). | <p>Base on the information collected, the ad-hoc noise monitoring results measured at near Valverde was met the acceptable noise levels. Drill and blast is not considered with respect to noise annoyance, as the duration of blasting is very short and infrequent.</p> <p>The Contractor volunteered to cancel late blasts and scheduling all blasts before 7pm as far as possible until the nearby adit blasting works completed by mid of December 2010 tentatively.</p> | Closed |
| COM-2010-11-165 | Intake TP5 | 15 and 17 November 2010 | Kerry Property Management Ltd phoned DSD at about 17:08 hrs on 15 November 2010 relaying some complaints from the residents of Valverde about the noise/vibration due to the blasting works in past weeks. Jennifer also requested DNJV not to carry out blasting works at nights. | | |
| COM-2010-12-170 | Intake DG1 | 7 December 2010 | The complaint was received regarding the noise arising from the excavation works, starting from 9:00 hrs, in the construction site near Evergreen Villa of Stubbs | Based on the information gathered in the Investigation, the noise levels measured at NC4 and NC6 in November and December 2010 were below the construction noise limit level or baseline levels. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-------------|------------------|---|---|--------|
| | | | Road. | <p>The Contractor has taken initiative to erect noise absorption blankets at the site boundary to minimize noise nuisance to the nearby residents.</p> <p>The Contractor was reminded to review the effectiveness of the implemented noise mitigation measures from time to time during different construction phases.</p> | |
| COM-2010-12-171 | Intake MB16 | 8 December 2010 | The complainant complained the works near Mount Butler Road generated dust, thus affecting the air quality in the vicinity. | DNJV would arrange water spraying at the entrance of Area B. In addition, Environmental Team and RSS would closely monitor to ensure relevant measures are effectively implemented. | Closed |
| COM-2010-12-173 | Intake W5 | 14 December 2010 | A complaint was received from a complainant regarding noisy construction activities at Site Portion W5 had affected her niece's study to prepare for examination. | DSD are now constructing an intake at the subject site under Hong Kong West Drainage Tunnel project. The construction work at Site Portion is expected for completion in end 2011. At the moment, the pipe piling works have been completed and the Contractor will carry out grouting work in this week and then excavation work afterwards. The noise generated by excavation works should be less than that of pipe piling | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------------|------------------|--|---|--------|
| | | | | works. Nevertheless, DSD would closely monitor the works in order to mitigate the noise impact to the nearby residents. | |
| COM-2010-12-178 | Intake TP5 | 22 December 2010 | Kerry Property Management Ltd notified that some complaints from the residents regarding the early commencement of the noise works at Intake Ste TP5 (earlier than 08:00hrs) in the past few days. | As advised by DNJV on 23 December 2010, they would carry out the work at site portion TP5 from 08:00 hrs to 19:00 hrs. Eddie Yau, DNJV Public Relation Manager had already explained to Kerry about the progress and arrangement at Site Portion TP5. | Closed |
| COM-2010-12-179 | Eastern Portal | 24 December 2010 | The Property Management Office of The Legend referred the complaint from the resident to DSD regarding the intermediate noise from Eastern Portal site portion in the morning and at night. | Based on the information gathered in the investigation, the noise levels measured at NC1 and NC2 were below the limit level. | Closed |
| COM-2011-01-181 | Eastern Portal | 21 January 2011 | The Property Management Office of Legend called DNJV to reflect a resident's concern on early construction noise at 8:30am on Saturday. | Based on the information gathered in the investigation, the noise levels measured at NC1 and NC2 were below the limit level. The breaking work to be completed by that day. | Closed |
| COM-2011-02-186 | Intake GL1 | 18 February 2011 | A complaint was received from the resident of Green Lane through the ICC on 18th February 2011 about the | Based on the information gathered in the investigation, the noise levels measured at near Green Lane was marginal below the construction | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------------|------------------|--|--|--------|
| | | | <p>construction noise generated from the plant equipments being operated at Intake GL1 from early in the morning and ends at around 19:00 at night.</p> | <p>noise limit. However, the Contractor has already implemented the noise mitigation measures to reduce noise impact. The major noise source due to the raise boring works has been finished since 26th February 2011</p> | |
| COM-2011-02-188 | Western Portal | 25 February 2011 | <p>The complaint was received from the resident of Bel Air who called hotline at 3am and 4pm on 25 Feb 2011 to complaint about noise. The complainant refuses to give details on the noise. He claims that he will report this to the Police and requested DNJV to provide him with copy of CNP.</p> | <p>Based on the information gathered in the investigation, the noise levels measured at NC3 was below the limit level.</p> | Closed |
| COM-2011-03-189 | Western Portal | 7 March 2011 | <p>Property management office of Aigburth and Valverde transferred noise complaints of residents about the vibration and early working noise emitting from the TP5 and TP789. DNJV replied to explain to the PMO.</p> | <p>DNJV had already explained to Property management office of Aigburth and Valverde about the progress and arrangement at Site Portion TP5. The raise boring work to be completed by that day.</p> | Closed |
| COM-2011-03-190 | Western Portal | 7 March 2011 | <p>The complaint was received from the resident of Aegean</p> | <p>Based on the information gathered in the investigation, the noise levels</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|---------------------|----------------|---------------|--|--|--------|
| COM-2011-03-193 (1) | Western Portal | 14 March 2011 | Terrace who complained about the night-time noise of Western Portal. DNJV would review the works during the restricted hours and further improve the enclosure where necessary. | measured at Western Portal was below the construction noise limit. However, the Contractor has already implemented the noise mitigation measures to reduce noise impact. | |
| COM-2011-03-193 (2) | Western Portal | 16 March 2011 | | | |
| COM-2011-03-192 | Intake B2 | 14 March 2011 | The PMO of Grand House at Macdonnell Road complained about the construction noise at the intake B2. In the site portion, rock excavation works was being carried out. The works was anticipated to complete in end April 2011. | Based on the information gathered in the investigation, the noise levels measured at near B2 was marginal below the construction noise limit. The Contractor has taken initiative to enclose the hydraulic breaker with noise absorption blankets to minimize noise nuisance to the nearby residents. The Contractor was reminded to review the effectiveness of the implemented noise mitigation measures from time to time during different construction phases. | Closed |
| COM-2011-03-195 | Intake CR1 | 28 March 2011 | The complaint was received from the resident of Conduit Tower, who complained about the construction noise at the intake CR1. | Based on the information gathered in the investigation, the noise levels measured at near CR1 was well below the construction noise limit. The Contractor has taken initiative to erect noise absorption blankets at the whole site boundary to minimize noise nuisance to the nearby residents. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|------------|---------------|--|--|--------|
| | | | | <p>The Contractor was reminded to review the effectiveness of the implemented noise mitigation measures from time to time during different construction phases.</p> | |
| COM-2011-05-210 | Intake GL1 | 30 May 2011 | <p>The complaint was raised from the resident of Green Lane, who complained about the construction noise at the intake GL1.</p> | <p>Based on the information gathered in the investigation, the noise levels measured at near Green Lane was well below the construction noise limit. However, the Contractor has already implemented the noise mitigation measures to reduce noise impact.</p> | Closed |
| COM-2011-05-211 | Intake CR1 | 30 May 2011 | <p>The complaint was received from the resident of Conduit Tower, who complained about the construction noise at the intake CR1. The complainant mainly concerned that the noisy works at Intake CR1 started at 8:00 hrs everyday is too early. He requested to defer the working hours later.</p> | <p>Based on the information gathered in the investigation, the noise levels measured at near CR1 was well below the construction noise limit. The Contractor has taken initiative to erect noise absorption blankets at the whole site boundary to minimize noise nuisance to the nearby residents. The Contractor was reminded to review the effectiveness of the implemented noise mitigation measures from time to time during different construction phases.</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|-----------------|----------------------|---|--|---------------|
| COM-2011-06-214 | Intake P5 | 2 June 2011 | The public complaint was raised on 2 nd June 2011 via Environmental Protection Department (EPD) regarding the construction noise nuisance from the Hong Kong West Drainage Tunnel construction site at Intake P5. | Based on the information gathered in the investigation, the noise levels measured at near P5 was well below the construction noise limit. In addition, the pipe-piling work has been stopped until the end of July 2011. However, the Contractor has prepared the remedial action that should be taken while starting the pipe-piling work. The Contractor was reminded to review the effectiveness of the implemented noise mitigation measures from time to time during different construction phases. | Closed |
| COM-2011-07-218 | Western Portal | 2 July 2011 | A public complaint was received from the resident of Aegean Terrace on 2nd July 2011 regarding the construction noise nuisance from the Hong Kong West Drainage Tunnel construction site at Cyberport (i.e. Western Portal Site) near Aegean Terrace. | Based on the information gathered in the investigation, the noise levels measured at Western Portal was below the construction noise limit. However, the Contractor has already implemented the noise mitigation measures to reduce noise impact. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|--------------|---------------|--|--|--------|
| COM-2011-07-219 | Intake P5 | 8 July 2011 | A public complaint was received from the resident of Belmont Court on 8th July 2011 and suspected in relation to the construction noise nuisance from the Hong Kong West Drainage Tunnel construction site at Intake P5. | Based on the information gathered in the investigation, the noise levels measured at near P5 was well below the construction noise limit. In addition, the pipe-piling work has been stopped until the end of July 2011. However, the Contractor has prepared the remedial action that should be taken while starting the pipe-piling work. | Closed |
| COM-2011-07-225 | Intake PFLR1 | 27 July 2011 | A resident, lives near Intake PFLR1, called DSD complaining the noise generated from the RBM. The noise probably generated from the RBM drilling rig. | Based on the information gathered in the investigation, the noise levels measured at near PFLR1 was below the construction noise limit. In addition, the Contractor has taken initiative to enclose or wrap the noise source with sound insulating materials to minimize noise nuisance to the nearby residents. | Closed |
| COM-2011-07-227 | Intake CR1 | 30 July 2011 | A resident complained about the noise from the Site Portion CR1. She said it was not supposed to work on Saturdays. | DNJV responded that the working hours are from Mondays to Saturdays. Currently, pipe piling works were in progress. They would improve the mitigation measure. According to the noise level measured at podium of Conduit Tower starting at 10:09 hrs on 1 August 2011, it was 73.5 dB(A). The works was completed at 9:10 hrs on 2 August 2011. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------------|---------------|--|---|--------|
| COM-2011-07-228 | Eastern Portal | 29 July 2011 | <p>The complaint was lodged by a complainant who referred some residents' complaints about the dust and smoke generated from Eastern Portal tunneling works recently. He urged to implement an effective and protective mitigation measures as soon as possible.</p> | <p>Both the 1-hour and 24-hour TSP monitoring results in July 2011 showed dust levels at True Light Secondary School were under Action and Limit Levels.</p> <p>The potential sources of smoke or dust may be occasionally generated at the Eastern Portal as a result of the difference in atmospheric condition such as temperature and humidity inside and outside the tunnel. This is a normal atmospheric phenomenon and did not constitute to environmental impacts.</p> <p>There are sufficient measures to minimize the smoke or dust emission, such as sprinkle system inside adits under blasting works. There was no deficiency recorded in the Eastern Portal.</p> <p>Ventilation system inside the tunnel was designed to extract the blasting fume from adits towards the adit dust scrubber in the Western Portal and then discharged locally. There should not be blasting fume accumulated in the Eastern Portal with a normal ventilation system.</p> | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------|----------------|--|---|--------|
| COM-2011-08-229 | W0 | 9 August 2011 | A resident complained about noise generated from DSD works area in the park on 24 Stubbs Road. The works caused obstruction to pedestrians and affected the environment. The complainant requested to obtain the contact of responsible person of the works. | Based on the information gathered in the investigation, the noise levels measured at the Hong Kong Academy was below the construction noise limit. According to the regular weekly site inspections in July and August 2011, there was no major noisy activity to be conducted at Intake W0. However, the Contractor has taken initiative to minimize noise nuisance to the nearby residents by implementation of mitigation measures before the time of complaint. | Closed |
| COM-2011-08-230 | EP | 11 August 2011 | A resident complained about the noise generated from rock breaking works at Eastern Portal during past few weeks. The complainant said that the noise was deafening and the breaking works was continuously carried out from 08:00 hrs to 18:00 hrs without consider the feeling of residents living nearby. It caused great nuisance to them. | Based on the information gathered in the investigation, the noise levels measured at the Legend was below the construction noise limit. However, the work was temporarily ceased after the complaint case emerged. To alleviate the breaking noise, the contractor plans to implement mitigation measures as far as practical. They may include wrapping the breaking head, erecting noise barriers or blankets, and controlling breaking duration. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------|----------------|---|--|-------------|
| COM-2011-08-232 | W10 | 24 August 2011 | A complainant said that noise came out from our Site Portion W10 near junction between Kotewall Road and University Drive, i.e. Intake W10 around 7:00 am on 19 August 2011 and requested us to keep the noise down in the early morning. | The Contractor will take the following follow-up measures to alleviate the noise impacts from our site to the stakeholders in the vicinity with immediate effect: 1. All noisy activities, the start of machine including Raise Boring Machine or other supporting plants/equipments would only be started after 08:00hrs; 2. Only non-noisy activities i.e. site safety briefing, body stretching exercise etc. could be carried out within the Site Portion before 08:00hrs. | In-progress |
| COM-2011-08-233 | P5 | 25 August 2011 | A resident complained that the noise generated from the Site Portion at the junction of Kotewall Road and Robinson Road caused immense nuisance. | Based on the information gathered in the investigation, the noise levels measured at the Legend was below the construction noise limit. The Contractor undertook some measures to alleviate the noise emission, as observed during site inspections. After receiving the complaint, the Contractor further reinforced the noise reduction measures that include extending noise barriers into a direction facing toward Villa Veneto, installing noise blankets at the piling rig curtain. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|-----------------|----------|----------------|---|--|-------------|
| | | | | <p>In addition, the Contractor controlled the piling duration in order to minimize a continuous and persistent emission of piling noise.</p> <p>In early September, it was observed in site inspections that a large scale of building innovation work started in Villa Veneto. Continuous breaking noise from the innovation work imposed difficulties to justify noise sources and it may induce complaints from the general public.</p> | |
| COM-2011-08-234 | BR5 | 26 August 2011 | <p>The complainant is from the PMO of Camelot Height (金巒閣) on Kennedy Road (near Site Portion BR5). He said that construction noise, generated from the work site on the slope at the back of their building, was heard at about 07:30 hrs recently. It caused great nuisance to residents.</p> | <p>The Contractor will take the following follow-up measures to alleviate the noise impacts from our site to the stakeholders in the vicinity with immediate effect:</p> <ol style="list-style-type: none"> 1. All noisy activities, the start of machine including Raise Boring Machine or other supporting plants/equipments would only be started after 08:00hrs; 2. Only non-noisy activities i.e. site safety briefing, body stretching exercise etc. could be carried out within the Site Portion before 08:00hrs. | In-progress |

APPENDIX M
CONSTRUCTION PROGRAMME

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | | |
|---|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|--|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV | |
| East & West Adit + Intake | | | | | | | | | | | | | | | |
| CC01 - PRELIMINARIES & GENERAL REQUIREMENTS | | | | | | | | | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | | |
| M1-1680 | 1.68-Acceptance of Monthly Report on TDMS(39M) | 0 | 0 | | 08JUL11A | 100 | 0 | -46 | | | | | | | |
| M1-1690 | 1.69-Acceptance of Monthly Report on TDMS(40M) | 0 | 0 | | 08JUL11A | 100 | 0 | -46 | | | | | | | |
| M1-1260 | 1.26-Complete to All Obligat's From126to1320d | 0 | 0 | | 08AUG11A | 100 | 0 | -8 | | | | | | | |
| M1-1700 | 1.70-Acceptance of Monthly Report on TDMS(41M) | 0 | 0 | | 08AUG11A | 100 | 0 | -77 | | | | | | | |
| M1-1710 | 1.71-Acceptance of Monthly Report on TDMS(42M) | 0 | 0 | | 08AUG11A | 100 | 0 | -69 | | | | | | | |
| M1-1220 | 1.22-Complete to All Obligat's From 1021to1080d | 0 | 0 | | 22AUG11* | 0 | 0 | -91 | | | | | | | |
| M1-1250 | 1.25-Complete to All Obligat's From120to1260d | 0 | 0 | | 22AUG11* | 0 | 0 | -83 | | | | | | | |
| M1-1720 | 1.72-Acceptance of Monthly Report on TDMS(43M) | 0 | 0 | | 22AUG11* | 0 | 0 | -53 | | | | | | | |
| M1-1820 | 1.82-Subm. of Draft Operation&Maintenance Manual | 0 | 0 | | 22AUG11* | 0 | 0 | -53 | | | | | | | |
| M1-1730 | 1.73-Acceptance of Monthly Report on TDMS(44M) | 0 | 0 | | 22AUG11* | 0 | 0 | -22 | | | | | | | |
| M1-1740 | 1.74-Acceptance of Monthly Report on TDMS(45M) | 0 | 0 | | 31AUG11* | 0 | 0 | 0 | | | | | | | |
| M1-1270 | 1.27-Complete to All Obligat's From132to1380d | 0 | 0 | | 30SEP11* | 0 | 0 | 0 | | | | | | | |
| M1-1750 | 1.75-Acceptance of Monthly Report on TDMS(46M) | 0 | 0 | | 30SEP11* | 0 | 0 | 0 | | | | | | | |
| M1-1760 | 1.76-Acceptance of Monthly Report on TDMS(47M) | 0 | 0 | | 31OCT11* | 0 | 0 | 0 | | | | | | | |
| M1-1800 | 1.80-Acceptance of Slope Maintenance Manuals | 0 | 0 | | 31OCT11* | 0 | 0 | 0 | | | | | | | |
| M1-1810 | 1.81-GEOCheckingCert.forAll Slopes&RelatingWall | 0 | 0 | | 31OCT11* | 0 | 0 | 0 | | | | | | | |
| CC02 - DESIGN & DESIGN CHECKING OF THE WORKS | | | | | | | | | | | | | | | |
| Design Stage | | | | | | | | | | | | | | | |
| Section 1 (Eastern Portal) | | | | | | | | | | | | | | | |
| D00275 | APP Cofferdam for Intake Shaft DDA | 42 | 7 | 21MAY08A | 29AUG11 | 90 | 1,189 | -91 | | | | | | | |
| D00279 | APP Reinst Perm Slope at Coff Intake Shaft DDA | 92 | 0 | 31OCT09A | 02AUG11A | 100 | 641 | -64 | | | | | | | |
| Section 1(W0,Adits,East & West Portal,Main Tunl) | | | | | | | | | | | | | | | |
| D00480 | P&S Adit/main tun intrct Perm Ling at W0 AIP | 63 | 7 | 12MAY10A | 29AUG11 | 90 | 468 | -91 | | | | | | | |
| Section 2 (Portion E5A) | | | | | | | | | | | | | | | |
| D00686 | APP E5A-Permanent Works Intake DDA | 92 | 0 | 29NOV09A | 16AUG11A | 100 | 626 | -78 | | | | | | | |
| Section 12 (Portion W1) | | | | | | | | | | | | | | | |
| D01265 | APP W1-Permanent Works Intake DDA | 92 | 7 | 31JAN10A | 29AUG11 | 90 | 569 | -91 | | | | | | | |
| Section 14 (Portion BR6) | | | | | | | | | | | | | | | |
| D01365 | APP BR6-Permanent Works Intake DDA | 92 | 7 | 31JAN10A | 29AUG11 | 90 | 569 | -91 | | | | | | | |
| Section 16 (Portion B2) | | | | | | | | | | | | | | | |
| D01465 | APP B2-Permanent Works Intake DDA | 92 | 7 | 01MAR10A | 29AUG11 | 90 | 540 | -91 | | | | | | | |
| Section 17 (Portion MA14) | | | | | | | | | | | | | | | |
| D01515 | APP MA14-Permanent Works Intake DDA | 92 | 7 | 31DEC09A | 29AUG11 | 90 | 600 | -91 | | | | | | | |
| Section 20 (Portion M3) | | | | | | | | | | | | | | | |
| D01689 | APP M3-Temp Works & Drainage Diversion DDA | 92 | 7 | 12FEB10A | 29AUG11 | 90 | 557 | -91 | | | | | | | |
| Section 25 (Portion CR1) | | | | | | | | | | | | | | | |
| D01965 | APP CR1-Permanent Works Intake DDA | 92 | 7 | 28FEB10A | 29AUG11 | 90 | 541 | -91 | | | | | | | |
| Section 28 (Portion P5) | | | | | | | | | | | | | | | |
| D02115 | APP P5-Permanent Works Intake DDA | 92 | 7 | 29NOV09A | 29AUG11 | 90 | 632 | -91 | | | | | | | |
| E&M | | | | | | | | | | | | | | | |
| D02360 | Statutory Submissions | 91 | 15 | 25APR11A | 21SEP11 | 50 | 120 | -60 | | | | | | | |
| D02355 | Method Statement Submissions (EP) | 30 | 30 | 23AUG11 | 21SEP11 | 0 | 0 | -91 | | | | | | | |
| Leaky Cable Communication Sys | | | | | | | | | | | | | | | |
| D04024 | P&S Re-design Leaky Cable Communication Sys-AIP | 62 | 15 | 12MAR11A | 06SEP11 | 15 | 164 | -81 | | | | | | | |
| D04028 | P&S Leaky Cable Communication Sys-DDA | 62 | 32 | 03MAY11A | 23SEP11 | 10 | 112 | -82 | | | | | | | |
| P04035 | Leaky Cable System Material Procurement | 92 | 92 | 23AUG11* | 22NOV11 | 0 | 0 | -22 | | | | | | | |
| D04026 | APP Re-design Leaky Cable Communication Sys-AIP | 28 | 28 | 07SEP11 | 04OCT11 | 0 | 0 | -81 | | | | | | | |
| D04030 | APP Leaky Cable Communication Sys-DDA | 28 | 28 | 24SEP11 | 21OCT11 | 0 | 0 | -82 | | | | | | | |
| Penstock | | | | | | | | | | | | | | | |
| D03034 | APP Penstock(E5A,BR4,W1,BR5,BR6,W0,CR1,EP) - P5 | 30 | 0 | 21JUN11A | 30JUL11A | 100 | 40 | -8 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Design Submission | | | | | | | | | | | | | | | |
| M2-1130 | 2.13-DDA-Dropshaft Submission | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | |
| M2-1250 | 2.25-Approval of As-built Records of Dropshafts | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | |
| CC03-PART OF SECTION 1 OF THE WORKS(MAIN TUNNEL) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| TBM Excavation (Western Tunnel) | | | | | | | | | | | | | | | |
| W1340 | West Main Tunnel Leaky Cable Sys Instal-(MT) | 72 | 72 | 23NOV11 | 21FEB12 | 0 | 0 | -19 | | | | | | | |
| TBM Excavation (Eastern Tunnel) | | | | | | | | | | | | | | | |
| E1665 | East Main Tunnel Leaky Cable Sys Instal-(MT) | 51 | 51 | 23NOV11 | 27JAN12 | 0 | 0 | -19 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 1 (Main Tunnel) | | | | | | | | | | | | | | | |
| M3-1050 | 3.05-Removal of TBM after of MTunnel(6.25m dia.) | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | |
| M3-1270 | 3.27-M.Tunnel Junction with W0 & CH4250 | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | |
| CC04 - PART OF SECTION 1 OF THE WORKS (ADITS) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - sec1 | | | | | | | | | | | | | | | |
| QH222 | Adit Lining from Ch+150 going to Ch+450(189m) W0 | 83 | 0 | 05MAR11A | 06AUG11A | 100 | 125 | -48 | | | | | | | |
| QH442 | Mechanical Excavation from Main Tunnel - W0 | 21 | 0 | 19MAY11A | 16JUL11A | 100 | 49 | -27 | | | | | | | |
| QH444 | Install Blast Door at Main Tunnel Side(Ch12)- W0 | 21 | 0 | 18JUL11A | 12AUG11A | 100 | 26 | -38 | | | | | | | |
| QH555 | Adit D&B + Removal Blast Door(Ch12 t Ch140) - W0 | 49 | 20 | 13AUG11A | 15SEP11 | 5 | 8 | -9 | | | | | | | |
| QL1015 | Adit Lining from Ch150 to Main Tunnel (251m) -W0 | 44 | 44 | 16SEP11 | 08NOV11 | 0 | 0 | -9 | | | | | | | |
| QL1016 | Junction with Main Tunnel - W0 | 25 | 25 | 09NOV11 | 07DEC11 | 0 | 0 | -9 | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - E5A | | | | | | | | | | | | | | | |
| QL106 | Lining E5A (274m) | 66 | 66 | 13SEP11 | 17NOV11 | 0 | 0 | -35 | | | | | | | |
| QL110 | Lining E5A (278m) | 67 | 67 | 18NOV11 | 23JAN12 | 0 | 0 | -35 | | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

Start Date 30NOV07
 Finish Date 15SEP12
 Data Date 23AUG11
 Run Date 31AUG11 17:54

Early Bar
 Last Month Progress 107A
 Progress Bar
 Critical Activity

108A Sheet 1 of 10
Design & Construction of HK, West Drainage Tunnel
 Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
|----------------------------------|------------------------------|---------|----------|
| Date | Revision | Checked | Approved |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | |
|---|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV |
| | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - E5B | | | | | | | | | | | | | | |
| QL109 | Lining E5B (66m) | 43 | 37 | 17AUG11A | 13OCT11 | 5 | 6 | -65 | | | | | | |
| QL1091 | Intersection E5B/E5A | 30 | 30 | 01SEP11* | 30SEP11 | 0 | 0 | 0 | | | | | | |
| QL2091 | Leaky Cable Installation E5B | 8 | 8 | 23NOV11* | 30NOV11 | 0 | 0 | -22 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - MB16 | | | | | | | | | | | | | | |
| QL114 | Lining MB16 (97m) | 58 | 6 | 21FEB11A | 29AUG11 | 90 | 149 | -64 | | | | | | |
| QL1141 | Turning bay MB16 | 30 | 0 | 17JUL11A | 15AUG11A | 100 | 30 | -32 | | | | | | |
| QL115 | Junction main tunnel MB16 | 30 | 30 | 30AUG11 | 06OCT11 | 0 | 0 | -39 | | | | | | |
| QL215 | Leaky Cable Installation MB16 | 9 | 9 | 23NOV11 | 02DEC11 | 0 | 0 | -19 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - MBD2 | | | | | | | | | | | | | | |
| QL119 | Lining MBD2 (106m) | 50 | 0 | 25APR11A | 11JUL11A | 100 | 78 | -28 | | | | | | |
| QL121 | Lining MBD2 (106m) | 49 | 23 | 12JUL11A | 14SEP11 | 20 | 42 | -44 | | | | | | |
| QL1191 | Turning Bay | 30 | 30 | 03SEP11 | 02OCT11 | 0 | 0 | -44 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - E7 | | | | | | | | | | | | | | |
| QHS060311 | Adit and Stilling Chamber Excavation (E7) | 164 | 0 | 26JUL10A | 09JUL11A | 100 | 283 | -36 | | | | | | |
| QL1221 | Turning bay E7 | 30 | 30 | 23AUG11* | 21SEP11 | 0 | 0 | -91 | | | | | | |
| QL123 | Lining E7 Part 1 (149m) | 49 | 49 | 04SEP11 | 22OCT11 | 0 | 0 | -49 | | | | | | |
| QL125 | Lining E7 Part 2 (149m) | 56 | 56 | 23OCT11 | 17DEC11 | 0 | 0 | -49 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - THR2 | | | | | | | | | | | | | | |
| QL128 | Lining THR2 (138m) | 62 | 16 | 16JUN11A | 07SEP11 | 61 | 68 | -45 | | | | | | |
| QL129 | Turning bay THR2 | 30 | 30 | 08SEP11 | 07OCT11 | 0 | 0 | -45 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - HR1 | | | | | | | | | | | | | | |
| QL139 | Turning bay HR1 | 30 | 30 | 20OCT11* | 18NOV11 | 0 | 0 | 0 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - DG1 | | | | | | | | | | | | | | |
| QL144 | Turning bay DG1 | 30 | 30 | 23AUG11* | 21SEP11 | 0 | 0 | -3 | | | | | | |
| QL142 | Lining DG1 Part 1 (106m) | 50 | 50 | 01OCT11 | 19NOV11 | 0 | 0 | -65 | | | | | | |
| QL145 | Lining DG1 Part 2 (106m) | 51 | 51 | 20NOV11 | 09JAN12 | 0 | 0 | -65 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - BR4 | | | | | | | | | | | | | | |
| QHS110606 | Adit Excavation Ch190 - Ch380 - BR4 | 47 | 2 | 08JUN11A | 24AUG11 | 95 | 64 | -7 | | | | | | |
| QHS110607 | Stilling Chamber Excavation - BR4 | 12 | 12 | 25AUG11 | 07SEP11 | 0 | 0 | -1 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W1 | | | | | | | | | | | | | | |
| QL090 | Lining W1 (155m) | 43 | 43 | 07OCT11 | 25NOV11 | 0 | 0 | 18 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - BR5 | | | | | | | | | | | | | | |
| QHS130275 | Adit and Stilling Chamber Excavation - BR5 | 37 | 0 | 12JUL11A | 05AUG11A | 100 | 22 | 3 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - BR6 | | | | | | | | | | | | | | |
| QHS14044 | Adit Excavation CH247 - CH407 (160m) -(BR6) | 52 | 6 | 08JUN11A | 29AUG11 | 90 | 64 | -26 | | | | | | |
| QHS14046 | Adit Excavation CH407 - CH495 (88m) -(BR6) | 28 | 28 | 30AUG11 | 03OCT11 | 0 | 0 | -25 | | | | | | |
| QHS14048 | Adit Excavation CH495 - CH552 (57m) -(BR6) | 15 | 15 | 04OCT11 | 21OCT11 | 0 | 0 | -25 | | | | | | |
| QHS14049 | Stilling Chamber Excavation Excavation (BR6) | 18 | 18 | 22OCT11 | 11NOV11 | 0 | 0 | -25 | | | | | | |
| QL081 | Stilling chamber Lining - BR6 | 30 | 30 | 12NOV11 | 16DEC11 | 0 | 0 | -25 | | | | | | |
| QL087 | Turning bay BR6 | 30 | 30 | 18NOV11 | 22DEC11 | 0 | 0 | -25 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W3 | | | | | | | | | | | | | | |
| QHS150355 | Adit Excavation CH147 - CH324 (177m) - (W3) | 53 | 25 | 20MAY11A | 21SEP11 | 75 | 79 | -50 | | | | | | |
| QHS150357 | Still Chamber Excavation - (W3) | 18 | 18 | 22SEP11 | 14OCT11 | 0 | 0 | -50 | | | | | | |
| QL079 | Turning bay W3 | 30 | 30 | 19NOV11 | 23DEC11 | 0 | 0 | -25 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - B2 | | | | | | | | | | | | | | |
| QHS160285 | Adit and Stilling Chamber Excavation - B2 | 92 | 0 | 21JAN11A | 28JUL11A | 100 | 151 | -17 | | | | | | |
| QL073 | Lining B2 (250m) | 54 | 54 | 12NOV11 | 17JAN12 | 0 | 0 | -8 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - MA15 | | | | | | | | | | | | | | |
| QL065 | Lining MA15 (67m) | 29 | 25 | 15AUG11A | 21SEP11 | 10 | 7 | 41 | | | | | | |
| QL066 | Junction main tunnel MA15 | 36 | 36 | 20OCT11 | 30NOV11 | 0 | 0 | 21 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - M3 | | | | | | | | | | | | | | |
| QL055 | Stabilisation shaft M3 | 5 | 0 | 15JUL11A | 16JUL11A | 100 | 2 | 0 | | | | | | |
| QL057 | Lining M3 (73m) | 31 | 31 | 29SEP11 | 05NOV11 | 0 | 0 | 35 | | | | | | |
| QL058 | Junction main tunnel M3 | 36 | 36 | 23NOV11 | 06JAN12 | 0 | 0 | 21 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - TP789 | | | | | | | | | | | | | | |
| QL053 | Lining TP789 (12m) | 18 | 18 | 23AUG11 | 12SEP11 | 0 | 0 | -47 | | | | | | |
| QL054 | Junction main tunnel TP789 | 36 | 36 | 14SEP11 | 27OCT11 | 0 | 0 | 21 | | | | | | |
| QL254 | Leaky Cable Installation TP789 | 6 | 6 | 23NOV11 | 29NOV11 | 0 | 0 | -1 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - TP5 | | | | | | | | | | | | | | |
| QL048 | Lining TP5 (101m) | 45 | 10 | 30MAY11A | 02SEP11 | 85 | 71 | -29 | | | | | | |
| QL049 | Junction main tunnel TP5 | 36 | 36 | 03SEP11 | 18OCT11 | 0 | 0 | -29 | | | | | | |
| QL050 | Turning bay TP5 | 30 | 30 | 03SEP11 | 11OCT11 | 0 | 0 | -29 | | | | | | |
| QL249 | Leaky Cable Installation TP5 | 9 | 9 | 23NOV11 | 02DEC11 | 0 | 0 | -19 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - TP4 | | | | | | | | | | | | | | |
| QL044 | Lining TP4 (35m) | 26 | 0 | 24MAY11A | 30JUL11A | 100 | 57 | -31 | | | | | | |
| QL045 | Junction main tunnel TP4 | 36 | 21 | 01AUG11A | 16SEP11 | 30 | 19 | 25 | | | | | | |
| QL245 | Leaky Cable Installation TP4 | 7 | 7 | 23NOV11 | 30NOV11 | 0 | 0 | -19 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W5 | | | | | | | | | | | | | | |
| S240356 | Adit Excavation by Drill & Blast Ch390 - 463(W5) | 33 | 0 | 04MAY11A | 14JUL11A | 100 | 59 | -26 | | | | | | |
| S240580 | Stilling Chamber Enlargement-(W5) | 26 | 0 | 15JUL11A | 18AUG11A | 100 | 30 | -37 | | | | | | |
| QL041 | Turning bay W5 | 30 | 30 | 12OCT11 | 15NOV11 | 0 | 0 | -29 | | | | | | |
| QL038 | Lining W5-frm CR1 Junction to Still Chambr(126m) | 44 | 44 | 25OCT11 | 14DEC11 | 0 | 0 | -51 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - CR1 | | | | | | | | | | | | | | |
| QHS250529 | Adit Excavation CH149 - CH268 (119m) - CR1 | 36 | 0 | 31MAY11A | 18JUL11A | 100 | 40 | -6 | | | | | | |
| QHS250531 | Still Chamber Excavation - CR1 | 18 | 0 | 19JUL11A | 20AUG11A | 100 | 29 | -17 | | | | | | |
| QL0351 | Lining CR1-frm CR1 SC to W5 Jctn (143m) straight | 32 | 32 | 06OCT11 | 11NOV11 | 0 | 0 | -23 | | | | | | |
| QL0352 | Lining CR1-from CR1 SC to W5 Jctn (100m) (Curve) | 18 | 18 | 15NOV11 | 05DEC11 | 0 | 0 | -2 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - RR1 | | | | | | | | | | | | | | |
| S260384 | Adit Excavation by Drill & Blast Ch115- 331(RR1) | 78 | 0 | 30SEP10A | 16JUL11A | 100 | 233 | -43 | | | | | | |
| S260385 | Still Chamber Excavation & Enlargement | 18 | 9 | 18JUL11A | 01SEP11 | 50 | 31 | -65 | | | | | | |

Start Date 30NOV07
 Finish Date 15SEP12
 Data Date 23AUG11
 Run Date 31AUG11 17:54

█ Early Bar
█ Last Month Progress 107A
█ Progress Bar
█ Critical Activity

108A Sheet 2 of 10

Design & Construction of HK, West Drainage Tunnel
 Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | | | |
|----------------------------------|------------------------------|---------|----------|--|--|
| Date | Revision | Checked | Approved | | |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B | | |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 | | |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 | | |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A | | |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F | | |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C | | |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | |
|---|---|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV |
| | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W8 | | | | | | | | | | | | | | |
| QHS270605 | Adit Excavation CH92 - CH271 (179m) (W8) | 77 | 0 | 14MAR11A | 28JUN11A | 100 | 85 | 2 | | | | | | |
| QHS270607 | Stilling Chamber Excavation (W8) | 18 | 0 | 29JUN11A | 17AUG11A | 100 | 42 | -22 | | | | | | |
| QHS270610 | Excavate lowest 5m of dropshaft by Adit Team(W8) | 5 | 5 | 23AUG11* | 27AUG11 | 0 | 0 | -26 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - P5 | | | | | | | | | | | | | | |
| S280128 | Adit Excavation by Drill & Blast Ch600 - 800(P5) | 72 | 0 | 13APR11A | 20AUG11A | 100 | 105 | -42 | | | | | | |
| S280580 | Stilling Chamber Enlargement-(P5) | 18 | 17 | 22AUG11A | 10SEP11 | 5 | 1 | -42 | | | | | | |
| QL0121 | Lining P5 normal 332m up to W10 Junction | 55 | 55 | 12SEP11 | 17NOV11 | 0 | 0 | -42 | | | | | | |
| QL022 | Turning bay P5 | 30 | 30 | 12SEP11 | 19OCT11 | 0 | 0 | -42 | | | | | | |
| QL016 | Intersection HKU1 / P5 | 36 | 36 | 07OCT11 | 17NOV11 | 0 | 0 | -23 | | | | | | |
| QL019 | Lining P5 big section 139 m | 36 | 36 | 18NOV11 | 31DEC11 | 0 | 0 | -23 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W10 | | | | | | | | | | | | | | |
| QL0131 | Lining W10 (0m) | 5 | 5 | 18NOV11 | 23NOV11 | 0 | 0 | -42 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - HKU1 | | | | | | | | | | | | | | |
| QL0141 | Lining HKU1 (229m) | 54 | 35 | 01AUG11A | 04OCT11 | 15 | 19 | -23 | | | | | | |
| QL023 | Turning bay HKU1 | 30 | 30 | 06OCT11 | 09NOV11 | 0 | 0 | -23 | | | | | | |
| QL223 | Leaky Cable Installation HKU1 | 15 | 15 | 23NOV11 | 09DEC11 | 0 | 0 | -19 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - PFLR1 | | | | | | | | | | | | | | |
| QL004 | Lining PLFR 1 (8m) | 10 | 10 | 23SEP11 | 06OCT11 | 0 | 0 | -2 | | | | | | |
| QL204 | Leaky Cable Installation PLFR 1 | 6 | 6 | 23NOV11 | 29NOV11 | 0 | 0 | -19 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - SM1 | | | | | | | | | | | | | | |
| S321660 | Stilling Chamber Enlargement (SM1) | 20 | 0 | 09MAR11A | 16JUL11A | 100 | 104 | -28 | | | | | | |
| QL001 | Stilling chamber Lining - SM 1 | 48 | 18 | 19AUG11A | 12SEP11 | 50 | 3 | -27 | | | | | | |
| QS321410 | Insitu Lining - 7.16m ID2.3 (SM1) | 6 | 6 | 28SEP11 | 06OCT11 | 0 | 0 | -41 | | | | | | |
| QL0051 | Lining SM1 -SM1-PFLR1 Junction-Main Tunnel(354m) | 33 | 33 | 07OCT11 | 14NOV11 | 0 | 0 | -2 | | | | | | |
| QL0011 | Lining SM1-Still Chamber to PFLR1 Junction(162m) | 42 | 42 | 07OCT11 | 24NOV11 | 0 | 0 | -41 | | | | | | |
| QL006 | Junction main tunnel SM1 | 36 | 36 | 15NOV11 | 28DEC11 | 0 | 0 | -2 | | | | | | |
| QL007 | Turning bay SM1 | 30 | 30 | 18NOV11 | 22DEC11 | 0 | 0 | -29 | | | | | | |
| + Milestone | | | | | | | | | | | | | | |
| | | 138 | 93 | 09JUL11A | 23NOV11 | 0 | 45 | 23 | | | | | | |
| CC5-PART OF SECTION 1 OF THE WORKS (EAST PORTAL) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| East Portal Assembly Chamber Lining Works | | | | | | | | | | | | | | |
| E-1872 | Assembly of Arch Formwork(CH133 to CH163) | 12 | 12 | 23AUG11 | 05SEP11 | 0 | 0 | -76 | | | | | | |
| E-1874 | Lining (CH133-163) | 67 | 67 | 06SEP11 | 25NOV11 | 0 | 0 | -73 | | | | | | |
| East Portal Intake Chamber/Tunnel Finishing Work | | | | | | | | | | | | | | |
| E-1950 | Intake Chamber (CH27.5 to CH43) | 40 | 40 | 01NOV11 | 16DEC11 | 0 | 0 | -63 | | | | | | |
| East Portal Maintenance Chamber Finishing Works | | | | | | | | | | | | | | |
| E-1888 | Dismantle Portal Enclosure & Hoist crane & vent | 27 | 0 | 19JUL11A | 13AUG11A | 100 | 23 | -50 | | | | | | |
| E-1900 | Cast Side wall & arch | 57 | 57 | 23AUG11 | 31OCT11 | 0 | 0 | -63 | | | | | | |
| E-1902 | Cast Center/end/retaining walls | 18 | 18 | 01NOV11 | 21NOV11 | 0 | 0 | -63 | | | | | | |
| E-1904 | Backfill slope | 12 | 12 | 22NOV11 | 05DEC11 | 0 | 0 | -63 | | | | | | |
| East Portal River Channel Finishing Works | | | | | | | | | | | | | | |
| E-2030 | Construct River Channel Structure | 30 | 0 | 23MAR11A | 15JUL11A | 100 | 91 | -23 | | | | | | |
| E-2032 | Re-Connect Diversion Pipes | 0 | 0 | | 15JUL11A | 100 | 0 | -23 | | | | | | |
| E-2060 | Removal of concrete deck | 24 | 24 | 28OCT11 | 24NOV11 | 0 | 0 | -23 | | | | | | |
| East Portal Finishing Works | | | | | | | | | | | | | | |
| E-12729 | Stoplog submission | 0 | 0 | | 22AUG11* | 0 | 0 | -32 | | | | | | |
| E-1721 | HEC submission & application for permanent power | 0 | 0 | | 22AUG11* | 0 | 0 | -57 | | | | | | |
| E-1726 | WSD Submission & Application for permanent Water | 0 | 0 | | 22AUG11* | 0 | 0 | -57 | | | | | | |
| E-1728 | DSD Target application last manhole connection | 0 | 0 | | 22AUG11* | 0 | 0 | -57 | | | | | | |
| E-1830 | Access Ramp on Top of RW1 to RW3 Part 1 | 48 | 48 | 23AUG11 | 20OCT11 | 0 | 0 | -70 | | | | | | |
| E-1941 | Major E&M Equipment Deliveries | 77 | 77 | 22SEP11 | 22DEC11 | 0 | 0 | -50 | | | | | | |
| E-1832 | Access Ramp on Top of RW1 to RW3 Part 1 | 48 | 48 | 21OCT11 | 15DEC11 | 0 | 0 | -70 | | | | | | |
| CC6-PART OF SECTION 1 OF THE WORKS (WEST PORTAL) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Western Portal Finishing Works | | | | | | | | | | | | | | |
| WPR164 | Excavate & ELS Still Basin(Ch10,704-Ch10,688) S1 | 52 | 33 | 28APR11A | 30SEP11 | 50 | 96 | -77 | | | | | | |
| WPR182 | Excavate & ELS Still Basin(Ch10,668-Ch10,638)S3a | 76 | 33 | 16MAY11A | 30SEP11 | 40 | 83 | -40 | | | | | | |
| WPR173 | Excavate & ELS Still Basin(Ch10,688-Ch10,668) S2 | 33 | 33 | 23AUG11 | 30SEP11 | 0 | 0 | -60 | | | | | | |
| WPR190 | Excavate & ELS Still Basin(Ch10,638-Ch10,622)S3b | 33 | 33 | 23AUG11 | 30SEP11 | 0 | 0 | -36 | | | | | | |
| WPR064 | Removal 25t overhead gantry(120t crane mobilized) | 8 | 8 | 23AUG11 | 31AUG11 | 0 | 0 | -76 | | | | | | |
| WPR095 | Erect concrete secatol sys from surface to shaft | 11 | 11 | 23AUG11 | 03SEP11 | 0 | 0 | -76 | | | | | | |
| WPR079 | Erect over head crane at shaft | 8 | 8 | 23AUG11 | 31AUG11 | 0 | 0 | -76 | | | | | | |
| WPR066 | Modification of ventilation system | 15 | 15 | 01SEP11 | 19SEP11 | 0 | 0 | -76 | | | | | | |
| WPR237 | Arch Tunl Struct-wall&roof(Ch10,578-Ch10,569) A1 | 36 | 36 | 20SEP11* | 02NOV11 | 0 | 0 | -76 | | | | | | |
| WPR144 | Handover Rect Trans Tunnel Adit Muck(Stg1) works | 0 | 0 | 30SEP11 | | 0 | 0 | 30 | | | | | | |
| WPR147 | Site demolition | 30 | 30 | 30SEP11 | 05NOV11 | 0 | 0 | 30 | | | | | | |
| WPR142 | Reprovisioning works (After ADIT excavation) | 30 | 30 | 30SEP11 | 05NOV11 | 0 | 0 | 30 | | | | | | |
| WPR203 | Still Basin Structure (Ch10,688-Ch10,668) S2 | 61 | 61 | 03OCT11 | 13DEC11 | 0 | 0 | -60 | | | | | | |
| WPR197 | Still Basin Structure (Ch10,704-Ch10,688) S1 | 46 | 46 | 03OCT11 | 25NOV11 | 0 | 0 | -77 | | | | | | |
| WPR244 | Arch Tunl Struct-wall&roof(Ch10,561-Ch10,554) A3 | 28 | 28 | 06OCT11 | 07NOV11 | 0 | 0 | -76 | | | | | | |
| WPR208 | Still Basin Struc Ch10,668-Ch10,638base/Wall S3a | 89 | 89 | 18OCT11 | 04FEB12 | 0 | 0 | -52 | | | | | | |
| WPR215 | Still Basin Struc(Ch10,638-Ch10,622base/wall S3b | 67 | 67 | 01NOV11 | 20JAN12 | 0 | 0 | -52 | | | | | | |
| WPR241 | Arch Tunl Struct-wall&roof(Ch10,569-Ch10,561) A2 | 28 | 28 | 03NOV11 | 05DEC11 | 0 | 0 | -76 | | | | | | |
| WPR228 | Rect Trans Structure (Ch10,596-Ch10,578) R3 | 66 | 66 | 07NOV11 | 28JAN12 | 0 | 0 | 30 | | | | | | |
| WPR247 | Arch Tunl Struct-wall&roof(Ch10,554-Ch10,544) A4 | 32 | 32 | 08NOV11 | 14DEC11 | 0 | 0 | -76 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 1 (Western Portal) | | | | | | | | | | | | | | |
| M6-1021 | 6.01-Excavation(Stilling Basin) 100% | 0 | 0 | | 30SEP11 | 0 | 0 | -43 | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

| | | |
|-------------|---------------|--------------------------|
| Start Date | 30NOV07 | Early Bar |
| Finish Date | 15SEP12 | Last Month Progress 107A |
| Data Date | 23AUG11 | Progress Bar |
| Run Date | 31AUG11 17:54 | Critical Activity |

108A Sheet 3 of 10

Design & Construction of HK. West Drainage Tunnel
Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
|----------------------------------|------------------------------|---------|----------|
| Date | Revision | Checked | Approved |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | |
|---|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV |
| | | | | | | | | | | | | | | |
| CC7 - PART OF SECTION 1 OF THE WORKS (PORTION W0) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| QHS14 | Construct Stilling Chamber Base Slab (W0) | 19 | 0 | 26JUL11A | 16AUG11A | 100 | 19 | -36 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - sec1 | | | | | | | | | | | | | | |
| QH333 | Construct Stilling Chamber Walls/Roof (W0) | 18 | 13 | 17AUG11A | 06SEP11 | 10 | 5 | -35 | | | | | | |
| QH3331 | Complete Stilling Chamber lining by Adit Team | 0 | 0 | | 06SEP11 | 0 | 0 | -35 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QH3332 | Access Shaft & Dropshaft Lining - W0 | 52 | 52 | 07SEP11 | 09NOV11 | 0 | 0 | -35 | | | | | | |
| QH3333 | Intake Struct stage 1 & Access Shaft(6 pours)-W0 | 60 | 60 | 10NOV11 | 21JAN12 | 0 | 0 | -35 | | | | | | |
| QH3330 | Penstock Delivery - (W0) | 0 | 0 | 15NOV11* | | 0 | 0 | 0 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 1(W0,Adits,East & West Portal,Main Tuni) | | | | | | | | | | | | | | |
| M7-1030 | 7.03-Lining(Dropshaft) | 0 | 0 | | 09NOV11 | 0 | 0 | -43 | | | | | | |
| M7-1050 | 7.05-Lining(Access Shaft) | 0 | 0 | | 09NOV11 | 0 | 0 | -43 | | | | | | |
| CC16-SECTION 10 OF THE WORKS (PORTION DG1) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - DG1 | | | | | | | | | | | | | | |
| QL141 | Stilling chamber Lining - DG1 | 36 | 33 | 15JUN11A | 30SEP11 | 5 | 58 | -55 | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QS100350 | Dropshaft-Position,Fix&Grout - 112m ID1.5 (DG1) | 41 | 41 | 03OCT11 | 19NOV11 | 0 | 0 | -55 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS100380 | Intake Permanent Structure(5 pours) Stage 1(DG1) | 54 | 0 | 16MAY11A | 08AUG11A | 100 | 71 | -22 | | | | | | |
| QHS100280 | Penstock Delivery - (DG1) | 0 | 0 | 23AUG11* | | 0 | 0 | -1 | | | | | | |
| QHS100381 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(DG1) | 33 | 33 | 21NOV11 | 30DEC11 | 0 | 0 | -55 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 10 (Portion DG1) | | | | | | | | | | | | | | |
| M16-1030 | 16.03-Lining (Dropshaft) | 0 | 0 | | 19NOV11 | 0 | 0 | -66 | | | | | | |
| CC29-SECTION 23 OF THE WORKS (PORTION TP4) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QPS230270 | Dropshaft-Position,Fix & Grout-165.8m ID1.5(TP4) | 43 | 0 | 30MAY11A | 02JUL11A | 100 | 28 | 10 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS230414 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(TP4) | 36 | 12 | 11JUL11A | 05SEP11 | 80 | 37 | -9 | | | | | | |
| QHS230100 | Local Intake Test & Commissioning - (TP4) | 12 | 12 | 23AUG11 | 05SEP11 | 0 | 0 | -9 | | | | | | |
| QHS230412 | Penstock Delivery - (TP4) | 0 | 0 | 23AUG11* | | 0 | 0 | -33 | | | | | | |
| QH230502 | Change OGC winch from 200 to 100m - TP4 | 7 | 7 | 06SEP11 | 14SEP11 | 0 | 0 | -9 | | | | | | |
| QH230503 | Finishing works / PS BW / Reinstatement -TP4 | 18 | 18 | 15SEP11 | 07OCT11 | 0 | 0 | -9 | | | | | | |
| QH230504 | Dismantle Overhead Gantry Crane(OHC) -TP4 | 7 | 7 | 08OCT11 | 15OCT11 | 0 | 0 | -9 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | |
| M291070 | 29.07-Section23 - TP4 Handover to SO | 0 | 0 | | 15OCT11 | 0 | 0 | -11 | | | | | | |
| Section 23 (Portion TP4) | | | | | | | | | | | | | | |
| M291030 | 29.03-Lining (Dropshaft) | 0 | 0 | | 08JUL11A | 100 | 0 | 6 | | | | | | |
| M291050 | 29.05-Concrete Structure (Intake) | 0 | 0 | | 07OCT11 | 0 | 0 | -13 | | | | | | |
| M291060 | 29.06-Slopedworks, Backfilling & Reinstatement | 0 | 0 | | 15OCT11 | 0 | 0 | -11 | | | | | | |
| CC12-SECTION 6 OF THE WORKS (PORTION E7) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S060382 | Excavation (Rock) +68mPD to +63mPD - (E7) | 82 | 0 | 15MAR11A | 18JUL11A | 100 | 100 | -17 | | | | | | |
| QHS060264 | Mech Dropshaft Excav (E7) | 48 | 33 | 19JUL11A | 30SEP11 | 24 | 30 | -32 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - E7 | | | | | | | | | | | | | | |
| QL122 | Stilling chamber Lining(Invert Only) - E7 | 12 | 12 | 23AUG11 | 03SEP11 | 0 | 0 | -56 | | | | | | |
| QL130 | Stilling chamber Lining(Arch & Roof) - E7 | 24 | 24 | 01OCT11 | 24OCT11 | 0 | 0 | -38 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS060265 | Intake Permanent Structure(6 pours) (E7) | 64 | 64 | 03OCT11 | 16DEC11 | 0 | 0 | -32 | | | | | | |
| QHS060263 | Penstock Delivery - (E7) | 0 | 0 | 15NOV11* | | 0 | 0 | 0 | | | | | | |
| Pipe Laying | | | | | | | | | | | | | | |
| QHS060279 | VO15-stage 1b SMH16 to Existing MH Upstream(E7) | 51 | 0 | 14MAY11A | 04JUL11A | 100 | 42 | 27 | | | | | | |
| QHS060272 | VO15-Stage2 Trenchless betwn SMH14&E7 (E7) | 78 | 20 | 07JUN11A | 15SEP11 | 40 | 65 | -18 | | | | | | |
| QHS060277 | VO15-Stag 3aUtil Diversion&TTMS(Downstream) (E7) | 68 | 26 | 20JUN11A | 22SEP11 | 50 | 54 | -24 | | | | | | |
| QHS060273 | VO15-Stage2bTrenchless betwn SMH14&E7MH Cons(E7) | 72 | 72 | 16SEP11 | 10DEC11 | 0 | 0 | -18 | | | | | | |
| QHS060278 | VO15-Stag 3b Piling & Flow Divr(Downstream) (E7) | 60 | 60 | 23SEP11 | 03DEC11 | 0 | 0 | -24 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 6 (Portion E7) | | | | | | | | | | | | | | |
| M121040 | 12.04-Excavation (Intake) | 0 | 0 | | 22AUG11 | 0 | 0 | -56 | | | | | | |
| M121010 | 12.01-Pre-drilling & Grouting Works(Dropshaft) | 0 | 0 | | 30SEP11 | 0 | 0 | -38 | | | | | | |
| M121020 | 12.02-Excavation (Dropshaft) | 0 | 0 | | 30SEP11 | 0 | 0 | -38 | | | | | | |
| CC10-SECTION 4 OF THE WORKS (PORTION MB16) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS040244 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(MB16) | 36 | 0 | 19MAR11A | 17AUG11A | 100 | 122 | -20 | | | | | | |
| QHS040245 | Cut Slope to facilitate pipe laying (MB16) | 24 | 0 | 21JUN11A | 27JUL11A | 100 | 31 | -14 | | | | | | |
| QHS040242 | Penstock Delivery - (MB16) | 0 | 0 | 19JUL11A | | 100 | 0 | -3 | | | | | | |
| QHS040246 | Drain from SMH9 to Intake MB16(MB16) | 24 | 24 | 23AUG11 | 20SEP11 | 0 | 0 | -36 | | | | | | |
| QHS040100 | Local Intake Test & Commissioning - (MB16) | 12 | 12 | 23AUG11 | 05SEP11 | 0 | 0 | -36 | | | | | | |
| QHS040247 | Finishing works / PS BW / Reinstatement (MB16) | 12 | 12 | 21SEP11 | 06OCT11 | 0 | 0 | -48 | | | | | | |
| Pipe Laying | | | | | | | | | | | | | | |
| QHS040250 | Excav/pipelay/Manhole Constr SMH5 to SMH3 (MB16) | 46 | 18 | 30MAY11A | 12SEP11 | 75 | 71 | -42 | | | | | | |
| QHS040251 | Permanent reinstatement along Mt Butler Rd(MB16) | 3 | 3 | 14SEP11 | 16SEP11 | 0 | 0 | -42 | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

Start Date 30NOV07
 Finish Date 15SEP12
 Data Date 23AUG11
 Run Date 31AUG11 17:54

- Early Bar
- Last Month Progress 107A
- Progress Bar
- Critical Activity

108A Sheet 4 of 10
Design & Construction of HK, West Drainage Tunnel
 Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
|----------------------------------|------------------------------|---------|----------|
| Date | Revision | Checked | Approved |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | | |
|--|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|--------|-----|-----|-----|-----|--|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV | |
| | | | | | | | | | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | | |
| M101090 | 10.09-Section4 MB16 Handover to SO | 0 | 0 | | 06OCT11 | 0 | 0 | -59 | | | | | | | |
| Section 4 (Portion MB16) | | | | | | | | | | | | | | | |
| M101070 | 10.07-100% of PipeLength of Drain.Works&Reins't | 0 | 0 | | 08AUG11A | 100 | 0 | -11 | | MC 126 | | | | | |
| M101030 | 10.03-Lining (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | |
| M101080 | 10.08-Slopeworks, Backfilling & Reinstatment | 0 | 0 | | 16SEP11 | 0 | 0 | -50 | | | | | | | |
| CC11-SECTION 5 OF THE WORKS (PORTION MBD2) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QH050101 | Intake Permanent Structure(3 pours)Stage 1b-MBD2 | 36 | 0 | 16MAY11A | 16JUL11A | 100 | 52 | -16 | | | | | | | |
| QH050099 | VO26 works Trench/Pipelaying&MH29 -MBD2 | 36 | 6 | 18JUL11A | 29AUG11 | 95 | 31 | 0 | | | | | | | |
| QH0501029 | Penstock Delivery - MBD2 | 0 | 0 | 23AUG11* | | 0 | 0 | -33 | | | | | | | |
| QH0501031 | BS/Penstock/Drain Dvn/TS - Stage 2-MBD2 | 33 | 33 | 07OCT11 | 14NOV11 | 0 | 0 | -43 | | | | | | | |
| QH050100 | Local Intake Test & Commissioning - MBD2 | 12 | 12 | 01NOV11 | 14NOV11 | 0 | 0 | -43 | | | | | | | |
| Pipe Laying | | | | | | | | | | | | | | | |
| QH050103 | Remaining Drainage works SMH10-SMH11 - Part 1 | 36 | 36 | 23AUG11 | 06OCT11 | 0 | 0 | -43 | | | | | | | |
| QH050104 | Remain Drain works MBD2-SMH24/SMH11-MBD2 -Part 2 | 36 | 36 | 27SEP11 | 09NOV11 | 0 | 0 | -39 | | | | | | | |
| QH050105 | Remain Drain works MBD2-SMH13 - Part 3 | 37 | 37 | 10NOV11 | 22DEC11 | 0 | 0 | -39 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 5 (Portion MBD2) | | | | | | | | | | | | | | | |
| M11-1050 | 11.05-Concrete Structure(Intake) | 0 | 0 | | 14NOV11 | 0 | 0 | -53 | | | | | | | |
| CC28-SECTION 22 OF THE WORKS (PORTION TP5) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | |
| QPS220310 | Dropshaft-Position,Fix & Grout-128.1m ID1.5(TP5) | 36 | 0 | 16JUN11A | 16JUL11A | 100 | 26 | 3 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QHS220339 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(TP5) | 36 | 6 | 25JUL11A | 29AUG11 | 80 | 25 | 2 | | | | | | | |
| QHS220337 | Penstock Delivery - (TP5) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | | | | | | | |
| QHS220100 | Local Intake Test & Commissioning - (TP5) | 6 | 6 | 23AUG11 | 29AUG11 | 0 | 0 | 2 | | | | | | | |
| QHS220340 | Finishing works / PS BW / Reinstatement (TP5) | 18 | 18 | 30AUG11 | 20SEP11 | 0 | 0 | 2 | | | | | | | |
| QHS220341 | Dismantling Overhead Gantry Crane (TP5) | 7 | 7 | 21SEP11 | 28SEP11 | 0 | 0 | 2 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | | |
| M28-1070 | 28.07-Section22 - TP5 Handover to SO | 0 | 0 | | 28SEP11 | 0 | 0 | 2 | | | | | | | |
| Section 22 (Portion TP5) | | | | | | | | | | | | | | | |
| M28-1030 | 28.03-Lining (Dropshaft) | 0 | 0 | | 08AUG11A | 100 | 0 | -19 | | MC 126 | | | | | |
| M28-1050 | 28.05-Concrete Structure (Intake) | 0 | 0 | | 20SEP11 | 0 | 0 | 2 | | | | | | | |
| M28-1060 | 28.06-Slopeworks, Backfilling & Reinstatement | 0 | 0 | | 28SEP11 | 0 | 0 | 2 | | | | | | | |
| CC14-SECTION 8 OF THE WORKS (PORTION GL1) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - GL1 | | | | | | | | | | | | | | | |
| QL133 | Stilling chamber Lining - GL1 | 36 | 21 | 08AUG11A | 12SEP11 | 15 | 15 | -76 | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | |
| QS080310 | Dropshaft-Position,Fix & Grout-43.5m ID1.5 (GL1) | 26 | 26 | 14SEP11 | 15OCT11 | 0 | 0 | -64 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QHS080374 | Penstock Delivery - (GL1) | 0 | 0 | 23AUG11* | | 0 | 0 | -1 | | | | | | | |
| QHS080375 | Intake Permanent Remaining(4 pours)Stage 1b(GL1) | 38 | 38 | 17OCT11 | 29NOV11 | 0 | 0 | -64 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 8 (Portion GL1) | | | | | | | | | | | | | | | |
| M141030 | 14.03-Lining (Dropshaft) | 0 | 0 | | 15OCT11 | 0 | 0 | -78 | | | | | | | |
| CC24-SECTION 18 OF THE WORKS (PORTION MA15) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - MA15 | | | | | | | | | | | | | | | |
| QL064 | Stilling chamber Lining - MA15 | 36 | 0 | 10JUN11A | 08AUG11A | 100 | 50 | 2 | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | |
| QPS180340 | Dropshaft-Position,Fix&Grout - 51.1m ID1.5(MA15) | 37 | 17 | 09AUG11A | 10SEP11 | 40 | 12 | 10 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QHS180555 | Penstock Delivery - (MA15) | 0 | 0 | 23AUG11* | | 0 | 0 | -1 | | | | | | | |
| QHS180557 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(MA15) | 33 | 33 | 12SEP11 | 22OCT11 | 0 | 0 | 10 | | | | | | | |
| QHS180100 | Local Intake Test & Commissioning - (MA15) | 12 | 12 | 10OCT11 | 22OCT11 | 0 | 0 | 10 | | | | | | | |
| QHS180558 | Finishing works / PS BW / Reinstatement (MA15) | 36 | 36 | 24OCT11 | 03DEC11 | 0 | 0 | 10 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 18 (Portion MA15) | | | | | | | | | | | | | | | |
| M241010 | 24.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | |
| M241040 | 24.04-Excavation (Intake) | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | |
| M241030 | 24.03-Lining (Dropshaft) | 0 | 0 | | 10SEP11 | 0 | 0 | 13 | | | | | | | |
| CC36-SECTION 30 OF THE WORKS (PORTION HKU1) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - HKU1 | | | | | | | | | | | | | | | |
| QL014 | Stilling chamber Lining - HKU1 | 36 | 0 | 21MAY11A | 23JUL11A | 100 | 53 | -17 | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | |
| QPS300300 | Dropshaft-Position,Fix Grout- 52.0m ID2.3(HKU1) | 26 | 0 | 25JUL11A | 06AUG11A | 100 | 12 | -3 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QHS300804 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(HKU1) | 36 | 24 | 08AUG11A | 20SEP11 | 15 | 13 | -4 | | | | | | | |
| QHS300803 | Penstock Delivery - (HKU1) | 0 | 0 | 23AUG11* | | 0 | 0 | -33 | | | | | | | |
| QHS300100 | Local Intake Test & Commissioning - (HKU1) | 12 | 12 | 06SEP11 | 20SEP11 | 0 | 0 | -4 | | | | | | | |
| QHS300805 | Finishing works / PS BW / Reinstatement (HKU1) | 18 | 18 | 21SEP11 | 13OCT11 | 0 | 0 | -4 | | | | | | | |
| QHS300806 | Steel Deck Dismantling (HKU1) | 18 | 18 | 14OCT11 | 03NOV11 | 0 | 0 | -4 | | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

| | | |
|-------------|---------------|--------------------------|
| Start Date | 30NOV07 | Early Bar |
| Finish Date | 15SEP12 | Last Month Progress 107A |
| Data Date | 23AUG11 | Progress Bar |
| Run Date | 31AUG11 17:54 | Critical Activity |

108A
 Sheet 5 of 10
Design & Construction of HK. West Drainage Tunnel
 Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
|----------------------------------|------------------------------|---------|----------|
| Date | Revision | Checked | Approved |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | | | | | | | |
|---|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|--|--|--|--|--|--|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV | | | | | | |
| Milestone | | | | | | | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | | | | | | | |
| M361070 | 36.07-Section30 - HKU1 Handover to SO | 0 | 0 | | 03NOV11 | 0 | 0 | -5 | | | | | | | | | | | | |
| Section30 (Portion HKU1) | | | | | | | | | | | | | | | | | | | | |
| M361010 | 36.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -91 | | | | | | | | | | | | |
| M361030 | 36.03-Lining (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -19 | | | | | | | | | | | | |
| M361050 | 36.05-Concrete Structure (Intake) | 0 | 0 | | 20SEP11 | 0 | 0 | -5 | | | | | | | | | | | | |
| M361060 | 36.06-Slopeworks, Backfilling & Reinstatement | 0 | 0 | | 03NOV11 | 0 | 0 | -5 | | | | | | | | | | | | |
| CC13-SECTION 7 OF THE WORKS (PORTION THR2) | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | | | | | | |
| QH070602 | BS/Vortex/Drain Dvn/TS - Stage 2(THR2) | 36 | 0 | 03JUN11A | 22AUG11A | 100 | 67 | -36 | | | | | | | | | | | | |
| QH070603 | Permanent Channel Diversion(THR2) | 21 | 7 | 06AUG11A | 30AUG11 | 80 | 14 | -22 | | | | | | | | | | | | |
| QH070600 | Penstock Delivery - (THR2) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | | | | | | | | | | | | |
| QHS070100 | Local Intake Test & Commissioning - (THR2) | 6 | 6 | 23AUG11 | 29AUG11 | 0 | 0 | -42 | | | | | | | | | | | | |
| QH070604 | Penstock / Finishing/PS BW/Reinstatement (THR2) | 37 | 37 | 31AUG11 | 15OCT11 | 0 | 0 | -18 | | | | | | | | | | | | |
| Milestone | | | | | | | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | | | | | | | |
| M13-1070 | 13.07-Section7 - THR2 Handover to SO | 0 | 0 | | 15OCT11 | 0 | 0 | -23 | | | | | | | | | | | | |
| Section 7 (Portion THR2) | | | | | | | | | | | | | | | | | | | | |
| M13-1030 | 13.03-Lining (Dropshaft) | 0 | 0 | | 08JUL11A | 100 | 0 | -42 | | | | | | | | | | | | |
| M13-1050 | 13.05-Concrete Structure (Intake) | 0 | 0 | | 08JUL11A | 100 | 0 | 3 | | | | | | | | | | | | |
| M13-1060 | 13.06-Slopwork, Backfilling & Reinstatement | 0 | 0 | | 15OCT11 | 0 | 0 | -23 | | | | | | | | | | | | |
| CC9 - SECTION 3 OF THE WORKS (PORTION E5B) | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - E5B | | | | | | | | | | | | | | | | | | | | |
| QL108 | Stilling chamber Lining - E5B | 36 | 13 | 20MAY11A | 06SEP11 | 60 | 79 | -60 | | | | | | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | | | | | | |
| QS030370 | Dropshaft-Position,Fix & Grout-47.53m ID1.5(E5B) | 23 | 0 | 02AUG11A | 13AUG11A | 100 | 11 | -17 | | | | | | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | | | | | | |
| QPSH03501 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(E5B) | 33 | 33 | 23AUG11 | 30SEP11 | 0 | 0 | -24 | | | | | | | | | | | | |
| QPSH03499 | Penstock Delivery - (E5B) | 0 | 0 | 23AUG11* | | 0 | 0 | -1 | | | | | | | | | | | | |
| QHS030100 | Local Intake Test & Commissioning - (E5B) | 12 | 12 | 17SEP11 | 30SEP11 | 0 | 0 | -24 | | | | | | | | | | | | |
| QPSH03502 | Finishing works / PS BW / Reinstatement (E5B) | 68 | 68 | 03OCT11 | 21DEC11 | 0 | 0 | -24 | | | | | | | | | | | | |
| Milestone | | | | | | | | | | | | | | | | | | | | |
| Section 3 (Portion E5B) | | | | | | | | | | | | | | | | | | | | |
| M91060 | 9.06-Lining (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -28 | | | | | | | | | | | | |
| M91080 | 9.08-Concrete Structure (Intake) | 0 | 0 | | 30SEP11 | 0 | 0 | -29 | | | | | | | | | | | | |
| CC26-SECTION 20 OF THE WORKS (PORTION M3) | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - M3 | | | | | | | | | | | | | | | | | | | | |
| QL056 | Stilling chamber Lining - M3 | 36 | 31 | 17AUG11A | 28SEP11 | 10 | 5 | -26 | | | | | | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | | | | | | |
| QS200520 | RB Setup/Reaming/Demobilization(M3) (133m) | 64 | 0 | 12APR11A | 15JUL11A | 100 | 75 | -4 | | | | | | | | | | | | |
| QS200577 | Back Reaming & Demobilization - (M3) | 42 | 0 | 21MAY11A | 15JUL11A | 100 | 46 | -4 | | | | | | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | | | | | | |
| QHS200409 | Part 2 Rock Excav+Rock Stab&Drain Divn works -M3 | 71 | 33 | 01AUG11A | 30SEP11 | 0 | 19 | 10 | | | | | | | | | | | | |
| QHS200411 | Intake Permanent Structure(4 pours) Stage 1 -M3 | 36 | 36 | 03OCT11 | 14NOV11 | 0 | 0 | 10 | | | | | | | | | | | | |
| QHS200412 | Overhead Gantry Erection -M3 | 14 | 14 | 08NOV11 | 23NOV11 | 0 | 0 | 10 | | | | | | | | | | | | |
| QHS200410 | Penstock Delivery - (M3) | 0 | 0 | 15NOV11* | | 0 | 0 | 0 | | | | | | | | | | | | |
| Milestone | | | | | | | | | | | | | | | | | | | | |
| Section 20 (Portion M3) | | | | | | | | | | | | | | | | | | | | |
| M261011 | 26.02-Excavation (Dropshaft) | 0 | 0 | | 08AUG11A | 100 | 0 | -28 | | | | | | | | | | | | |
| CC22-SECTION 16 OF THE WORKS (PORTION B2) | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | | | | | | |
| S160232 | Grouting Works-(B2) | 18 | 0 | 13JUN11A | 02JUL11A | 100 | 17 | -14 | | | | | | | | | | | | |
| S160240 | Main Structure Const + RBM Platform -(B2) | 12 | 0 | 04JUL11A | 16JUL11A | 100 | 12 | 7 | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - B2 | | | | | | | | | | | | | | | | | | | | |
| QL072 | Stilling chamber Lining - B2 | 36 | 36 | 29SEP11 | 11NOV11 | 0 | 0 | -8 | | | | | | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | | | | | | |
| QS160290 | RB Setup/Reaming/Demobilization(B2) (65m) | 41 | 1 | 18JUL11A | 23AUG11 | 95 | 31 | 16 | | | | | | | | | | | | |
| QS160293 | RBM Mobilization & Pilot Hole drilling - (B2) | 15 | 0 | 18JUL11A | 03AUG11A | 100 | 15 | 7 | | | | | | | | | | | | |
| QS160295 | Back Reaming & Demobilization - (B2) | 26 | 1 | 04AUG11A | 23AUG11 | 95 | 16 | 16 | | | | | | | | | | | | |
| QPS160310 | Dropshaft-Position,Fix & Grout-64.6m ID1.5 (B2) | 40 | 40 | 12NOV11 | 30DEC11 | 0 | 0 | -8 | | | | | | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | | | | | | |
| QHS160123 | Penstock Delivery - (B2) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | | | | | | | | | | | | |
| QL071 | Stabilisation shaft B2 | 6 | 6 | 24AUG11 | 30AUG11 | 0 | 0 | 16 | | | | | | | | | | | | |
| QHS160124 | Intake Structure(2 pours) remaining Stage 1 (B2) | 36 | 36 | 31AUG11 | 14OCT11 | 0 | 0 | 16 | | | | | | | | | | | | |
| Milestone | | | | | | | | | | | | | | | | | | | | |
| Section 16 (Portion B2) | | | | | | | | | | | | | | | | | | | | |
| M22-1010 | 22.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -11 | | | | | | | | | | | | |
| M22-1020 | 22.02-Excavation (Dropshaft) | 0 | 0 | | 23AUG11 | 0 | 0 | 18 | | | | | | | | | | | | |
| CC20-SECTION 14 OF THE WORKS (PORTION BR6) | | | | | | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | | | | | | | |
| S140191 | Dropshaft Excavation -(BR6) | 38 | 0 | 11MAY11A | 11AUG11A | 100 | 78 | -44 | | | | | | | | | | | | |
| QHS140298 | Flow Diversion & Backdrop manhole (BR6) | 69 | 33 | 04JUN11A | 30SEP11 | 50 | 66 | -40 | | | | | | | | | | | | |
| S140192 | Install Protection cover inside dropshaft (BR6) | 10 | 0 | 12AUG11A | 16AUG11A | 100 | 4 | -38 | | | | | | | | | | | | |
| S140193 | Intake structure Stage 1, (5 pours) (BR6) | 60 | 48 | 17AUG11A | 20OCT11 | 5 | 5 | -31 | | | | | | | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

Start Date 30NOV07
Finish Date 15SEP12
Data Date 23AUG11
Run Date 31AUG11 17:54

Early Bar
Last Month Progress 107A
Progress Bar
Critical Activity

108A
Sheet 6 of 10
Design & Construction of HK. West Drainage Tunnel
Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
|----------------------------------|------------------------------|---------|----------|
| Date | Revision | Checked | Approved |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | |
|---|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV |
| | | | | | | | | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS140296 | Penstock Delivery - (BR6) | 0 | 0 | 23AUG11* | | 0 | 0 | -1 | | | | | | |
| QHS140297 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(BR6) | 33 | 33 | 21OCT11 | 28NOV11 | 0 | 0 | -31 | | | | | | |
| QHS140100 | Local Intake Test & Commissioning - (BR6) | 12 | 12 | 15NOV11 | 28NOV11 | 0 | 0 | -31 | | | | | | |
| Pipe Laying | | | | | | | | | | | | | | |
| S140320 | Finalize design details for drains & MH | 36 | 0 | 14MAY11A | 22AUG11A | 100 | 84 | -48 | | | | | | |
| S140204 | Pipejacking SMH17 to Intake CH46-Ch69 (BR6) | 61 | 0 | 17MAY11A | 13JUL11A | 100 | 48 | 13 | | | | | | |
| S140206 | Pipejacking SMH17 to Intake CH69-Ch94 (BR6) | 61 | 24 | 14JUL11A | 20SEP11 | 10 | 34 | 16 | | | | | | |
| S140330 | Cofferdam const, Excav & ELS at BR7 | 64 | 64 | 23AUG11 | 08NOV11 | 0 | 0 | -40 | | | | | | |
| S140207 | Remedial works for misaligned segments | 30 | 30 | 21SEP11 | 27OCT11 | 0 | 0 | 16 | | | | | | |
| S140208 | Precast pipe, grouting, connection to BR6 | 30 | 30 | 28OCT11 | 01DEC11 | 0 | 0 | 16 | | | | | | |
| S140340 | Pipeline & MH construction SMH17 to BR7 | 64 | 64 | 09NOV11 | 28JAN12 | 0 | 0 | -34 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 14 (Portion BR6) | | | | | | | | | | | | | | |
| M201070 | 20.07-100% P.Length of TrenchlessDrainageWorks | 0 | 0 | | 20SEP11 | 0 | 0 | 21 | | | | | | |
| M201020 | 20.02-Excavation (Dropshaft) | 0 | 0 | | 30SEP11 | 0 | 0 | -48 | | | | | | |
| M201040 | 20.04-Excavation (Intake) | 0 | 0 | | 30SEP11 | 0 | 0 | -48 | | | | | | |
| CC21-SECTION 15 OF THE WORKS (PORTION W3) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S150199 | Still Chamber Excavation +33mPD - W3 | 53 | 0 | 18MAY11A | 27JUL11A | 100 | 59 | 40 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QL0761 | Stilling chamber Lining underneath Intake - (W3) | 30 | 21 | 28JUL11A | 16SEP11 | 30 | 22 | 0 | | | | | | |
| QHS150203 | Penstock Delivery - (W3) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | | | | | | |
| QHS150204 | Intake Permanent Structure(3 pours) Stage 1a(W3) | 36 | 36 | 17SEP11 | 31OCT11 | 0 | 0 | 27 | | | | | | |
| QL076 | Stilling chamber Lining - (W3) | 30 | 30 | 15OCT11 | 18NOV11 | 0 | 0 | -25 | | | | | | |
| QHS150205 | HEC Cable diversion (W3) | 36 | 36 | 01NOV11 | 12DEC11 | 0 | 0 | 27 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 15 (Portion W3) | | | | | | | | | | | | | | |
| M211010 | 21.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | 21 | | | | | | |
| M211040 | 21.04-Excavation (Intake) | 0 | 0 | | 22AUG11 | 0 | 0 | 21 | | | | | | |
| M211030 | 21.03-Lining (Dropshaft) | 0 | 0 | | 18NOV11 | 0 | 0 | -29 | | | | | | |
| CC27-SECTION 21 OF THE WORKS (PORTION TP789) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - TP789 | | | | | | | | | | | | | | |
| QL052 | Stilling chamber Lining - TP789 | 36 | 0 | 30APR11A | 30JUN11A | 100 | 50 | -3 | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QPS210280 | Dropshaft-Position,Fix&Grout-162.1m ID2.3(TP789) | 44 | 0 | 09JUL11A | 08AUG11A | 100 | 26 | 9 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QH210601 | Overhad Gantry erection TP789 | 14 | 0 | 12MAY11A | 08JUL11A | 100 | 48 | -35 | | | | | | |
| QHS210409 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(TP789) | 36 | 30 | 09AUG11A | 27SEP11 | 15 | 12 | 3 | | | | | | |
| QHS210407 | Penstock Delivery - (TP789) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | | | | | | |
| QHS210101 | Local Intake Test & Commissioning - (TP789) | 12 | 12 | 14SEP11 | 27SEP11 | 0 | 0 | 3 | | | | | | |
| QHS210410 | Finishing works / PS BW / Reinstatement (TP789) | 18 | 18 | 28SEP11 | 20OCT11 | 0 | 0 | 3 | | | | | | |
| QHS210411 | OHC Hydraulic arm dismantling (TP789) | 7 | 7 | 21OCT11 | 28OCT11 | 0 | 0 | 3 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | |
| M27-1070 | 27.07-Section21 - TP789 Handover to SO | 0 | 0 | | 28OCT11 | 0 | 0 | 4 | | | | | | |
| Section 21 (Portion TP789) | | | | | | | | | | | | | | |
| M27-1030 | 27.03-Lining (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -4 | | | | | | |
| M27-1050 | 27.05-Concrete Structure (Intake) | 0 | 0 | | 27SEP11 | 0 | 0 | 3 | | | | | | |
| M27-1060 | 27.06-Slopeworks, Backfilling & Reinstatement | 0 | 0 | | 28OCT11 | 0 | 0 | 4 | | | | | | |
| CC35-SECTION 29 OF THE WORKS (PORTION W10) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| QHS290584 | Intake Struc Part 2(4 pours)+Drain D-Stag1b(W10) | 40 | 40 | 22SEP11 | 09NOV11 | 0 | 0 | -33 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W10 | | | | | | | | | | | | | | |
| QL013 | Stilling chamber Lining - W10 | 36 | 36 | 22SEP11 | 04NOV11 | 0 | 0 | -33 | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QS290580 | RB Setup/Reaming/Demobilization(W10) (95m) | 59 | 19 | 27MAY11A | 14SEP11 | 45 | 73 | -33 | | | | | | |
| QS290604 | RBM Mobilization & Pilot Hole drilling - (W10) | 19 | 0 | 27MAY11A | 24JUN11A | 100 | 24 | -5 | | | | | | |
| QS290606 | Back Reaming & Demobilization - (W10) | 40 | 19 | 25JUN11A | 14SEP11 | 50 | 49 | -33 | | | | | | |
| QPS290370 | Dropshaft-Position,Fix&Grout- 94.7m ID2.3 (W10) | 38 | 38 | 10NOV11 | 23DEC11 | 0 | 0 | -33 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS290368 | Penstock Delivery - (W10) | 0 | 0 | 23AUG11* | | 0 | 0 | -33 | | | | | | |
| QL010 | Stabilisation shaft W10 | 6 | 6 | 15SEP11 | 21SEP11 | 0 | 0 | -33 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 29 (Portion W10) | | | | | | | | | | | | | | |
| M351010 | 35.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -65 | | | | | | |
| M351020 | 35.02-Excavation (Dropshaft) | 0 | 0 | | 14SEP11 | 0 | 0 | -40 | | | | | | |
| CC8 - SECTION 2 OF THE WORKS (PORTION E5A) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| QHS020288 | Intake Permanent Structure (6pours) Stage 1 -E5A | 66 | 66 | 22OCT11 | 10JAN12 | 0 | 0 | -28 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - E5A | | | | | | | | | | | | | | |
| QL105 | Stilling chamber Lining - E5A | 30 | 21 | 12AUG11A | 12SEP11 | 50 | 11 | -35 | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QS020350 | Dropshaft-Position,Fix&Grout - 42.8m ID2.3 (E5A) | 31 | 31 | 14SEP11 | 21OCT11 | 0 | 0 | -28 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS020297 | Rock Excav stage 2 (122cu, 4cu/day) -(E5A) | 69 | 18 | 11APR11A | 12SEP11 | 60 | 108 | -28 | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

| | | |
|-------------|---------------|--------------------------|
| Start Date | 30NOV07 | Early Bar |
| Finish Date | 15SEP12 | Last Month Progress 107A |
| Data Date | 23AUG11 | Progress Bar |
| Run Date | 31AUG11 17:54 | Critical Activity |

108A
 Sheet 7 of 10
Design & Construction of HK, West Drainage Tunnel
 Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
|----------------------------------|------------------------------|---------|----------|
| Date | Revision | Checked | Approved |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | |
|---|--|----------|---------|-------------------|--------------------|--------|-----------------|--|----------|-----|-----|-----|-----|-----|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV |
| | | | | | | | | | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 2 (Portion E5A) | | | | | | | | | | | | | | |
| M81020 | 8.02-Excavation (Dropshaft) | 0 | 0 | | 08JUL11A | 100 | 0 | -23 | ◆ MC 125 | | | | | |
| M81010 | 8.01-Pre-drilling&Grouting Works(Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -87 | | | | | | |
| M81030 | 8.03-Lining (Dropshaft) | 0 | 0 | | 21OCT11 | 0 | 0 | -35 | ◆ | | | | | |
| CC37-SECTION 31 OF THE WORKS (PORTION PFLR1) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S311395 | Remove Temporary Steel Deck | 3 | 0 | 29JUN11A | 02JUL11A | 100 | 3 | -16 | ■ | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - PFLR1 | | | | | | | | | | | | | | |
| QL003 | Stilling chamber Lining - PLFR 1 | 36 | 36 | 23AUG11 | 06OCT11 | 0 | 0 | -2 | ■ | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QS311400 | RB Setup/Reaming/Demobilization(PFLR1) (56m) | 51 | 0 | 04JUL11A | 06AUG11A | 100 | 30 | 5 | ■ | | | | | |
| QS311425 | RBM Mobilization & Pilot Hole drilling - (PFLR1) | 18 | 0 | 04JUL11A | 16JUL11A | 100 | 12 | -10 | ■ | | | | | |
| QS311430 | Back Reaming & Demobilization - (PFLR1) | 33 | 0 | 18JUL11A | 06AUG11A | 100 | 18 | 5 | ■ | | | | | |
| QPS310330 | Dropshaft-Position,Fix&Grout-56.4m ID2.3 (PFLR1) | 24 | 24 | 07OCT11 | 03NOV11 | 0 | 0 | -2 | ■ | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QL0021 | Stabilisation shaft PFLR1 | 6 | 0 | 15AUG11A | 22AUG11A | 100 | 7 | -2 | ■ | | | | | |
| QHS311008 | Complete remaining Stage 1 Concrete pours(PFLR1) | 34 | 34 | 23AUG11 | 03OCT11 | 0 | 0 | 0 | ■ | | | | | |
| QHS311007 | Penstock Delivery - (PFLR1) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | ◆ | | | | | |
| QHS311009 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(PFLR1) | 33 | 33 | 04NOV11 | 12DEC11 | 0 | 0 | -2 | ■ | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 31 (Portion PFLR1) | | | | | | | | | | | | | | |
| M371020 | 37.02-Excavation (Dropshaft) | 0 | 0 | | 08AUG11A | 100 | 0 | 4 | ◆ MC 126 | | | | | |
| M371010 | 37.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -48 | ◆ | | | | | |
| M371030 | 37.03-Lining (Dropshaft) | 0 | 0 | | 03NOV11 | 0 | 0 | -2 | ◆ | | | | | |
| CC15-SECTION9 OF THE WORKS(PORTION HR1) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S090260 | Main Structure Construcion-(HR1) | 60 | 34 | 14JUN11A | 03OCT11 | 50 | 59 | -25 | ■ | | | | | |
| S090280 | Backfilling & Compaction-(HR1) | 8 | 8 | 04OCT11 | 13OCT11 | 0 | 0 | -25 | ■ | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - HR1 | | | | | | | | | | | | | | |
| QL134 | Stilling chamber Lining - HR1 | 36 | 36 | 13SEP11 | 18OCT11 | 0 | 0 | -35 | ■ | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QS090350 | Dropshaft-Position,Fix&Grout - 44.8m ID2.3 (HR1) | 31 | 31 | 19OCT11 | 23NOV11 | 0 | 0 | -28 | ■ | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QPS090269 | Penstock Delivery - (HR1) | 0 | 0 | 23AUG11* | | 0 | 0 | -1 | ◆ | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 9 (Portion HR1) | | | | | | | | | | | | | | |
| M151070 | 15.07-Excavation (Dropshaft) | 0 | 0 | | 08JUL11A | 100 | 0 | -23 | ◆ MC 125 | | | | | |
| M151060 | 15.06-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -89 | ◆ | | | | | |
| M151080 | 15.08-Lining (Dropshaft) | 0 | 0 | | 23NOV11 | 0 | 0 | -33 | ◆ | | | | | |
| CC25-SECTION 19 OF THE WORKS (PORTION MA17) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S190337 | Excavate & Strut to +166.5mPD-(MA17) | 18 | 0 | 17JUN11A | 08JUL11A | 100 | 18 | -15 | ■ | | | | | |
| S190339 | Hard Excav to +162.5mPD | 35 | 0 | 09JUL11A | 27JUL11A | 100 | 16 | 4 | ■ | | | | | |
| S190342 | Hard Excavation up to +160mPD | 20 | 4 | 28JUL11A | 26AUG11 | 75 | 22 | 77 | ■ | | | | | |
| S190344 | Hard Excav to +157.1mPD + Stab + Soil Nail Rem | 28 | 28 | 27AUG11 | 29SEP11 | 0 | 0 | 73 | ■ | | | | | |
| S190345 | Install RBM Steel Platform | 10 | 10 | 30SEP11 | 13OCT11 | 0 | 0 | -50 | ■ | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QS190620 | RB Setup/Reaming/Demobilization(MA17) (117m) | 69 | 69 | 14OCT11 | 05JAN12 | 0 | 0 | -50 | ■ | | | | | |
| QS190655 | RBM Mobilization & Pilot Hole drilling - (MA17) | 23 | 23 | 14OCT11 | 09NOV11 | 0 | 0 | -50 | ■ | | | | | |
| QS190657 | Back Reaming & Demobilization - (MA17) | 46 | 46 | 10NOV11 | 05JAN12 | 0 | 0 | -50 | ■ | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 19 (Portion MA17) | | | | | | | | | | | | | | |
| M25-1040 | 25.04-Excavation (Intake) | 0 | 0 | | 29SEP11 | 0 | 0 | 90 | ◆ | | | | | |
| M25-1010 | 25.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 09NOV11 | 0 | 0 | -62 | ◆ | | | | | |
| CC17-SECTION 11 OF THE WORKS (PORTION BR4) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S110200 | Construct Intake Stage 1 (4 pours)+ RBM Platform | 61 | 0 | 01JUN11A | 08AUG11A | 100 | 57 | 4 | ■ | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - BR4 | | | | | | | | | | | | | | |
| QL094 | Stilling chamber Lining - BR4 | 36 | 36 | 14OCT11 | 24NOV11 | 0 | 0 | 30 | ■ | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | |
| QS110610 | RB Setup/Reaming/Demobilization(BR4) (58m) | 55 | 42 | 09AUG11A | 13OCT11 | 0 | 12 | 30 | ■ | | | | | |
| QS11613 | RBM Mobilization & Pilot Hole drilling - (BR4) | 27 | 2 | 09AUG11A | 24AUG11 | 75 | 12 | 42 | ■ | | | | | |
| QS11615 | Back Reaming & Demobilization - (BR4) | 28 | 28 | 08SEP11 | 13OCT11 | 0 | 0 | 30 | ■ | | | | | |
| QHS110435 | Install Dropshaft lining Temp Support (BR4) | 6 | 6 | 14OCT11 | 20OCT11 | 0 | 0 | 30 | ■ | | | | | |
| QS110741 | Dropshaft-Position,Fix & Grout-58.5m ID1.5(BR4) | 26 | 26 | 21OCT11 | 19NOV11 | 0 | 0 | 30 | ■ | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS110434 | Penstock Delivery - (BR4) | 0 | 0 | 23AUG11* | | 0 | 0 | -1 | ◆ | | | | | |
| QHS110436 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(BR4) | 33 | 33 | 21NOV11 | 30DEC11 | 0 | 0 | 30 | ■ | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 11 (Portion BR4) | | | | | | | | | | | | | | |
| M171010 | 17.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 24AUG11 | 0 | 0 | 52 | ◆ | | | | | |
| M171020 | 17.02-Excavation (Dropshaft) | 0 | 0 | | 13OCT11 | 0 | 0 | 35 | ◆ | | | | | |
| M171030 | 17.03-Lining (Dropshaft) | 0 | 0 | | 19NOV11 | 0 | 0 | 38 | ◆ | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

Start Date 30NOV07
Finish Date 15SEP12
Data Date 23AUG11
Run Date 31AUG11 17:54

- Early Bar
- Last Month Progress 107A
- Progress Bar
- Critical Activity

108A
Sheet 8 of 10
Design & Construction of HK, West Drainage Tunnel
Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
|----------------------------------|------------------------------|---------|----------|
| Date | Revision | Checked | Approved |
| 13JAN09 | Approved Works Programme # 1 | SOR | 804B |
| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | | |
|--|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|--|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV | |
| CC23-SECTION 17 OF THE WORKS (PORTION MA14) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | | |
| S170296 | Intake Stage 1/RBM platform & OHC Install-(MA14) | 59 | 0 | 31MAY11A | 30JUL11A | 100 | 51 | 7 | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - MA14 | | | | | | | | | | | | | | | |
| QL068 | Stilling chamber Lining - MA14 | 36 | 36 | 23NOV11 | 06JAN12 | 0 | 0 | -13 | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | |
| QS170560 | RB Setup/Reaming/Demobilization(MA14) (154m) | 70 | 70 | 24AUG11 | 16NOV11 | 0 | 0 | -13 | | | | | | | |
| QS170595 | RBM Mobilization & Pilot Hole drilling - (MA14) | 23 | 23 | 24AUG11 | 20SEP11 | 0 | 0 | -13 | | | | | | | |
| QS170597 | Back Reaming & Demobilization - (MA14) | 47 | 47 | 21SEP11 | 16NOV11 | 0 | 0 | -13 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QL067 | Stabilisation shaft MA14 | 5 | 5 | 17NOV11 | 22NOV11 | 0 | 0 | -13 | | | | | | | |
| QL0671 | Install Temp support for Dropshaft Lining- MA14 | 17 | 17 | 23NOV11 | 12DEC11 | 0 | 0 | -13 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 17 (Portion MA14) | | | | | | | | | | | | | | | |
| M23-1040 | 23.04-Excavation (Intake) | 0 | 0 | | 22AUG11 | 0 | 0 | -86 | | | | | | | |
| M23-1010 | 23.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 20SEP11 | 0 | 0 | -17 | | | | | | | |
| M23-1020 | 23.02-Excavation (Dropshaft) | 0 | 0 | | 16NOV11 | 0 | 0 | -15 | | | | | | | |
| CC19-SECTION 13 OF WORKS (PORTION BR5) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | | |
| S130215 | Construct RBM Platform - (BR5) | 12 | 0 | 13JUN11A | 29JUL11A | 100 | 40 | -40 | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - BR5 | | | | | | | | | | | | | | | |
| QL082 | Stilling chamber Lining - BR5 | 36 | 36 | 04OCT11 | 15NOV11 | 0 | 0 | 63 | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | |
| QS130280 | RB Setup/Reaming/Demobilization(BR5) (71m) | 59 | 28 | 30JUL11A | 24SEP11 | 5 | 20 | 33 | | | | | | | |
| QS130283 | RBM Mobilization & Pilot Hole drilling - (BR5) | 29 | 0 | 30JUL11A | 19AUG11A | 100 | 18 | 33 | | | | | | | |
| QS130285 | Back Reaming & Demobilization - (BR5) | 30 | 28 | 20AUG11A | 24SEP11 | 5 | 2 | 33 | | | | | | | |
| QL080 | Stabilisation shaft BR5 | 6 | 6 | 26SEP11 | 03OCT11 | 0 | 0 | 33 | | | | | | | |
| QS130340 | Dropshaft-Position,Fix&Grout - 71m ID1.5 (BR5) | 40 | 40 | 04OCT11 | 19NOV11 | 0 | 0 | 33 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QSH130299 | Penstock delivery - (BR5) | 0 | 0 | 15NOV11* | | 0 | 0 | 0 | | | | | | | |
| QSH130301 | BS/Vortex/Penstock/Drain Dvn/TS - Stage 2(BR5) | 33 | 33 | 21NOV11 | 30DEC11 | 0 | 0 | 33 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 13 (Portion BR5) | | | | | | | | | | | | | | | |
| M19-1010 | 19.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | 37 | | | | | | | |
| M19-1020 | 19.02-Excavation (Dropshaft) | 0 | 0 | | 24SEP11 | 0 | 0 | 41 | | | | | | | |
| M19-1030 | 19.03-Lining (Dropshaft) | 0 | 0 | | 19NOV11 | 0 | 0 | 41 | | | | | | | |
| CC18-SECTION 12 OF THE WORKS (PORTION W1) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | | |
| QPS120250 | Part 2 Rock Excavation after RBM works - (W1) | 42 | 22 | 30JUL11A | 17SEP11 | 50 | 20 | 0 | | | | | | | |
| QPS120251 | Intake structure - Stage 1(8 pours) - (W1) | 61 | 61 | 19SEP11 | 30NOV11 | 0 | 0 | -23 | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W1 | | | | | | | | | | | | | | | |
| QL089 | Stilling chamber Lining - W1 | 36 | 36 | 23AUG11 | 06OCT11 | 0 | 0 | 18 | | | | | | | |
| Dropshaft - Excavation/ Shaft Lining | | | | | | | | | | | | | | | |
| QS120290 | RB Setup/Reaming/Demobilization(W1) (50m) | 59 | 0 | 13JUN11A | 29JUL11A | 100 | 40 | 22 | | | | | | | |
| QS120293 | RBM Mobilization & Pilot Hole drilling - (W1) | 27 | 0 | 13JUN11A | 28JUN11A | 100 | 14 | 16 | | | | | | | |
| QS120295 | Back Reaming & Demobilization - (W1) | 29 | 0 | 12JUL11A | 29JUL11A | 100 | 16 | 19 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QHS120222 | Penstock Delivery - (W1) | 0 | 0 | 15NOV11* | | 0 | 0 | 0 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 12 (Portion W1) | | | | | | | | | | | | | | | |
| M181020 | 18.02-Excavation (Dropshaft) | 0 | 0 | | 08AUG11A | 100 | 0 | 12 | | | | | | | |
| M181010 | 18.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 22AUG11 | 0 | 0 | -35 | | | | | | | |
| M181040 | 18.04-Excavation (Intake) | 0 | 0 | | 22AUG11 | 0 | 0 | -72 | | | | | | | |
| CC30-SECTION 24 OF THE WORKS (PORTION W5) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | | |
| QHS240343 | Construct Temporary Dropshaft Lining - (W5) | 52 | 33 | 13JUN11A | 30SEP11 | 65 | 60 | -44 | | | | | | | |
| QHS240345 | Intake Structure (8 pours) Stage 1 (W5) | 89 | 89 | 03OCT11 | 18JAN12 | 0 | 0 | -44 | | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W5 | | | | | | | | | | | | | | | |
| QL034 | Stilling chamber Lining - W5 | 36 | 36 | 03OCT11 | 14NOV11 | 0 | 0 | -51 | | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | | |
| QHS240344 | Penstock Delivery - (W5) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 24 (Portion W5) | | | | | | | | | | | | | | | |
| M301020 | 30.02-Excavation (Dropshaft) | 0 | 0 | | 30SEP11 | 0 | 0 | -52 | | | | | | | |
| CC31-SECTION 25 OF THE WORKS (PORTION CR1) | | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | | |
| S250275 | Cofferdam Wall Piling 32m -(CR1) | 30 | 0 | 14MAR11A | 23JUN11A | 100 | 81 | -10 | | | | | | | |
| S250280 | Cofferdam Wall Curtain Grout (CR1) | 24 | 0 | 24JUN11A | 04AUG11A | 100 | 35 | -21 | | | | | | | |
| S250290 | OHC Installation -(CR1) | 33 | 18 | 05AUG11A | 12SEP11 | 0 | 15 | -42 | | | | | | | |
| S250300 | Cofferdam Excav,ELS & Drain Divn -(CR1) | 46 | 46 | 14SEP11 | 08NOV11 | 0 | 0 | -42 | | | | | | | |
| S250310 | HDC Excavation & Temp Lining -(CR1) | 23 | 23 | 09NOV11 | 05DEC11 | 0 | 0 | -42 | | | | | | | |
| Milestone | | | | | | | | | | | | | | | |
| Section 25 (Portion CR1) | | | | | | | | | | | | | | | |
| M31-1040 | 31.04-Excavation (Intake) | 0 | 0 | | 08NOV11 | 0 | 0 | -52 | | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

Start Date 30NOV07
Finish Date 15SEP12
Data Date 23AUG11
Run Date 31AUG11 17:54

- █ Early Bar
- █ Last Month Progress 107A
- █ Progress Bar
- █ Critical Activity

108A Sheet 9 of 10
Design & Construction of HK, West Drainage Tunnel
Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
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| 27MAR09 | Approved Works Programme # 2 | SOR | 9032 |
| 10DEC10 | Approved Works Programme # 3 | SOR | 9116 |
| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

| Act ID | Activity Description | Orig Dur | Rem Dur | Anticipated Start | Anticipated Finish | % Comp | Actual Duration | Works Prog # 6 WP6C EF Variance | 2011 | | | | | |
|---|--|----------|---------|-------------------|--------------------|--------|-----------------|--|------|-----|-----|-----|-----|-----|
| | | | | | | | | | J | JUL | AUG | SEP | OCT | NOV |
| | | | | | | | | | | | | | | |
| CC32-SECTION 26 OF THE WORKS (PORTION RR1) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S260368 | Cofferdam Excavation, ELS & Drain Divn - (RR1) | 49 | 0 | 30MAR11A | 27JUL11A | 100 | 95 | -32 | | | | | | |
| S260369 | 3rd Casing Installation (Remedial works) - RR1 | 39 | 17 | 28JUL11A | 10SEP11 | 50 | 22 | 0 | | | | | | |
| QHS260374 | Stage 1 structure (5 pours) - (RR1) | 84 | 84 | 12SEP11 | 21DEC11 | 0 | 0 | -71 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - RR1 | | | | | | | | | | | | | | |
| QL025 | Stilling chamber Lining - RR1 | 36 | 36 | 12SEP11 | 26OCT11 | 0 | 0 | -73 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS260373 | Penstock Delivery - (RR1) | 0 | 0 | 23AUG11* | | 0 | 0 | -13 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 26 (Portion RR1) | | | | | | | | | | | | | | |
| M32-1040 | 32.04-Excavation (Intake) | 0 | 0 | | 08AUG11A | 100 | 0 | -51 | | | | | | |
| CC33-SECTION 27 OF THE WORKS (PORTION W8) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S270320 | Cofferdam Excav, ELS & Dain Dvn to +63.6mPD-(W8) | 70 | 10 | 27APR11A | 02SEP11 | 90 | 97 | -43 | | | | | | |
| S270321 | Excavation + ELS to +58.5mPD - (W8) | 60 | 60 | 03SEP11 | 15NOV11 | 0 | 0 | -43 | | | | | | |
| S270330 | HDC Excavation & Temp Lining - (W8) | 31 | 31 | 16NOV11 | 21DEC11 | 0 | 0 | -43 | | | | | | |
| Adit Tunnel Excavation & Tunnel Lining - W8 | | | | | | | | | | | | | | |
| QL026 | Stilling chamber Lining - W8 | 35 | 35 | 05NOV11 | 15DEC11 | 0 | 0 | -33 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 27 (Portion W8) | | | | | | | | | | | | | | |
| M33-1040 | 33.04-Excavation (Intake) | 0 | 0 | | 15NOV11 | 0 | 0 | -53 | | | | | | |
| CC34-SECTION 28 OF THE WORKS (PORTION P5) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| QHS280114 | Cofferdam Wall Pipe Piling & Grouting (P5) | 64 | 34 | 14MAY11A | 03OCT11 | 50 | 84 | -41 | | | | | | |
| QHS280119 | Shaft Remedial works(fill sand&anulus grout)(P5) | 16 | 0 | 02JUL11A | 20JUL11A | 100 | 16 | -16 | | | | | | |
| QHS280121 | Shaft Remedial works(peripheral grout)(P5) | 25 | 25 | 23AUG11 | 21SEP11 | 0 | 0 | -44 | | | | | | |
| QHS280122 | Shaft Remedial works(rock dowel&Grabbing)(P5) | 99 | 99 | 22SEP11 | 20JAN12 | 0 | 0 | -44 | | | | | | |
| QHS280118 | Cofferdam Excav+ELS+Temp Divern to+95.6mPD -(P5) | 98 | 98 | 04OCT11 | 02FEB12 | 0 | 0 | -41 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| Section 28 (Portion P5) | | | | | | | | | | | | | | |
| M341010 | 34.01-Pre-drilling & Grouting Works (Dropshaft) | 0 | 0 | | 03OCT11 | 0 | 0 | -51 | | | | | | |
| CC38-SECTION 32 OF THE WORKS (PORTION SM1) | | | | | | | | | | | | | | |
| Construction | | | | | | | | | | | | | | |
| Section 32 (Portion SM1) | | | | | | | | | | | | | | |
| S321610 | Dropshaft insitu lining/Still Chamber Const(SM1) | 36 | 36 | 23AUG11 | 06OCT11 | 0 | 0 | -47 | | | | | | |
| Intakes - External Structures (Stage1) | | | | | | | | | | | | | | |
| S321360 | Waiting for Penstock delivery - SM1 | 65 | 0 | 05JAN11A | 25JUL11A | 100 | 162 | -1 | | | | | | |
| Intakes - Internal Structures (Stage 2) | | | | | | | | | | | | | | |
| QHS321633 | Penstock Delivery (SM1) | 0 | 0 | 25JUL11A | | 100 | 0 | -8 | | | | | | |
| QHS321634 | Penstock/Finish/PSBW/RI - Intake Stage 2 (SM1) | 22 | 0 | 26JUL11A | 22AUG11A | 100 | 24 | -6 | | | | | | |
| Milestone | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | |
| M381070 | 38.07-Section32 - SM1 Handover to SO | 0 | 0 | | 22AUG11 | 0 | 0 | -7 | | | | | | |
| Section 32 (Portion SM1) | | | | | | | | | | | | | | |
| M381050 | 38.05-Concrete Structure (Intake) | 0 | 0 | | 22AUG11 | 0 | 0 | -7 | | | | | | |
| M381060 | 38.06-Slopeworks, Backfilling & Reinstatement | 0 | 0 | | 22AUG11 | 0 | 0 | -7 | | | | | | |
| M381030 | 38.03-Lining (Dropshaft) | 0 | 0 | | 06OCT11 | 0 | 0 | -51 | | | | | | |

| J | JUL | AUG | SEP | OCT | NOV |
|------|-----|-----|-----|-----|-----|
| 2011 | | | | | |

Start Date 30NOV07
 Finish Date 15SEP12
 Data Date 23AUG11
 Run Date 31AUG11 17:54

- █ Early Bar
- █ Last Month Progress 107A
- █ Progress Bar
- █ Critical Activity

108A Sheet 10 of 10

Design & Construction of HK, West Drainage Tunnel
 Contract No. DC/2007/10
3 MONTH ROLLING PROGRAMME
AUG /2011 MONTHLY REPORT

| WORKS PROGRAMME APPROVAL HISTORY | | | |
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| 01MAR10 | Approved Works Programme # 4 | SOR | 003A |
| 25FEB11 | Approved Works Programme # 5 | SOR | 301F |
| 29JUN11 | Approved Works Programme # 6 | SOR | WP6C |

APPENDIX N
WASTE GENERATED QUANTITY

Monthly Waste Flow Table

| Quarter ending | Actual Quantities of Inert C&D Materials Generated Monthly | | | | | | Actual Quantities of C&D Wastes Generated Monthly | | | | |
|----------------|--|----------------------|------------------------|--------------------------|-------------------------|----------------------|---|----------------------------|------------------------|----------------|-----------------------------|
| | Total Quantity Generated | Broken Concrete | Reused in the Contract | Reused in other Projects | Disposed as Public Fill | Imported Fill | Metals | Paper/ cardboard packaging | Plastics (see notes 2) | Chemical Waste | Others, e.g. general refuse |
| | (in m ³) | (in m ³) | (in m ³) | (in m ³) | (in m ³) | (in m ³) | (in Kg) | (in Kg) | (in Kg) | (in Kg) | (in m ³) |
| Jan 2011 | 24478 | 0 | 24 | 22424 | 1992 | 38 | 25905 | 385 | 0 | 0 | 84 |
| Feb 2011 | 11114 | 0 | 0 | 10034 | 1080 | 0 | 128470 | 385 | 0 | 4924 | 73 |
| Mar 2011 | 14052 | 0 | 4 | 12042 | 2006 | 0 | 273060 | 700 | 0 | 3072 | 101 |
| Apr 2011 | 11795 | 0 | 0 | 10441 | 1354 | 0 | 496610 | 315 | 0 | 0 | 84 |
| May 2011 | 12099 | 0 | 0 | 11134 | 965 | 0 | 54330 | 315 | 0 | 0 | 140 |
| Jun 2011 | 14976 | 0 | 0 | 6929 | 8047 | 0 | 25120 | 420 | 0 | 0 | 101 |
| Sub-Total | 88514 | 0 | 28 | 73004 | 15444 | 38 | 1003495 | 2520 | 0 | 7996 | 583 |
| July 2011 | 13696 | 0 | 0 | 0 | 13696 | 0 | 129850 | 420 | 0 | 600 | 123 |
| Aug 2011 | 12732 | 0 | 0 | 0 | 12732 | 0 | 151670 | 315 | 0 | 1101 | 112 |
| Sep 2011 | | | | | | | | | | | |
| Oct 2011 | | | | | | | | | | | |
| Nov 2011 | | | | | | | | | | | |
| Dec 2011 | | | | | | | | | | | |
| Total | | | | | | | | | | | |

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
 - (2) Plastics refer to plastic bottles/containers, plastic/foam from packaging material.
 - (3) Quantities in August 2011 are upto 31 August 2011.
 - (4) Assuming the conversion factor from m³ to ton for rock is 2.5.
 - (5) The materials reused in other Project shall not be treated as waste under the Waste Disposal Ordinance (Cap 354).
 - (6) The figures are included for the sake of completeness of record.

APPENDIX O
QUALITY CONTROL REPORTS FOR SS
LABORATORY ANALYSIS

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13780 |
| Date of Issue: | 2011/08/02 |
| Date Received: | 2011/08/01 |
| Date Tested: | 2011/08/01 |
| Date Completed: | 2011/08/02 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/01
Number of Sample: 30
Custody No.: MA8001 (Cyberport)/110801

| Total Suspended Solids Sampling Point | Duplicate Analysis | | | QC Recovery, % |
|--|--------------------|------------------|------------------|----------------|
| | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| CEse | 4 | 5 | 9 | 97 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13798 |
| Date of Issue: | 2011/08/04 |
| Date Received: | 2011/08/03 |
| Date Tested: | 2011/08/03 |
| Date Completed: | 2011/08/04 |

Page: 1 of 1


ATTN: Mr. Henry Leung

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/03
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110803

| Total Suspended Solids Sampling Point | Duplicate Analysis | | | QC Recovery, % |
|--|--------------------|------------------|------------------|----------------|
| | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| CEse | 8 | 7 | 9 | 93 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13819 |
| Date of Issue: | 2011/08/08 |
| Date Received: | 2011/08/05 |
| Date Tested: | 2011/08/05 |
| Date Completed: | 2011/08/08 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/05
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110805

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| CFmf | 8 | 7 | 9 | 91 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13831 |
| Date of Issue: | 2011/08/09 |
| Date Received: | 2011/08/08 |
| Date Tested: | 2011/08/08 |
| Date Completed: | 2011/08/09 |

Page: 1 of 1

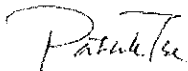
ATTN: Mr. Henry Leung

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/08
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110808

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| CFmf | 9 | 10 | 12 | 115 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13848 |
| Date of Issue: | 2011/08/11 |
| Date Received: | 2011/08/10 |
| Date Tested: | 2011/08/10 |
| Date Completed: | 2011/08/11 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/10
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110810

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| Ilme | 9 | 8 | 5 | 101 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13870 |
| Date of Issue: | 2011/08/15 |
| Date Received: | 2011/08/12 |
| Date Tested: | 2011/08/12 |
| Date Completed: | 2011/08/15 |

Page: 1 of 1

ATTN: Mr. Henry Leung

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/12
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110812

| Total Suspended Solids Sampling Point | Duplicate Analysis | | | QC Recovery, % |
|--|--------------------|------------------|------------------|----------------|
| | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| I1be | 9 | 8 | 16 | 96 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13886 |
| Date of Issue: | 2011/08/16 |
| Date Received: | 2011/08/15 |
| Date Tested: | 2011/08/15 |
| Date Completed: | 2011/08/16 |

Page: 1 of 1

ATTN: Mr. Henry Leung

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/15
Number of Sample: 30
Custody No.: MA8001 (Cyberport)/110815

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| CEme | 7 | 8 | 12 | 101 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13898 |
| Date of Issue: | 2011/08/18 |
| Date Received: | 2011/08/17 |
| Date Tested: | 2011/08/17 |
| Date Completed: | 2011/08/18 |

Page: 1 of 1

ATTN: Mr. Henry Leung

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/17
Number of Sample: 72
Custody No.: MA8001 (Cyberport)/110817

| Total Suspended Solids Sampling Point | Duplicate Analysis | | | QC Recovery, % |
|--|--------------------|------------------|------------------|----------------|
| | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| CFbe | 8 | 8 | 1 | 103 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13920 |
| Date of Issue: | 2011/08/22 |
| Date Received: | 2011/08/19 |
| Date Tested: | 2011/08/19 |
| Date Completed: | 2011/08/22 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/19
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110819

| Total Suspended Solids Sampling Point | Duplicate Analysis | | | QC Recovery, % |
|--|--------------------|------------------|------------------|----------------|
| | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| I2bf | 7 | 8 | 10 | 96 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13939 |
| Date of Issue: | 2011/08/23 |
| Date Received: | 2011/08/22 |
| Date Tested: | 2011/08/22 |
| Date Completed: | 2011/08/23 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/22
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110822-1

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| IntakeAse | 3 | 3 | 11 | 97 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13952 |
| Date of Issue: | 2011/08/25 |
| Date Received: | 2011/08/24 |
| Date Tested: | 2011/08/24 |
| Date Completed: | 2011/08/25 |

ATTN: Mr. Henry Leung

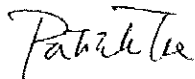
Page: 1 of 1

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/24
Number of Sample: 30
Custody No.: MA8001 (Cyberport)/110824-1

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| IntakeAse | 6 | 7 | 12 | 104 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13973 |
| Date of Issue: | 2011/08/29 |
| Date Received: | 2011/08/26 |
| Date Tested: | 2011/08/26 |
| Date Completed: | 2011/08/29 |

Page: 1 of 1

ATTN: Mr. Henry Leung

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/26
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110826-1

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| IntakeAse | 5 | 4 | 5 | 101 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 13988 |
| Date of Issue: | 2011/08/30 |
| Date Received: | 2011/08/29 |
| Date Tested: | 2011/08/29 |
| Date Completed: | 2011/08/30 |
| Page: | 1 of 1 |

ATTN: Mr. Henry Leung
Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/29
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110829-1

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| Ilbe | 5 | 5 | 2 | 102 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

TEST REPORT

QC REPORT

APPLICANT: Cinotech Consultants Limited
Rm1710, Technology Park,
18 On Lai Street,
Shatin, N.T.

| | |
|-----------------|------------|
| Laboratory No.: | 14009 |
| Date of Issue: | 2011/09/02 |
| Date Received: | 2011/08/31 |
| Date Tested: | 2011/08/31 |
| Date Completed: | 2011/09/02 |

ATTN: Mr. Henry Leung

Page: 1 of 1

Sampling Site: Hong Kong West Drainage Tunnel
Project No.: MA8001
Sampling Date: 2011/08/31
Number of Sample: 60
Custody No.: MA8001 (Cyberport)/110831-1

| Total Suspended Solids | Duplicate Analysis | | | QC Recovery, % |
|------------------------|--------------------|------------------|------------------|----------------|
| Sampling Point | Trial 1, mg/L | Trial 2, mg/L | Difference, % | |
| CFmf | 14 | 13 | 5 | 98 |

*****END OF REPORT*****

PREPARED AND CHECKED BY:
For and On Behalf of WELLAB Ltd.



PATRICK TSE
Laboratory Manager

**APPENDIX P
BASELINE REVIEW FOR MARINE
WATER QUALITY MONITORING**

Water Quality Monitoring Results at CE - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|------|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 1-Aug-11 | Fine | Moderate | 12:54 | Surface | 1 | 28.2 28.2 | 28.2 | 8.0 7.7 | 7.9 | 29.3 29.3 | 29.3 | 127.8 128.0 | 127.9 | 8.5 8.6 | 8.6 | 7.9 | 5.5 5.5 | 5.5 | 5.3 | 4.0 4.0 | 4.0 | 5.3 |
| | | | | Middle | 5.5 | 26.5 26.5 | 26.5 | 8.1 8.0 | 8.1 | 31.9 32.1 | 32.0 | 108.1 104.8 | 106.5 | 7.2 7.0 | 7.1 | | 4.9 5.1 | 5.0 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 10 | 25.1 25.1 | 25.1 | 7.6 7.7 | 7.7 | 32.3 32.1 | 32.2 | 88.9 88.3 | 88.6 | 6.3 6.3 | 6.3 | | 5.4 5.4 | 5.4 | | 6.0 6.0 | 6.0 | |
| 3-Aug-11 | Fine | Moderate | 15:08 | Surface | 1 | 27.9 27.9 | 27.9 | 7.9 7.7 | 7.8 | 30.0 30.0 | 30.0 | 129.9 129.9 | 129.9 | 8.7 8.7 | 8.7 | 8.3 | 5.1 5.1 | 5.1 | 5.3 | 8.0 8.0 | 8.0 | 8.8 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 7.8 7.5 | 7.7 | 30.7 30.8 | 30.8 | 118.2 117.5 | 117.9 | 7.9 7.8 | 7.9 | | 5.2 5.0 | 5.1 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 9 | 26.1 26.1 | 26.1 | 7.5 7.5 | 7.5 | 30.1 30.1 | 30.1 | 107.5 107.5 | 107.5 | 7.1 7.1 | 7.1 | | 5.6 5.7 | 5.7 | | 12.0 11.0 | 11.5 | |
| 5-Aug-11 | Sunny | Moderate | 16:33 | Surface | 1 | 27.8 27.8 | 27.8 | 7.7 7.5 | 7.6 | 29.9 29.9 | 29.9 | 121.2 122.0 | 121.6 | 8.0 8.0 | 8.0 | 7.8 | 5.0 5.0 | 5.0 | 5.1 | 8.0 8.0 | 8.0 | 7.7 |
| | | | | Middle | 5.5 | 26.9 26.9 | 26.9 | 7.4 8.2 | 7.8 | 31.2 31.2 | 31.2 | 115.8 115.2 | 115.5 | 7.6 7.6 | 7.6 | | 5.2 5.1 | 5.2 | | 9.0 9.0 | 9.0 | |
| | | | | Bottom | 10 | 25.8 25.8 | 25.8 | 7.8 7.8 | 7.8 | 30.7 30.8 | 30.8 | 97.8 96.8 | 97.3 | 6.4 6.3 | 6.4 | | 5.1 5.1 | 5.1 | | 6.0 6.0 | 6.0 | |
| 8-Aug-11 | Sunny | Calm | 08:55 | Surface | 1 | 28.1 28.1 | 28.1 | 7.3 7.4 | 7.4 | 28.9 29.0 | 29.0 | 127.5 129.2 | 128.4 | 8.6 8.7 | 8.7 | 8.4 | 5.5 5.4 | 5.5 | 5.3 | 15.0 15.0 | 15.0 | 11.0 |
| | | | | Middle | 5.5 | 26.9 27.4 | 27.2 | 10.4 7.7 | 9.1 | 30.4 28.5 | 29.5 | 117.5 118.9 | 118.2 | 7.9 8.0 | 8.0 | | 5.3 5.2 | 5.3 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 10 | 25.7 25.8 | 25.8 | 12.9 12.6 | 12.8 | 31.0 30.8 | 30.9 | 98.0 95.8 | 96.9 | 6.7 6.6 | 6.7 | | 5.0 4.9 | 5.0 | | 10.0 10.0 | 10.0 | |
| 10-Aug-11 | Rainy | Rough | 11:47 | Surface | 1 | 27.8 27.9 | 27.9 | 7.5 7.5 | 7.5 | 28.3 28.2 | 28.3 | 102.2 102.6 | 102.4 | 7.4 7.4 | 7.4 | 7.1 | 2.7 2.8 | 2.8 | 3.1 | 6.0 6.0 | 6.0 | 7.0 |
| | | | | Middle | 5.5 | 27.4 27.4 | 27.4 | 7.6 7.6 | 7.6 | 30.5 30.5 | 30.5 | 94.9 92.9 | 93.9 | 6.9 6.7 | 6.8 | | 3.7 3.6 | 3.7 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 10 | 27.6 27.6 | 27.6 | 7.4 7.4 | 7.4 | 29.7 29.6 | 29.7 | 94.2 94.1 | 94.2 | 6.8 6.8 | 6.8 | | 2.8 2.9 | 2.9 | | 7.0 7.0 | 7.0 | |
| 12-Aug-11 | Sunny | Moderate | 12:02 | Surface | 1 | 27.4 27.0 | 27.2 | 7.9 7.8 | 7.9 | 29.2 29.6 | 29.4 | 111.6 110.3 | 111.0 | 8.0 7.9 | 8.0 | 7.9 | 4.5 4.6 | 4.6 | 4.7 | 7.0 7.0 | 7.0 | 7.3 |
| | | | | Middle | 5.5 | 26.5 26.2 | 26.4 | 7.7 8.1 | 7.9 | 30.5 30.8 | 30.7 | 106.8 105.6 | 106.2 | 7.7 7.6 | 7.7 | | 4.8 4.8 | 4.8 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 10 | 25.8 26.4 | 26.1 | 7.8 7.9 | 7.9 | 31.1 30.4 | 30.8 | 92.7 92.4 | 92.6 | 6.7 6.7 | 6.7 | | 4.8 4.6 | 4.7 | | 8.0 8.0 | 8.0 | |
| 15-Aug-11 | Sunny | Moderate | 11:54 | Surface | 1 | 26.4 26.4 | 26.4 | 7.3 7.1 | 7.2 | 29.6 29.6 | 29.6 | 92.4 92.1 | 92.3 | 7.0 6.9 | 7.0 | 6.7 | 2.7 2.8 | 2.8 | 3.1 | 4.0 4.0 | 4.0 | 6.3 |
| | | | | Middle | 5.5 | 26.0 25.9 | 26.0 | 8.1 6.9 | 7.5 | 30.6 30.6 | 30.6 | 83.4 83.3 | 83.4 | 6.3 6.3 | 6.3 | | 3.7 3.6 | 3.7 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 10 | 24.1 24.3 | 24.2 | 8.7 8.5 | 8.6 | 32.5 32.3 | 32.4 | 77.2 74.9 | 76.1 | 6.5 6.4 | 6.5 | | 2.8 2.9 | 2.9 | | 8.0 8.0 | 8.0 | |
| 17-Aug-11 | Cloudy | Moderate | 14:32 | Surface | 1 | 27.1 27.1 | 27.1 | 7.8 7.7 | 7.8 | 29.7 29.7 | 29.7 | 103.3 103.5 | 103.4 | 7.1 7.1 | 7.1 | 6.9 | 2.8 2.9 | 2.9 | 3.1 | 10.0 10.0 | 10.0 | 10.8 |
| | | | | Middle | 5.5 | 26.4 26.4 | 26.4 | 7.6 7.4 | 7.5 | 30.9 30.9 | 30.9 | 96.1 95.7 | 95.9 | 6.6 6.6 | 6.6 | | 3.4 3.3 | 3.4 | | 10.0 10.0 | 10.0 | |
| | | | | Bottom | 10 | 24.9 25.0 | 25.0 | 7.7 7.4 | 7.6 | 31.6 31.5 | 31.6 | 86.0 84.3 | 85.2 | 6.3 6.2 | 6.3 | | 2.9 3.0 | 3.0 | | 13.0 12.0 | 12.5 | |
| 19-Aug-11 | Sunny | Moderate | 15:37 | Surface | 1 | 28.4 28.4 | 28.4 | 7.8 7.9 | 7.9 | 31.0 31.0 | 31.0 | 94.6 94.8 | 94.7 | 7.4 7.4 | 7.4 | 7.2 | 2.8 2.9 | 2.9 | 3.1 | 4.0 4.0 | 4.0 | 6.0 |
| | | | | Middle | 5.5 | 27.7 27.7 | 27.7 | 7.7 7.7 | 7.7 | 32.2 32.2 | 32.2 | 87.4 87.0 | 87.2 | 6.9 6.9 | 6.9 | | 3.4 3.3 | 3.4 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 10 | 26.2 26.3 | 26.3 | 8.2 8.2 | 8.2 | 32.9 32.8 | 32.9 | 75.3 73.6 | 74.5 | 6.4 6.3 | 6.4 | | 2.9 3.0 | 3.0 | | 8.0 8.0 | 8.0 | |
| 22-Aug-11 | Sunny | Moderate | 17:42 | Surface | 1 | 28.0 27.0 | 27.5 | 7.9 8.0 | 8.0 | 29.0 30.3 | 29.7 | 113.8 108.3 | 111.1 | 7.8 7.4 | 7.6 | 7.5 | 3.0 3.1 | 3.1 | 3.1 | 5.0 5.0 | 5.0 | 6.0 |
| | | | | Middle | 5.5 | 27.0 26.1 | 26.6 | 7.8 7.9 | 7.9 | 30.1 30.9 | 30.5 | 108.1 105.8 | 107.0 | 7.4 7.4 | 7.4 | | 3.1 3.3 | 3.2 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 10 | 26.1 27.9 | 27.0 | 8.0 8.0 | 8.0 | 30.9 29.0 | 30.0 | 89.5 90.2 | 89.9 | 6.2 6.3 | 6.3 | | 3.3 2.7 | 3.0 | | 6.0 6.0 | 6.0 | |

Water Quality Monitoring Results at CE - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 24-Aug-11 | Fine | Moderate | 09:21 | Surface | 1 | 27.1 27.1 | 27.1 | 8.4 8.3 | 8.4 | 29.7 29.7 | 29.7 | 103.3 103.5 | 103.4 | 7.1 7.1 | 7.1 | 6.9 | 2.8 2.9 | 2.9 | 3.1 | 6.0 6.0 | 6.0 | 6.8 |
| | | | | Middle | 5.5 | 26.4 26.4 | 26.4 | 8.3 7.7 | 8.0 | 30.9 30.9 | 30.9 | 96.1 95.7 | 95.9 | 6.6 6.6 | 6.6 | | 3.4 3.3 | 3.4 | | 7.0 6.0 | 6.5 | |
| | | | | Bottom | 10 | 24.9 25.0 | 25.0 | 7.9 7.7 | 7.8 | 31.6 31.5 | 31.6 | 86.0 84.3 | 85.2 | 6.3 6.2 | 6.3 | | 2.9 3.0 | 3.0 | | 8.0 8.0 | 8.0 | |
| 26-Aug-11 | Sunny | Moderate | 11:30 | Surface | 1 | 27.2 27.1 | 27.2 | 7.9 7.9 | 7.9 | 30.0 30.0 | 30.0 | 114.5 113.4 | 114.0 | 7.8 7.8 | 7.8 | 7.6 | 2.7 3.0 | 2.9 | 3.0 | 4.0 4.0 | 4.0 | 4.2 |
| | | | | Middle | 5.5 | 26.6 26.6 | 26.6 | 7.7 7.6 | 7.7 | 29.8 29.8 | 29.8 | 109.0 107.5 | 108.3 | 7.4 7.3 | 7.4 | | 3.0 3.0 | 3.0 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 10 | 27.6 27.6 | 27.6 | 7.7 7.5 | 7.6 | 29.8 29.8 | 29.8 | 103.9 103.7 | 103.8 | 6.6 6.6 | 6.6 | | 3.1 3.2 | 3.2 | | 4.0 3.0 | 3.5 | |
| 29-Aug-11 | Sunny | Moderate | 12:10 | Surface | 1 | 25.6 25.6 | 25.6 | 7.9 7.9 | 7.9 | 33.6 33.6 | 33.6 | 99.8 98.0 | 98.9 | 7.2 7.1 | 7.2 | 6.9 | 3.0 3.0 | 3.0 | 3.1 | 9.0 9.0 | 9.0 | 7.8 |
| | | | | Middle | 5.5 | 25.2 25.2 | 25.2 | 7.9 8.0 | 8.0 | 33.7 33.7 | 33.7 | 88.2 87.9 | 88.1 | 6.5 6.5 | 6.5 | | 3.2 3.1 | 3.2 | | 7.0 8.0 | 7.5 | |
| | | | | Bottom | 10 | 24.8 24.8 | 24.8 | 7.7 8.0 | 7.9 | 33.9 33.9 | 33.9 | 79.4 79.5 | 79.5 | 6.2 6.2 | 6.2 | | 3.0 2.9 | 3.0 | | 7.0 7.0 | 7.0 | |
| 31-Aug-11 | Sunny | Moderate | 13:03 | Surface | 1 | 26.6 26.6 | 26.6 | 8.1 8.0 | 8.1 | 28.9 28.9 | 28.9 | 88.5 89.1 | 88.8 | 7.0 7.0 | 7.0 | 6.9 | 5.7 5.7 | 5.7 | 6.0 | 8.0 8.0 | 8.0 | 9.2 |
| | | | | Middle | 5.5 | 26.1 26.1 | 26.1 | 7.9 8.2 | 8.1 | 30.7 30.7 | 30.7 | 85.1 84.2 | 84.7 | 6.7 6.7 | 6.7 | | 6.2 6.1 | 6.2 | | 11.0 10.0 | 10.5 | |
| | | | | Bottom | 10 | 25.9 25.9 | 25.9 | 7.8 8.0 | 7.9 | 32.0 31.9 | 32.0 | 79.2 78.6 | 78.9 | 6.3 6.3 | 6.3 | | 6.1 6.2 | 6.2 | | 9.0 9.0 | 9.0 | |

Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at CF - Mid-Flood Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 3-Aug-11 | Fine | Moderate | 07:59 | Surface | 1 | 28.0 28.0 | 28.0 | 7.4 7.7 | 7.6 | 30.0 30.0 | 30.0 | 128.8 130.4 | 129.6 | 8.6 8.7 | 8.7 | 8.3 | 5.3 5.3 | 5.3 | 5.3 | 7.0 7.0 | 7.0 | 5.8 |
| | | | | Middle | 3.5 | 26.7 26.7 | 26.7 | 7.9 7.8 | 7.9 | 32.0 32.0 | 32.0 | 117.1 115.9 | 116.5 | 7.8 7.8 | 7.8 | | 5.3 5.3 | 5.3 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 6 | 25.4 25.4 | 25.4 | 7.2 7.4 | 7.3 | 31.5 31.5 | 31.5 | 98.8 97.8 | 98.3 | 6.9 6.7 | 6.8 | | 5.2 5.1 | 5.2 | | 6.0 5.0 | 5.5 | |
| 5-Aug-11 | Sunny | Moderate | 09:34 | Surface | 1 | 28.0 28.1 | 28.1 | 8.2 7.9 | 8.1 | 29.4 29.4 | 29.4 | 116.5 118.9 | 117.7 | 7.7 7.8 | 7.8 | 7.6 | 5.4 5.3 | 5.4 | 5.2 | 5.0 6.0 | 5.5 | 7.0 |
| | | | | Middle | 3.5 | 26.7 26.7 | 26.7 | 8.0 7.4 | 7.7 | 31.5 31.1 | 31.3 | 110.4 110.6 | 110.5 | 7.2 7.3 | 7.3 | | 5.0 4.9 | 5.0 | | 8.0 7.0 | 7.5 | |
| | | | | Bottom | 6 | 25.5 25.5 | 25.5 | 7.5 7.2 | 7.4 | 32.0 32.0 | 32.0 | 99.1 97.4 | 98.3 | 6.7 6.6 | 6.7 | | 5.3 5.3 | 5.3 | | 8.0 8.0 | 8.0 | |
| 8-Aug-11 | Sunny | Calm | 14:20 | Surface | 1 | 27.7 27.7 | 27.7 | 7.7 7.8 | 7.8 | 29.8 29.9 | 29.9 | 121.7 121.7 | 121.7 | 8.2 8.2 | 8.2 | 8.2 | 4.8 4.8 | 4.8 | 5.0 | 9.0 9.0 | 9.0 | 9.2 |
| | | | | Middle | 5 | 27.1 27.1 | 27.1 | 9.6 9.6 | 9.6 | 30.5 30.5 | 30.5 | 122.6 122.6 | 122.6 | 8.2 8.2 | 8.2 | | 5.1 4.9 | 5.0 | | 9.0 9.0 | 9.0 | |
| | | | | Bottom | 9 | 26.2 26.2 | 26.2 | 11.1 11.1 | 11.1 | 30.0 30.1 | 30.1 | 114.9 113.8 | 114.4 | 7.7 7.6 | 7.7 | | 5.1 5.1 | 5.1 | | 10.0 9.0 | 9.5 | |
| 10-Aug-11 | Rainy | Rough | 16:16 | Surface | 1 | 27.8 27.8 | 27.8 | 7.8 7.8 | 7.8 | 28.5 28.5 | 28.5 | 99.5 98.8 | 99.2 | 6.9 6.9 | 6.9 | 6.9 | 3.0 3.0 | 3.0 | 3.0 | 10.0 9.0 | 9.5 | 7.2 |
| | | | | Middle | 4 | 27.8 27.8 | 27.8 | 7.9 7.9 | 7.9 | 28.5 28.5 | 28.5 | 98.1 97.4 | 97.8 | 6.8 6.8 | 6.8 | | 3.0 3.0 | 3.0 | | 4.0 4.0 | 4.0 | |
| | | | | Bottom | 7 | 27.6 27.6 | 27.6 | 9.3 9.2 | 9.3 | 29.6 29.5 | 29.6 | 91.3 89.0 | 90.2 | 6.3 6.2 | 6.3 | | 3.0 3.0 | 3.0 | | 8.0 8.0 | 8.0 | |
| 12-Aug-11 | Sunny | Moderate | 17:17 | Surface | 1 | 27.8 27.4 | 27.6 | 8.0 7.9 | 8.0 | 28.6 29.0 | 28.8 | 116.2 112.8 | 114.5 | 8.5 8.1 | 8.3 | 8.1 | 4.5 4.5 | 4.5 | 4.6 | 10.0 10.0 | 10.0 | 8.8 |
| | | | | Middle | 3.5 | 26.9 26.7 | 26.8 | 8.0 7.7 | 7.9 | 29.9 29.9 | 29.9 | 108.4 108.4 | 108.4 | 7.8 7.8 | 7.8 | | 4.5 4.5 | 4.5 | | 11.0 11.0 | 11.0 | |
| | | | | Bottom | 6 | 26.2 26.9 | 26.6 | 7.7 7.5 | 7.6 | 30.3 29.7 | 30.0 | 94.2 93.4 | 93.8 | 6.8 6.7 | 6.8 | | 4.6 4.7 | 4.7 | | 5.0 6.0 | 5.5 | |
| 17-Aug-11 | Cloudy | Moderate | 08:29 | Surface | 1 | 27.9 28.0 | 28.0 | 7.5 7.6 | 7.6 | 29.1 29.0 | 29.1 | 112.5 113.8 | 113.2 | 7.7 7.8 | 7.8 | 7.6 | 3.1 3.0 | 3.1 | 3.2 | 8.0 9.0 | 8.5 | 9.5 |
| | | | | Middle | 3.5 | 27.0 27.0 | 27.0 | 7.7 7.6 | 7.7 | 30.3 30.1 | 30.2 | 108.3 108.1 | 108.2 | 7.4 7.4 | 7.4 | | 3.1 3.1 | 3.1 | | 12.0 12.0 | 12.0 | |
| | | | | Bottom | 6 | 26.1 26.1 | 26.1 | 7.4 7.4 | 7.4 | 30.9 30.9 | 30.9 | 91.5 89.5 | 90.5 | 6.3 6.1 | 6.2 | | 3.3 3.3 | 3.3 | | 8.0 8.0 | 8.0 | |
| 19-Aug-11 | Sunny | Moderate | 09:34 | Surface | 1 | 29.2 29.3 | 29.3 | 7.8 7.7 | 7.8 | 30.4 30.3 | 30.4 | 103.8 105.1 | 104.5 | 8.0 8.1 | 8.1 | 7.9 | 3.1 3.0 | 3.1 | 3.2 | 4.0 4.0 | 4.0 | 5.8 |
| | | | | Middle | 3.5 | 28.3 28.3 | 28.3 | 7.8 7.6 | 7.7 | 31.6 31.4 | 31.5 | 99.6 99.4 | 99.5 | 7.7 7.7 | 7.7 | | 3.1 3.1 | 3.1 | | 4.0 5.0 | 4.5 | |
| | | | | Bottom | 6 | 27.4 27.4 | 27.4 | 7.8 7.5 | 7.7 | 32.2 32.2 | 32.2 | 82.8 80.8 | 81.8 | 6.6 6.4 | 6.5 | | 3.3 3.3 | 3.3 | | 9.0 9.0 | 9.0 | |
| 22-Aug-11 | Sunny | Moderate | 11:39 | Surface | 1 | 28.0 26.9 | 27.5 | 7.8 7.9 | 7.9 | 29.0 30.5 | 29.8 | 121.6 109.1 | 115.4 | 8.9 7.6 | 8.3 | 7.9 | 2.7 2.8 | 2.8 | 2.8 | 6.0 6.0 | 6.0 | 7.0 |
| | | | | Middle | 3.5 | 26.9 26.1 | 26.5 | 8.0 7.9 | 8.0 | 30.6 31.0 | 30.8 | 106.5 106.7 | 106.6 | 7.4 7.3 | 7.4 | | 2.7 2.7 | 2.7 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 6 | 26.0 27.9 | 27.0 | 7.8 7.6 | 7.7 | 30.9 29.2 | 30.1 | 90.8 89.6 | 90.2 | 6.3 6.3 | 6.3 | | 2.6 3.0 | 2.8 | | 9.0 9.0 | 9.0 | |
| 26-Aug-11 | Sunny | Moderate | 16:24 | Surface | 1 | 26.7 26.6 | 26.7 | 7.6 7.6 | 7.6 | 30.7 30.7 | 30.7 | 107.5 105.1 | 106.3 | 7.4 7.2 | 7.3 | 6.5 | 2.7 2.9 | 2.8 | 2.9 | 7.0 6.0 | 6.5 | 5.8 |
| | | | | Middle | 4.5 | 25.5 25.5 | 25.5 | 7.6 7.6 | 7.6 | 31.2 31.3 | 31.3 | 84.0 82.1 | 83.1 | 5.8 5.6 | 5.7 | | 2.8 2.8 | 2.8 | | 4.0 4.0 | 4.0 | |
| | | | | Bottom | 8 | 27.1 27.1 | 27.1 | 7.6 7.4 | 7.5 | 29.7 29.7 | 29.7 | 103.3 103.5 | 103.4 | 7.1 7.1 | 7.1 | | 3.0 3.2 | 3.1 | | 7.0 7.0 | 7.0 | |
| 29-Aug-11 | Sunny | Moderate | 16:43 | Surface | 1 | 25.5 25.5 | 25.5 | 7.8 8.0 | 7.9 | 33.6 33.6 | 33.6 | 100.2 99.1 | 99.7 | 7.3 7.2 | 7.3 | 6.9 | 3.0 3.0 | 3.0 | 3.3 | 8.0 8.0 | 8.0 | 8.2 |
| | | | | Middle | 3.5 | 25.1 25.1 | 25.1 | 8.0 8.1 | 8.1 | 33.7 33.7 | 33.7 | 86.4 85.9 | 86.2 | 6.4 6.3 | 6.4 | | 3.5 3.5 | 3.5 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 6 | 24.7 24.7 | 24.7 | 7.7 7.8 | 7.8 | 33.9 33.9 | 33.9 | 78.1 77.7 | 77.9 | 6.2 6.2 | 6.2 | | 3.5 3.5 | 3.5 | | 8.0 9.0 | 8.5 | |

Water Quality Monitoring Results at CF - Mid-Flood Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|------|------------------------|---------|-------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 31-Aug-11 | Sunny | Moderate | 08:25 | Surface | 1 | 27.7 | 27.7 | 8.2 | 8.2 | 27.6 | 27.7 | 99.3 | 99.1 | 7.7 | 7.6 | 5.4 | 5.4 | 5.7 | 7.0 | 6.5 | 10.2 | |
| | | | | | 27.7 | 8.1 | 8.2 | 27.7 | 98.9 | 7.6 | 7.7 | 5.4 | 6.0 | | | | | | | | | |
| | | | | Middle | 3.5 | 27.6 | 27.6 | 8.1 | 8.0 | 28.1 | 28.1 | 96.8 | 96.7 | 7.5 | | 7.5 | | | 5.9 | | | 5.9 |
| | | | | | 27.6 | 7.9 | 8.0 | 28.1 | 96.5 | 7.5 | 7.5 | 5.9 | 14.0 | | | | | | | | | |
| | | | | Bottom | 6 | 27.6 | 27.6 | 8.0 | 8.0 | 28.4 | 28.4 | 91.1 | 91.3 | 7.1 | 7.1 | 7.1 | 5.9 | 5.9 | 10.0 | 10.0 | | |
| | | | | | 27.6 | 7.9 | 8.0 | 28.3 | 91.4 | 7.1 | 7.1 | 5.9 | 10.0 | | | | | | | | | |

Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at I1 - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 1-Aug-11 | Fine | Moderate | 12:32 | Surface | 1 | 27.9 27.8 | 27.9 | 7.8 7.6 | 7.7 | 29.8 29.7 | 29.8 | 125.7 125.2 | 125.5 | 8.4 8.4 | 8.4 | 8.3 | 5.1 5.2 | 5.2 | 5.2 | 3.0 3.0 | 3.0 | 5.3 |
| | | | | Middle | 5 | 27.2 27.2 | 27.2 | 7.9 7.9 | 7.9 | 28.9 28.6 | 28.8 | 119.6 120.6 | 120.1 | 8.0 8.1 | 8.1 | | 5.0 4.9 | 5.0 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 9 | 27.2 27.2 | 27.2 | 7.7 8.0 | 7.9 | 29.2 29.8 | 29.5 | 116.6 117.6 | 117.1 | 7.4 7.5 | 7.5 | | 5.4 5.4 | 5.4 | | 5.0 5.0 | 5.0 | |
| 3-Aug-11 | Fine | Moderate | 14:43 | Surface | 1 | 28.1 28.1 | 28.1 | 7.6 7.3 | 7.5 | 29.1 29.2 | 29.2 | 126.5 124.6 | 125.6 | 8.5 8.4 | 8.5 | 7.7 | 5.5 5.5 | 5.5 | 5.3 | 5.0 5.0 | 5.0 | 3.7 |
| | | | | Middle | 5.5 | 26.7 26.7 | 26.7 | 7.9 7.8 | 7.9 | 31.3 32.2 | 31.8 | 104.6 104.0 | 104.3 | 6.9 6.8 | 6.9 | | 4.9 5.1 | 5.0 | | 3.0 3.0 | 3.0 | |
| | | | | Bottom | 10 | 26.1 26.1 | 26.1 | 7.4 7.8 | 7.6 | 30.7 30.8 | 30.8 | 96.1 96.1 | 96.1 | 6.3 6.3 | 6.3 | | 5.4 5.4 | 5.4 | | 3.0 3.0 | 3.0 | |
| 5-Aug-11 | Sunny | Moderate | 16:08 | Surface | 1 | 27.7 27.7 | 27.7 | 7.9 7.2 | 7.6 | 29.8 29.9 | 29.9 | 116.7 116.7 | 116.7 | 7.7 7.7 | 7.7 | 7.7 | 4.8 4.8 | 4.8 | 5.0 | 5.0 5.0 | 5.0 | 6.5 |
| | | | | Middle | 5 | 27.1 27.1 | 27.1 | 7.8 7.9 | 7.9 | 30.5 30.5 | 30.5 | 117.6 117.6 | 117.6 | 7.7 7.7 | 7.7 | | 5.1 4.9 | 5.0 | | 7.0 6.0 | 6.5 | |
| | | | | Bottom | 9 | 26.2 26.2 | 26.2 | 7.8 7.6 | 7.7 | 30.0 30.1 | 30.1 | 109.9 108.8 | 109.4 | 7.2 7.1 | 7.2 | | 5.1 5.1 | 5.1 | | 8.0 8.0 | 8.0 | |
| 8-Aug-11 | Sunny | Calm | 08:33 | Surface | 1 | 28.3 28.4 | 28.4 | 7.8 7.7 | 7.8 | 29.2 29.2 | 29.2 | 131.8 136.4 | 134.1 | 9.1 9.4 | 9.3 | 8.8 | 5.7 5.4 | 5.6 | 5.3 | 3.0 3.0 | 3.0 | 5.7 |
| | | | | Middle | 5 | 26.6 26.6 | 26.6 | 11.8 11.6 | 11.7 | 31.4 31.2 | 31.3 | 118.2 117.8 | 118.0 | 8.2 8.2 | 8.2 | | 5.1 5.0 | 5.1 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 9 | 25.2 25.2 | 25.2 | 15.0 15.0 | 15.0 | 32.5 32.5 | 32.5 | 93.2 91.2 | 92.2 | 6.6 6.5 | 6.6 | | 5.3 5.2 | 5.3 | | 9.0 9.0 | 9.0 | |
| 10-Aug-11 | Rainy | Rough | 11:21 | Surface | 1 | 27.9 27.9 | 27.9 | 6.7 6.8 | 6.8 | 27.7 27.7 | 27.7 | 101.8 101.3 | 101.6 | 7.1 7.0 | 7.1 | 6.9 | 2.7 2.7 | 2.7 | 2.7 | 7.0 7.0 | 7.0 | 7.5 |
| | | | | Middle | 5 | 27.7 27.7 | 27.7 | 8.4 8.5 | 8.5 | 29.0 29.0 | 29.0 | 95.1 94.3 | 94.7 | 6.6 6.5 | 6.6 | | 2.7 2.8 | 2.8 | | 9.0 9.0 | 9.0 | |
| | | | | Bottom | 9 | 27.8 27.7 | 27.8 | 7.6 7.6 | 7.6 | 28.2 28.3 | 28.3 | 93.0 92.4 | 92.7 | 6.5 6.4 | 6.5 | | 2.5 2.5 | 2.5 | | 7.0 6.0 | 6.5 | |
| 12-Aug-11 | Sunny | Moderate | 11:37 | Surface | 1 | 27.5 27.3 | 27.4 | 7.9 7.6 | 7.8 | 28.9 29.0 | 29.0 | 112.1 111.7 | 111.9 | 8.0 8.0 | 8.0 | 7.9 | 4.1 4.2 | 4.2 | 4.3 | 10.0 10.0 | 10.0 | 7.8 |
| | | | | Middle | 4.5 | 27.1 26.9 | 27.0 | 7.8 7.9 | 7.9 | 29.4 29.4 | 29.4 | 110.7 107.2 | 109.0 | 7.9 7.7 | 7.8 | | 4.3 4.3 | 4.3 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 8 | 26.5 26.9 | 26.7 | 7.9 7.7 | 7.8 | 30.0 29.8 | 29.9 | 102.5 107.0 | 104.8 | 7.3 7.6 | 7.5 | | 4.4 4.5 | 4.5 | | 9.0 8.0 | 8.5 | |
| 15-Aug-11 | Sunny | Moderate | 12:22 | Surface | 1 | 27.5 27.5 | 27.5 | 7.1 6.7 | 6.9 | 29.3 29.3 | 29.3 | 98.8 99.5 | 99.2 | 6.6 6.7 | 6.7 | 6.7 | 2.7 2.7 | 2.7 | 2.7 | 8.0 8.0 | 8.0 | 7.2 |
| | | | | Middle | 4.5 | 27.3 27.2 | 27.3 | 8.7 8.6 | 8.7 | 29.4 29.4 | 29.4 | 98.4 96.3 | 97.4 | 6.6 6.5 | 6.6 | | 2.7 2.8 | 2.8 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 8 | 27.1 27.1 | 27.1 | 8.6 8.6 | 8.6 | 29.5 29.5 | 29.5 | 95.2 93.3 | 94.3 | 6.4 6.2 | 6.3 | | 2.5 2.5 | 2.5 | | 7.0 8.0 | 7.5 | |
| 17-Aug-11 | Cloudy | Moderate | 14:07 | Surface | 1 | 27.6 27.6 | 27.6 | 7.6 7.2 | 7.4 | 29.6 29.6 | 29.6 | 114.2 114.6 | 114.4 | 7.8 7.8 | 7.8 | 7.8 | 2.7 2.7 | 2.7 | 2.8 | 13.0 13.0 | 13.0 | 9.2 |
| | | | | Middle | 4.5 | 27.2 27.1 | 27.2 | 7.8 7.8 | 7.8 | 30.0 30.0 | 30.0 | 114.5 113.4 | 114.0 | 7.8 7.8 | 7.8 | | 2.9 2.8 | 2.9 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 8 | 26.6 26.6 | 26.6 | 7.4 7.7 | 7.6 | 29.8 29.8 | 29.8 | 109.0 107.5 | 108.3 | 7.4 7.3 | 7.4 | | 2.8 2.8 | 2.8 | | 7.0 8.0 | 7.5 | |
| 19-Aug-11 | Sunny | Moderate | 15:12 | Surface | 1 | 28.9 28.9 | 28.9 | 8.0 7.7 | 7.9 | 30.9 30.9 | 30.9 | 105.5 105.9 | 105.7 | 8.1 8.1 | 8.1 | 8.1 | 2.7 2.7 | 2.7 | 2.8 | 5.0 5.0 | 5.0 | 5.2 |
| | | | | Middle | 4.5 | 28.5 28.4 | 28.5 | 7.8 7.8 | 7.8 | 31.3 31.3 | 31.3 | 105.8 104.7 | 105.3 | 8.1 8.1 | 8.1 | | 2.9 2.8 | 2.9 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 8 | 27.9 27.9 | 27.9 | 7.9 7.7 | 7.8 | 31.1 31.1 | 31.1 | 100.3 98.8 | 99.6 | 7.7 7.6 | 7.7 | | 2.8 2.8 | 2.8 | | 10.0 1.0 | 5.5 | |
| 22-Aug-11 | Sunny | Moderate | 17:17 | Surface | 1 | 27.4 26.9 | 27.2 | 8.0 7.8 | 7.9 | 29.7 30.2 | 30.0 | 110.7 109.1 | 109.9 | 7.6 7.5 | 7.6 | 7.4 | 2.7 3.0 | 2.9 | 3.0 | 3.0 3.0 | 3.0 | 6.7 |
| | | | | Middle | 4.5 | 26.9 26.4 | 26.7 | 7.9 7.9 | 7.9 | 30.2 30.1 | 30.2 | 108.4 98.4 | 103.4 | 7.4 6.8 | 7.1 | | 3.0 3.0 | 3.0 | | 6.0 11.0 | 11.0 | |
| | | | | Bottom | 8 | 26.4 27.6 | 27.0 | 8.0 7.8 | 7.9 | 30.1 29.6 | 29.9 | 98.6 114.2 | 106.4 | 6.8 7.8 | 7.3 | | 3.1 3.2 | 3.2 | | 6.0 6.0 | 6.0 | |

Water Quality Monitoring Results at I1 - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|------------|-----|-------------------------|------------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 24-Aug-11 | Fine | Moderate | 08:59 | Surface | 1 | 27.6 27.6 | 27.6 | 8.1 7.5 | 7.8 | 29.6 29.6 | 29.6 | 114.2 114.6 | 114.4 | 7.8 7.8 | 7.8 | 7.8 | 2.7 2.7 | 2.7 | 2.8 | 6.0 6.0 | 6.0 | 6.0 |
| | | | | Middle | 4.5 | 27.2 27.1 | 27.2 | 8.4 8.4 | 8.4 | 30.0 30.0 | 30.0 | 114.5 113.4 | 114.0 | 7.8 7.8 | 7.8 | | 2.9 2.8 | 2.9 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 8 | 26.6 26.6 | 26.6 | 7.6 8.3 | 8.0 | 29.8 29.8 | 29.8 | 109.0 107.5 | 108.3 | 7.4 7.3 | 7.4 | | 7.4 | 2.8 2.8 | | 2.8 | 6.0 6.0 | |
| 26-Aug-11 | Sunny | Moderate | 11:08 | Surface | 1 | 27.8 27.9 | 27.9 | 7.7 7.4 | 7.6 | 29.3 29.2 | 29.3 | 118.1 117.9 | 118.0 | 8.1 8.1 | 8.1 | 8.0 | 3.0 3.0 | 3.0 | 3.2 | 4.0 3.0 | 3.5 | 3.2 |
| | | | | Middle | 5 | 27.3 27.2 | 27.3 | 7.8 7.8 | 7.8 | 29.0 28.8 | 28.9 | 113.9 114.1 | 114.0 | 7.8 7.8 | 7.8 | | 3.3 3.3 | 3.3 | | 3.0 3.0 | 3.0 | |
| | | | | Bottom | 9 | 26.9 26.9 | 26.9 | 7.5 7.7 | 7.6 | 29.5 29.8 | 29.7 | 113.8 113.1 | 113.5 | 7.9 7.8 | 7.9 | | 7.9 | 3.3 3.3 | | 3.3 | 3.0 3.0 | |
| 29-Aug-11 | Sunny | Moderate | 11:40 | Surface | 1 | 25.7 25.6 | 25.7 | 7.8 7.8 | 7.8 | 33.6 33.6 | 33.6 | 97.9 96.9 | 97.4 | 7.1 7.0 | 7.1 | 6.7 | 3.2 3.2 | 3.2 | 3.2 | 5.0 5.0 | 5.0 | 5.8 |
| | | | | Middle | 4.5 | 25.0 25.0 | 25.0 | 7.7 7.9 | 7.8 | 33.7 33.7 | 33.7 | 84.7 84.4 | 84.6 | 6.3 6.2 | 6.3 | | 3.2 3.3 | 3.3 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 8 | 24.9 24.9 | 24.9 | 8.0 8.0 | 8.0 | 33.8 33.8 | 33.8 | 83.7 84.1 | 83.9 | 6.5 6.5 | 6.5 | | 6.5 | 3.0 3.0 | | 3.0 | 5.0 6.0 | |
| 31-Aug-11 | Sunny | Moderate | 12:47 | Surface | 1 | 27.8 27.8 | 27.8 | 7.9 7.8 | 7.9 | 27.5 27.5 | 27.5 | 97.5 97.8 | 97.7 | 7.5 7.5 | 7.5 | 7.4 | 4.9 4.9 | 4.9 | 5.0 | 6.0 6.0 | 6.0 | 7.8 |
| | | | | Middle | 4.5 | 27.6 27.6 | 27.6 | 7.9 8.0 | 8.0 | 28.1 28.1 | 28.1 | 94.6 94.1 | 94.4 | 7.3 7.3 | 7.3 | | 5.0 5.0 | 5.0 | | 9.0 9.0 | 9.0 | |
| | | | | Bottom | 8 | 27.3 27.3 | 27.3 | 8.0 7.9 | 8.0 | 30.3 30.3 | 30.3 | 87.5 86.4 | 87.0 | 6.8 6.7 | 6.8 | | 6.8 | 5.2 5.2 | | 5.2 | 8.0 9.0 | |

Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at I1 - Mid-Flood Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 3-Aug-11 | Fine | Moderate | 08:30 | Surface | 1 | 27.7 27.7 | 27.7 | 7.5 7.5 | 7.5 | 29.8 29.9 | 29.9 | 119.7 119.7 | 119.7 | 8.0 8.0 | 8.0 | 8.0 | 4.8 4.8 | 4.8 | 5.0 | 4.0 5.0 | 4.5 | 5.5 |
| | | | | Middle | 5 | 27.1 27.1 | 27.1 | 7.7 7.8 | 7.8 | 30.5 30.5 | 30.5 | 120.6 120.6 | 120.6 | 8.0 8.0 | 8.0 | | 5.1 4.9 | 5.0 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 9 | 26.2 26.2 | 26.2 | 7.1 7.3 | 7.2 | 30.0 30.1 | 30.1 | 112.9 111.8 | 112.4 | 7.5 7.4 | 7.5 | | 5.1 5.1 | 5.1 | | 6.0 6.0 | 6.0 | |
| 5-Aug-11 | Sunny | Moderate | 10:05 | Surface | 1 | 27.8 27.8 | 27.8 | 8.1 7.4 | 7.8 | 29.6 29.6 | 29.6 | 114.3 114.4 | 114.4 | 7.6 7.6 | 7.6 | 7.7 | 5.1 5.2 | 5.2 | 5.2 | 8.0 8.0 | 8.0 | 8.0 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 7.7 8.3 | 8.0 | 31.6 30.9 | 31.3 | 115.7 116.5 | 116.1 | 7.6 7.7 | 7.7 | | 5.0 4.9 | 5.0 | | 9.0 9.0 | 9.0 | |
| | | | | Bottom | 9 | 25.9 25.9 | 25.9 | 7.4 7.6 | 7.5 | 31.4 31.4 | 31.4 | 103.0 101.6 | 102.3 | 6.7 6.6 | 6.7 | | 5.4 5.4 | 5.4 | | 7.0 7.0 | 7.0 | |
| 8-Aug-11 | Sunny | Calm | 14:46 | Surface | 1 | 28.0 28.0 | 28.0 | 8.0 7.9 | 8.0 | 30.0 30.0 | 30.0 | 122.8 124.4 | 123.6 | 8.0 8.1 | 8.1 | 7.7 | 5.3 5.3 | 5.3 | 5.3 | 9.0 9.0 | 9.0 | 8.7 |
| | | | | Middle | 3.5 | 26.7 26.7 | 26.7 | 10.3 10.3 | 10.3 | 32.0 32.0 | 32.0 | 111.1 109.9 | 110.5 | 7.2 7.2 | 7.2 | | 5.3 5.3 | 5.3 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 6 | 25.4 25.4 | 25.4 | 13.0 13.0 | 13.0 | 31.5 31.5 | 31.5 | 98.8 97.8 | 98.3 | 6.9 6.7 | 6.8 | | 5.2 5.1 | 5.2 | | 10.0 10.0 | 10.0 | |
| 10-Aug-11 | Rainy | Rough | 16:42 | Surface | 1 | 28.1 28.0 | 28.1 | 6.4 6.4 | 6.4 | 27.4 27.4 | 27.4 | 101.1 101.3 | 101.2 | 7.0 7.0 | 7.0 | 7.0 | 2.4 2.4 | 2.4 | 2.5 | 7.0 7.0 | 7.0 | 7.0 |
| | | | | Middle | 4 | 27.9 27.9 | 27.9 | 6.8 6.8 | 6.8 | 27.7 27.7 | 27.7 | 98.8 98.0 | 98.4 | 6.9 6.8 | 6.9 | | 2.5 2.5 | 2.5 | | 9.0 9.0 | 9.0 | |
| | | | | Bottom | 7 | 27.6 27.6 | 27.6 | 7.0 7.1 | 7.1 | 29.4 29.4 | 29.4 | 97.4 96.4 | 96.9 | 7.1 7.0 | 7.1 | | 2.7 2.7 | 2.7 | | 5.0 5.0 | 5.0 | |
| 12-Aug-11 | Sunny | Moderate | 17:48 | Surface | 1 | 27.6 27.3 | 27.5 | 8.0 7.6 | 7.8 | 28.7 28.9 | 28.8 | 111.7 111.1 | 111.4 | 8.0 7.9 | 8.0 | 7.9 | 4.4 4.5 | 4.5 | 4.5 | 9.0 9.0 | 9.0 | 7.2 |
| | | | | Middle | 5 | 27.0 26.5 | 26.8 | 7.8 8.1 | 8.0 | 29.7 30.1 | 29.9 | 108.1 107.8 | 108.0 | 7.7 7.7 | 7.7 | | 4.4 4.3 | 4.4 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 9 | 26.2 26.7 | 26.5 | 7.6 7.7 | 7.7 | 30.1 29.5 | 29.8 | 98.1 96.7 | 97.4 | 7.1 7.0 | 7.1 | | 4.4 4.5 | 4.5 | | 7.0 6.0 | 6.5 | |
| 17-Aug-11 | Cloudy | Moderate | 09:00 | Surface | 1 | 27.6 27.6 | 27.6 | 7.6 7.4 | 7.5 | 29.4 29.4 | 29.4 | 113.0 113.4 | 113.2 | 7.7 7.8 | 7.8 | 7.8 | 2.9 2.9 | 2.9 | 2.9 | 11.0 11.0 | 11.0 | 9.3 |
| | | | | Middle | 4.5 | 27.1 27.0 | 27.1 | 7.6 7.6 | 7.6 | 30.5 30.1 | 30.3 | 113.5 112.9 | 113.2 | 7.7 7.7 | 7.7 | | 2.8 2.8 | 2.8 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 8 | 26.5 26.5 | 26.5 | 7.2 7.4 | 7.3 | 30.5 30.5 | 30.5 | 105.6 103.9 | 104.8 | 7.2 7.1 | 7.2 | | 2.9 2.9 | 2.9 | | 9.0 9.0 | 9.0 | |
| 19-Aug-11 | Sunny | Moderate | 10:05 | Surface | 1 | 28.9 28.9 | 28.9 | 7.9 7.6 | 7.8 | 30.7 30.7 | 30.7 | 104.3 104.7 | 104.5 | 8.0 8.1 | 8.1 | 8.1 | 2.9 2.9 | 2.9 | 2.9 | 6.0 6.0 | 6.0 | 4.5 |
| | | | | Middle | 4.5 | 28.4 28.3 | 28.4 | 7.8 7.9 | 7.9 | 31.8 31.4 | 31.6 | 104.8 104.2 | 104.5 | 8.0 8.0 | 8.0 | | 2.8 2.8 | 2.8 | | 3.0 4.0 | 3.5 | |
| | | | | Bottom | 8 | 27.8 27.8 | 27.8 | 7.7 7.8 | 7.8 | 31.8 31.8 | 31.8 | 96.9 95.2 | 96.1 | 7.5 7.4 | 7.5 | | 2.9 2.9 | 2.9 | | 4.0 4.0 | 4.0 | |
| 22-Aug-11 | Sunny | Moderate | 12:10 | Surface | 1 | 27.7 26.8 | 27.3 | 7.9 7.7 | 7.8 | 29.3 29.9 | 29.6 | 113.2 111.5 | 112.4 | 7.7 7.6 | 7.7 | 7.5 | 3.0 3.0 | 3.0 | 2.9 | 5.0 6.0 | 5.5 | 6.2 |
| | | | | Middle | 5.5 | 26.9 25.7 | 26.3 | 7.8 8.0 | 7.9 | 29.0 31.0 | 30.0 | 105.6 104.4 | 105.0 | 7.3 7.2 | 7.3 | | 3.0 2.7 | 2.9 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 10 | 25.7 27.2 | 26.5 | 7.7 7.7 | 7.7 | 30.9 29.3 | 30.1 | 89.6 87.1 | 88.4 | 6.3 6.2 | 6.3 | | 2.7 3.1 | 2.9 | | 5.0 5.0 | 5.0 | |
| 26-Aug-11 | Sunny | Moderate | 17:20 | Surface | 1 | 27.9 28.0 | 28.0 | 7.7 7.5 | 7.6 | 29.1 29.0 | 29.1 | 112.5 113.8 | 113.2 | 7.7 7.8 | 7.8 | 7.6 | 3.1 3.0 | 3.1 | 3.2 | 4.0 5.0 | 4.5 | 3.8 |
| | | | | Middle | 3.5 | 27.0 27.0 | 27.0 | 7.5 7.5 | 7.5 | 30.3 30.1 | 30.2 | 108.3 108.1 | 108.2 | 7.4 7.4 | 7.4 | | 3.1 3.1 | 3.1 | | 4.0 4.0 | 4.0 | |
| | | | | Bottom | 6 | 26.1 26.1 | 26.1 | 7.3 7.5 | 7.4 | 30.9 30.9 | 30.9 | 91.5 89.5 | 90.5 | 6.3 6.1 | 6.2 | | 3.3 3.3 | 3.3 | | 3.0 3.0 | 3.0 | |
| 29-Aug-11 | Sunny | Moderate | 17:20 | Surface | 1 | 25.8 25.8 | 25.8 | 8.1 7.8 | 8.0 | 33.5 33.5 | 33.5 | 94.2 94.0 | 94.1 | 6.8 6.8 | 6.8 | 6.8 | 3.3 3.3 | 3.3 | 3.6 | 11.0 11.0 | 11.0 | 9.3 |
| | | | | Middle | 4.5 | 25.3 25.3 | 25.3 | 8.0 7.9 | 8.0 | 33.7 33.7 | 33.7 | 92.1 92.0 | 92.1 | 6.7 6.7 | 6.7 | | 3.8 3.8 | 3.8 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 8 | 24.8 24.8 | 24.8 | 7.8 7.8 | 7.8 | 33.9 33.9 | 33.9 | 79.1 78.2 | 78.7 | 6.3 6.2 | 6.3 | | 3.8 3.8 | 3.8 | | 10.0 10.0 | 10.0 | |

Water Quality Monitoring Results at I1 - Mid-Flood Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|------|------------------------|---------|-------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 31-Aug-11 | Sunny | Moderate | 09:06 | Surface | 1 | 27.7 | 27.7 | 8.2 | 8.0 | 27.7 | 27.7 | 96.3 | 96.1 | 7.4 | 7.4 | 7.3 | 5.3 | 5.3 | 5.3 | 10.0 | 10.0 | 8.8 |
| | | | | | 27.7 | 27.7 | 7.8 | 8.0 | 27.7 | 27.7 | 95.9 | 96.1 | 7.4 | 7.4 | 5.3 | | 5.3 | 10.0 | | 10.0 | | |
| | | | | Middle | 4.5 | 27.4 | 27.4 | 8.1 | 8.2 | 29.0 | 29.0 | 91.6 | 91.3 | 7.1 | 7.1 | 5.3 | 5.4 | 8.0 | | 8.0 | | |
| | | | | | 27.4 | 27.4 | 8.2 | 8.2 | 29.0 | 29.0 | 91.0 | 91.3 | 7.1 | 7.1 | 5.4 | 5.4 | 8.0 | 8.0 | | | | |
| | | | | Bottom | 8 | 27.5 | 27.5 | 7.8 | 7.9 | 28.2 | 28.3 | 90.1 | 89.9 | 7.0 | 7.0 | 5.1 | 5.1 | 8.0 | | 8.5 | | |
| | | | | | 27.5 | 27.5 | 7.9 | 7.9 | 28.3 | 28.3 | 89.7 | 89.9 | 7.0 | 7.0 | 5.1 | 5.1 | 9.0 | 8.5 | | | | |

Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at I2 - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|------------|-----------------|------------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 1-Aug-11 | Fine | Moderate | 12:25 | Surface | 1 | 28.1 28.1 | 28.1 | 7.7 7.8 | 7.8 | 29.1 29.2 | 29.2 | 121.5 119.6 | 120.6 | 8.2 8.0 | 8.1 | 7.4 | 5.7 5.4 | 5.6 | 5.3 | 5.0 5.0 | 5.0 | 5.3 |
| | | | | Middle | 5.5 | 26.7 26.7 | 26.7 | 7.8 7.7 | 7.8 | 31.3 32.2 | 31.8 | 99.6 99.0 | 99.3 | 6.6 6.5 | 6.6 | | 5.1 5.0 | 5.1 | | 7.0 7.0 | | |
| | | | | Bottom | 10 | 26.1 26.1 | 26.1 | 8.1 7.8 | 8.0 | 30.7 30.8 | 30.8 | 106.1 106.1 | 106.1 | 7.4 7.4 | 7.4 | 5.3 5.2 | 5.3 | 4.0 4.0 | | | | |
| 3-Aug-11 | Fine | Moderate | 14:35 | Surface | 1 | 28.1 28.1 | 28.1 | 7.5 7.7 | 7.6 | 28.9 29.0 | 29.0 | 125.5 127.2 | 126.4 | 8.4 8.5 | 8.5 | 8.2 | 5.5 5.4 | 5.5 | 5.3 | 6.0 6.0 | 5.0 | 5.0 |
| | | | | Middle | 5.5 | 26.9 27.4 | 27.2 | 7.5 7.5 | 7.5 | 30.4 28.5 | 29.5 | 115.5 116.9 | 116.2 | 7.7 7.8 | 7.8 | | 5.3 5.2 | 5.3 | | 3.0 3.0 | | |
| | | | | Bottom | 10 | 25.7 25.8 | 25.8 | 7.7 7.6 | 7.7 | 31.0 30.8 | 30.9 | 98.0 95.8 | 96.9 | 6.7 6.6 | 6.7 | 5.0 4.9 | 5.0 | 6.0 6.0 | | | | |
| 5-Aug-11 | Sunny | Moderate | 16:00 | Surface | 1 | 27.6 27.6 | 27.6 | 7.5 7.6 | 7.6 | 30.3 30.2 | 30.3 | 112.7 113.9 | 113.3 | 7.4 7.5 | 7.5 | 7.4 | 5.2 5.1 | 5.2 | 5.6 | 5.0 5.0 | 6.2 | 6.2 |
| | | | | Middle | 5 | 26.7 26.6 | 26.7 | 7.8 8.0 | 7.9 | 31.1 31.1 | 31.1 | 110.3 109.3 | 109.8 | 7.3 7.2 | 7.3 | | 5.7 5.6 | 5.7 | | 6.0 6.0 | | |
| | | | | Bottom | 9 | 25.7 25.7 | 25.7 | 7.0 7.4 | 7.2 | 30.7 30.7 | 30.7 | 98.3 97.7 | 98.0 | 6.6 6.5 | 6.6 | 5.2 6.3 | 5.8 | 8.0 7.0 | | | | |
| 8-Aug-11 | Sunny | Calm | 08:27 | Surface | 1 | 27.9 27.9 | 27.9 | 7.9 7.9 | 7.9 | 30.0 30.0 | 30.0 | 131.9 131.9 | 131.9 | 8.9 8.9 | 8.9 | 8.5 | 5.1 5.1 | 5.1 | 5.3 | 8.0 8.0 | 8.3 | 8.3 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 9.9 10.0 | 10.0 | 30.7 30.8 | 30.8 | 120.2 119.5 | 119.9 | 8.1 8.0 | 8.1 | | 5.2 5.0 | 5.1 | | 9.0 9.0 | | |
| | | | | Bottom | 9 | 26.1 26.1 | 26.1 | 11.2 11.1 | 11.2 | 30.1 30.1 | 30.1 | 109.5 109.5 | 109.5 | 7.3 7.3 | 7.3 | 5.6 5.7 | 5.7 | 8.0 8.0 | | | | |
| 10-Aug-11 | Rainy | Rough | 11:13 | Surface | 1 | 28.0 28.0 | 28.0 | 6.6 6.7 | 6.7 | 27.6 27.6 | 27.6 | 106.1 105.6 | 105.9 | 7.4 7.3 | 7.4 | 7.3 | 2.3 2.3 | 2.3 | 2.5 | 5.0 5.0 | 5.8 | 5.8 |
| | | | | Middle | 5 | 27.9 27.9 | 27.9 | 7.2 7.2 | 7.2 | 28.1 28.1 | 28.1 | 102.6 102.1 | 102.4 | 7.1 7.1 | 7.1 | | 2.4 2.4 | 2.4 | | 6.0 6.0 | | |
| | | | | Bottom | 9 | 27.8 27.8 | 27.8 | 7.9 7.7 | 7.8 | 28.4 28.3 | 28.4 | 94.4 94.9 | 94.7 | 6.5 6.6 | 6.6 | 2.9 2.9 | 2.9 | 7.0 6.0 | | | | |
| 12-Aug-11 | Sunny | Moderate | 11:29 | Surface | 1 | 27.6 27.3 | 27.5 | 7.8 7.7 | 7.8 | 28.9 29.1 | 29.0 | 113.7 111.3 | 112.5 | 8.3 8.0 | 8.2 | 8.0 | 4.3 4.3 | 4.3 | 4.5 | 9.0 9.0 | 8.7 | 8.7 |
| | | | | Middle | 5 | 27.0 26.8 | 26.9 | 7.9 8.0 | 8.0 | 29.5 29.5 | 29.5 | 109.2 105.5 | 107.4 | 7.8 7.6 | 7.7 | | 4.5 4.6 | 4.6 | | 10.0 10.0 | | |
| | | | | Bottom | 9 | 26.3 26.7 | 26.5 | 7.5 7.7 | 7.6 | 30.1 30.1 | 30.1 | 96.6 99.4 | 98.0 | 6.9 7.1 | 7.0 | 4.5 4.7 | 4.6 | 7.0 7.0 | | | | |
| 15-Aug-11 | Sunny | Moderate | 12:30 | Surface | 1 | 27.4 27.3 | 27.4 | 7.0 7.3 | 7.2 | 29.2 29.3 | 29.3 | 96.7 96.6 | 96.7 | 6.6 6.5 | 6.6 | 6.6 | 2.3 2.3 | 2.3 | 2.5 | 4.0 4.0 | 6.8 | 6.8 |
| | | | | Middle | 4.5 | 27.2 27.2 | 27.2 | 7.6 7.8 | 7.7 | 29.3 29.3 | 29.3 | 96.9 96.6 | 96.8 | 6.6 6.6 | 6.6 | | 2.4 2.4 | 2.4 | | 8.0 8.0 | | |
| | | | | Bottom | 8 | 27.2 27.1 | 27.2 | 8.3 8.2 | 8.3 | 29.5 29.5 | 29.5 | 90.6 91.6 | 91.1 | 6.1 6.2 | 6.2 | 2.9 2.9 | 2.9 | 8.0 9.0 | | | | |
| 17-Aug-11 | Cloudy | Moderate | 13:59 | Surface | 1 | 27.5 27.4 | 27.5 | 7.5 7.7 | 7.6 | 29.7 29.7 | 29.7 | 110.2 110.7 | 110.5 | 7.6 7.6 | 7.6 | 7.6 | 2.7 2.7 | 2.7 | 3.0 | 6.0 6.0 | 5.3 | 5.3 |
| | | | | Middle | 4.5 | 26.9 26.9 | 26.9 | 7.5 7.6 | 7.6 | 30.2 30.2 | 30.2 | 109.1 108.4 | 108.8 | 7.5 7.4 | 7.5 | | 3.0 3.0 | 3.0 | | 4.0 4.0 | | |
| | | | | Bottom | 8 | 26.4 26.4 | 26.4 | 7.6 7.6 | 7.6 | 30.1 30.1 | 30.1 | 98.4 98.6 | 98.5 | 6.8 6.8 | 6.8 | 3.0 3.6 | 3.3 | 6.0 6.0 | | | | |
| 19-Aug-11 | Sunny | Moderate | 15:04 | Surface | 1 | 28.8 28.7 | 28.8 | 8.0 7.9 | 8.0 | 31.0 31.0 | 31.0 | 101.5 102.0 | 101.8 | 7.9 7.9 | 7.9 | 7.9 | 2.7 2.7 | 2.7 | 3.0 | 3.0 3.0 | 4.3 | 4.3 |
| | | | | Middle | 4.5 | 28.2 28.2 | 28.2 | 7.8 8.0 | 7.9 | 31.5 31.5 | 31.5 | 100.4 99.7 | 100.1 | 7.8 7.7 | 7.8 | | 3.0 3.0 | 3.0 | | 4.0 4.0 | | |
| | | | | Bottom | 8 | 27.7 27.7 | 27.7 | 7.8 7.8 | 7.8 | 31.4 31.4 | 31.4 | 89.7 89.9 | 89.8 | 7.1 7.1 | 7.1 | 3.0 3.6 | 3.3 | 6.0 6.0 | | | | |
| 22-Aug-11 | Sunny | Moderate | 17:09 | Surface | 1 | 27.8 27.0 | 27.4 | 7.9 7.8 | 7.9 | 29.3 29.9 | 29.6 | 120.1 111.6 | 115.9 | 8.8 7.8 | 8.3 | 7.8 | 2.8 2.9 | 2.9 | 2.9 | 8.0 8.0 | 5.8 | 5.8 |
| | | | | Middle | 5 | 27.0 26.6 | 26.8 | 7.9 8.0 | 8.0 | 29.9 29.9 | 29.9 | 110.4 101.1 | 105.8 | 7.6 6.9 | 7.3 | | 2.8 3.0 | 2.9 | | 7.0 6.0 | | |
| | | | | Bottom | 9 | 26.4 27.5 | 27.0 | 7.9 7.9 | 7.9 | 29.8 29.7 | 29.8 | 100.2 110.2 | 105.2 | 6.9 7.6 | 7.3 | 3.0 2.7 | 2.9 | 3.0 3.0 | | | | |

Water Quality Monitoring Results at I2 - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|------------|-----|-------------------------|------------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 24-Aug-11 | Fine | Moderate | 08:52 | Surface | 1 | 27.5 27.4 | 27.5 | 7.9 8.3 | 8.1 | 29.7 29.7 | 29.7 | 110.2 110.7 | 110.5 | 7.6 7.6 | 7.6 | 7.6 | 2.7 2.7 | 2.7 | 3.0 | 7.0 6.0 | 6.5 | 7.2 |
| | | | | Middle | 4.5 | 26.9 26.9 | 26.9 | 7.8 7.9 | 7.9 | 30.2 30.2 | 30.2 | 109.1 108.4 | 108.8 | 7.5 7.4 | 7.5 | | 3.0 3.0 | 3.0 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 8 | 26.4 26.4 | 26.4 | 8.1 8.1 | 8.1 | 30.1 30.1 | 30.1 | 98.4 98.6 | 98.5 | 6.8 6.8 | 6.8 | | 6.8 | 3.0 3.6 | | 3.3 | 8.0 8.0 | |
| 26-Aug-11 | Sunny | Moderate | 11:01 | Surface | 1 | 27.2 27.2 | 27.2 | 7.6 7.8 | 7.7 | 29.3 29.4 | 29.4 | 104.4 103.3 | 103.9 | 7.2 7.1 | 7.2 | 6.7 | 3.1 3.1 | 3.1 | 3.2 | 3.0 3.0 | 3.0 | 3.7 |
| | | | | Middle | 5.5 | 26.4 26.3 | 26.4 | 7.6 7.6 | 7.6 | 31.0 31.4 | 31.2 | 89.0 88.6 | 88.8 | 6.1 6.1 | 6.1 | | 3.3 3.3 | 3.3 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 10 | 25.1 25.2 | 25.2 | 7.8 7.8 | 7.8 | 31.6 31.6 | 31.6 | 88.6 87.5 | 88.1 | 6.6 6.5 | 6.6 | | 6.6 | 3.1 3.1 | | 3.1 | 3.0 3.0 | |
| 29-Aug-11 | Sunny | Moderate | 11:29 | Surface | 1 | 25.7 25.7 | 25.7 | 8.0 7.6 | 7.8 | 33.6 33.6 | 33.6 | 109.4 109.1 | 109.3 | 7.9 7.9 | 7.9 | 7.1 | 3.1 3.1 | 3.1 | 3.1 | 5.0 5.0 | 5.0 | 7.0 |
| | | | | Middle | 4.5 | 24.9 25.0 | 25.0 | 8.0 8.1 | 8.1 | 33.8 33.8 | 33.8 | 85.8 85.0 | 85.4 | 6.3 6.3 | 6.3 | | 3.3 3.3 | 3.3 | | 12.0 12.0 | 12.0 | |
| | | | | Bottom | 8 | 24.9 24.9 | 24.9 | 7.8 7.9 | 7.9 | 33.8 33.8 | 33.8 | 83.6 83.4 | 83.5 | 6.3 6.2 | 6.3 | | 6.3 | 3.0 3.0 | | 3.0 | 4.0 4.0 | |
| 31-Aug-11 | Sunny | Moderate | 12:39 | Surface | 1 | 27.7 27.7 | 27.7 | 8.1 7.9 | 8.0 | 27.4 27.4 | 27.4 | 96.8 96.9 | 96.9 | 7.5 7.5 | 7.5 | 7.5 | 5.0 5.0 | 5.0 | 5.2 | 8.0 8.0 | 8.0 | 6.3 |
| | | | | Middle | 4.5 | 27.6 27.6 | 27.6 | 8.0 8.2 | 8.1 | 27.9 28.0 | 28.0 | 95.4 94.7 | 95.1 | 7.4 7.3 | 7.4 | | 5.2 5.3 | 5.3 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 8 | 27.2 27.2 | 27.2 | 7.8 7.9 | 7.9 | 30.2 30.2 | 30.2 | 84.6 83.7 | 84.2 | 6.6 6.6 | 6.6 | | 6.6 | 5.3 5.3 | | 5.3 | 6.0 6.0 | |

Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at I2 - Mid-Flood Tic I2

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|------------|-----|-------------------------|--------------|------|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 3-Aug-11 | Fine | Moderate | 08:23 | Surface | 1 | 27.6 27.6 | 27.6 | 7.6 7.2 | 7.4 | 30.3 30.2 | 30.3 | 115.7 116.9 | 116.3 | 7.7 7.8 | 7.8 | 7.7 | 5.2 5.1 | 5.2 | 5.6 | 9.0 9.0 | 9.0 | 6.5 |
| | | | | Middle | 5.5 | 26.7 26.6 | 26.7 | 7.5 7.6 | 7.6 | 31.1 31.1 | 31.1 | 113.3 112.3 | 112.8 | 7.6 7.5 | 7.6 | | 5.7 5.6 | 5.7 | | 5.0 6.0 | 5.5 | |
| | | | | Bottom | 10 | 25.7 25.7 | 25.7 | 7.5 7.4 | 7.5 | 30.7 30.7 | 30.7 | 96.3 95.7 | 96.0 | 6.4 6.3 | 6.4 | | 6.4 | 5.2 6.3 | | 5.8 | 5.0 5.0 | |
| 5-Aug-11 | Sunny | Moderate | 09:58 | Surface | 1 | 28.3 28.4 | 28.4 | 7.4 8.0 | 7.7 | 29.2 29.2 | 29.2 | 118.8 123.4 | 121.1 | 7.8 8.1 | 8.0 | 7.5 | 5.7 5.4 | 5.6 | 5.3 | 6.0 7.0 | 6.5 | 8.2 |
| | | | | Middle | 5 | 26.6 26.6 | 26.6 | 7.4 7.5 | 7.5 | 31.4 31.2 | 31.3 | 105.2 104.8 | 105.0 | 6.9 6.9 | 6.9 | | 5.1 5.0 | 5.1 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 9 | 25.2 25.2 | 25.2 | 7.8 7.6 | 7.7 | 32.5 32.5 | 32.5 | 95.2 93.2 | 94.2 | 6.8 6.7 | 6.8 | | 6.8 | 5.3 5.2 | | 5.3 | 10.0 10.0 | |
| 8-Aug-11 | Sunny | Calm | 14:38 | Surface | 1 | 28.2 28.2 | 28.2 | 7.8 7.9 | 7.9 | 29.3 29.3 | 29.3 | 126.8 127.0 | 126.9 | 8.3 8.3 | 8.3 | 7.6 | 5.0 5.0 | 5.0 | 4.9 | 9.0 9.0 | 9.0 | 9.3 |
| | | | | Middle | 5.5 | 26.5 26.5 | 26.5 | 12.5 12.8 | 12.7 | 31.9 32.1 | 32.0 | 107.1 103.8 | 105.5 | 6.9 6.7 | 6.8 | | 4.9 4.9 | 4.9 | | 9.0 9.0 | 9.0 | |
| | | | | Bottom | 10 | 25.1 25.1 | 25.1 | 14.7 14.4 | 14.6 | 32.3 32.1 | 32.2 | 88.9 88.3 | 88.6 | 6.2 6.1 | 6.2 | | 6.2 | 4.9 4.8 | | 4.9 | 10.0 10.0 | |
| 10-Aug-11 | Rainy | Rough | 16:34 | Surface | 1 | 28.0 28.0 | 28.0 | 6.4 6.4 | 6.4 | 27.4 27.4 | 27.4 | 102.6 102.7 | 102.7 | 7.1 7.1 | 7.1 | 7.1 | 2.5 2.5 | 2.5 | 2.7 | 8.0 8.0 | 8.0 | 5.3 |
| | | | | Middle | 5.5 | 27.9 27.8 | 27.9 | 7.0 7.1 | 7.1 | 27.9 28.0 | 28.0 | 100.6 99.5 | 100.1 | 7.0 6.9 | 7.0 | | 2.7 2.8 | 2.8 | | 3.0 3.0 | 3.0 | |
| | | | | Bottom | 10 | 27.5 27.5 | 27.5 | 7.1 7.2 | 7.2 | 30.2 30.3 | 30.3 | 95.2 93.9 | 94.6 | 6.9 6.8 | 6.9 | | 6.9 | 2.8 2.8 | | 2.8 | 5.0 5.0 | |
| 12-Aug-11 | Sunny | Moderate | 17:41 | Surface | 1 | 27.4 27.2 | 27.3 | 7.6 7.9 | 7.8 | 28.8 29.1 | 29.0 | 114.4 116.0 | 115.2 | 8.2 8.3 | 8.3 | 8.0 | 4.5 4.3 | 4.4 | 4.4 | 7.0 7.0 | 7.0 | 7.7 |
| | | | | Middle | 5 | 26.5 26.4 | 26.5 | 7.6 7.7 | 7.7 | 30.2 30.2 | 30.2 | 107.6 104.6 | 106.1 | 7.7 7.5 | 7.6 | | 4.3 4.3 | 4.3 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 9 | 25.9 26.3 | 26.1 | 7.9 7.8 | 7.9 | 30.6 30.2 | 30.4 | 93.7 97.2 | 95.5 | 6.7 7.0 | 6.9 | | 6.9 | 4.5 4.5 | | 4.5 | 8.0 8.0 | |
| 17-Aug-11 | Cloudy | Moderate | 08:53 | Surface | 1 | 27.9 27.8 | 27.9 | 7.5 7.4 | 7.5 | 29.2 29.2 | 29.2 | 113.2 115.5 | 114.4 | 7.7 7.9 | 7.8 | 7.6 | 3.0 2.8 | 2.9 | 2.9 | 7.0 7.0 | 7.0 | 11.0 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 7.5 7.6 | 7.6 | 30.4 30.3 | 30.4 | 106.5 106.2 | 106.4 | 7.3 7.3 | 7.3 | | 2.7 2.7 | 2.7 | | 14.0 14.0 | 14.0 | |
| | | | | Bottom | 9 | 26.2 26.1 | 26.2 | 7.7 7.5 | 7.6 | 31.0 31.0 | 31.0 | 101.4 100.9 | 101.2 | 7.3 7.3 | 7.3 | | 7.3 | 3.1 3.0 | | 3.1 | 12.0 12.0 | |
| 19-Aug-11 | Sunny | Moderate | 09:58 | Surface | 1 | 29.2 29.1 | 29.2 | 7.6 7.8 | 7.7 | 30.5 30.5 | 30.5 | 104.5 106.8 | 105.7 | 8.0 8.2 | 8.1 | 7.9 | 3.0 2.8 | 2.9 | 2.9 | 3.0 3.0 | 3.0 | 4.8 |
| | | | | Middle | 5 | 28.2 28.2 | 28.2 | 7.5 7.9 | 7.7 | 31.7 31.6 | 31.7 | 97.8 97.5 | 97.7 | 7.6 7.6 | 7.6 | | 2.7 2.7 | 2.7 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 9 | 27.5 27.4 | 27.5 | 8.0 7.9 | 8.0 | 32.3 32.3 | 32.3 | 80.7 80.2 | 80.5 | 6.4 6.4 | 6.4 | | 6.4 | 3.1 3.0 | | 3.1 | 7.0 6.0 | |
| 22-Aug-11 | Sunny | Moderate | 12:03 | Surface | 1 | 27.6 27.1 | 27.4 | 7.6 7.7 | 7.7 | 29.4 30.5 | 30.0 | 113.4 113.5 | 113.5 | 7.8 7.7 | 7.8 | 7.7 | 2.9 2.8 | 2.9 | 2.9 | 4.0 4.0 | 4.0 | 6.0 |
| | | | | Middle | 4.5 | 27.0 26.5 | 26.8 | 7.6 7.7 | 7.7 | 30.1 30.5 | 30.3 | 112.9 105.6 | 109.3 | 7.7 7.2 | 7.5 | | 2.8 2.9 | 2.9 | | 3.0 3.0 | 3.0 | |
| | | | | Bottom | 8 | 26.5 27.7 | 27.1 | 7.9 7.9 | 7.9 | 30.5 29.2 | 29.9 | 103.9 118.2 | 111.1 | 7.1 8.1 | 7.6 | | 7.6 | 2.9 3.0 | | 3.0 | 11.0 11.0 | |
| 26-Aug-11 | Sunny | Moderate | 17:12 | Surface | 1 | 27.5 27.4 | 27.5 | 7.4 7.4 | 7.4 | 29.7 29.7 | 29.7 | 110.2 110.7 | 110.5 | 7.6 7.6 | 7.6 | 7.6 | 2.9 3.4 | 3.2 | 3.4 | 8.0 8.0 | 8.0 | 5.3 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 7.4 7.4 | 7.4 | 30.2 30.2 | 30.2 | 109.1 108.4 | 108.8 | 7.5 7.4 | 7.5 | | 3.3 2.9 | 3.1 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 9 | 26.4 26.4 | 26.4 | 7.6 7.7 | 7.7 | 30.1 30.1 | 30.1 | 98.4 98.6 | 98.5 | 6.8 6.8 | 6.8 | | 6.8 | 3.8 4.0 | | 3.9 | 3.0 3.0 | |
| 29-Aug-11 | Sunny | Moderate | 17:08 | Surface | 1 | 25.8 25.8 | 25.8 | 7.8 7.8 | 7.8 | 33.6 33.6 | 33.6 | 97.0 96.2 | 96.6 | 7.0 7.0 | 7.0 | 6.7 | 3.0 3.0 | 3.0 | 3.1 | 5.0 5.0 | 5.0 | 8.7 |
| | | | | Middle | 4.5 | 25.1 25.1 | 25.1 | 7.7 7.7 | 7.7 | 33.7 33.7 | 33.7 | 86.5 86.2 | 86.4 | 6.4 6.4 | 6.4 | | 3.2 3.1 | 3.2 | | 16.0 16.0 | 16.0 | |
| | | | | Bottom | 8 | 24.7 24.7 | 24.7 | 7.8 7.7 | 7.8 | 33.9 33.9 | 33.9 | 79.2 78.3 | 78.8 | 6.2 6.2 | 6.2 | | 6.2 | 3.0 2.9 | | 3.0 | 5.0 5.0 | |

Water Quality Monitoring Results at I2 - Mid-Flood Tid I2

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|------|------------------------|---------|-------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 31-Aug-11 | Sunny | Moderate | 08:57 | Surface | 1 | 26.5 | 26.5 | 7.9 | 8.0 | 28.1 | 28.1 | 99.6 | 99.8 | 7.8 | 7.8 | 7.6 | 4.9 | 4.9 | 5.1 | 8.0 | 8.0 | 7.5 |
| | | | | | 26.5 | 26.5 | 8.0 | 8.0 | 28.1 | 28.1 | 99.9 | 99.8 | 7.8 | 7.8 | 4.9 | | 4.9 | 8.0 | | 8.0 | | |
| | | | | Middle | 4.5 | 26.4 | 26.4 | 7.9 | 8.0 | 29.4 | 29.4 | 93.3 | 92.6 | 7.3 | 7.3 | 5.0 | 5.0 | 5.0 | | 9.0 | 9.0 | |
| | | | | | 26.4 | 26.4 | 8.0 | 8.0 | 29.3 | 29.3 | 91.8 | 92.6 | 7.2 | 7.3 | 5.0 | | 5.0 | | | 9.0 | 9.0 | |
| | | | | Bottom | 8 | 26.4 | 26.4 | 8.1 | 8.1 | 29.3 | 29.3 | 90.2 | 89.5 | 7.1 | 7.1 | 7.1 | 5.5 | 5.5 | | 5.0 | 5.5 | |
| | | | | | 26.4 | 26.4 | 8.1 | 8.1 | 29.3 | 29.3 | 88.7 | 89.5 | 7.0 | 7.1 | 5.5 | | 5.5 | 6.0 | | 5.5 | | |

Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at Intake A - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|-----|-------------------------|---------|------|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 1-Aug-11 | Fine | Moderate | 12:07 | Surface | 1 | 28.1 28.1 | 28.1 | 8.2 7.5 | 7.9 | 28.9 29.0 | 29.0 | 120.5 122.2 | 121.4 | 8.1 8.2 | 8.2 | 7.9 | 5.0 5.0 | 5.0 | 4.9 | 4.0 5.0 | 4.5 | 5.0 |
| | | | | Middle | 5.5 | 26.9 27.4 | 27.2 | 8.0 8.3 | 8.2 | 30.4 28.5 | 29.5 | 110.5 111.9 | 111.2 | 7.4 7.5 | 7.5 | | 4.9 4.9 | 4.9 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 10 | 25.7 25.8 | 25.8 | 7.6 7.7 | 7.7 | 31.0 30.8 | 30.9 | 98.0 95.8 | 96.9 | 6.9 6.8 | 6.9 | | 4.9 4.8 | 4.9 | | 5.0 4.0 | 4.5 | |
| 3-Aug-11 | Fine | Moderate | 14:25 | Surface | 1 | 27.8 27.8 | 27.8 | 7.9 7.3 | 7.6 | 29.6 29.6 | 29.6 | 117.3 117.4 | 117.4 | 7.9 7.9 | 7.9 | 8.0 | 5.1 5.2 | 5.2 | 5.2 | <2.5 3.0 | 2.8 | 6.6 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 7.8 8.1 | 8.0 | 31.6 30.9 | 31.3 | 118.7 119.5 | 119.1 | 7.9 8.0 | 8.0 | | 5.0 4.9 | 5.0 | | 11.0 11.0 | 11.0 | |
| | | | | Bottom | 9 | 25.9 25.9 | 25.9 | 7.4 7.6 | 7.5 | 31.4 31.4 | 31.4 | 106.0 104.6 | 105.3 | 7.0 6.9 | 7.0 | | 5.4 5.4 | 5.4 | | 6.0 6.0 | 6.0 | |
| 5-Aug-11 | Sunny | Moderate | 15:50 | Surface | 1 | 27.9 27.9 | 27.9 | 7.5 7.8 | 7.7 | 30.0 30.0 | 30.0 | 126.9 126.9 | 126.9 | 8.4 8.4 | 8.4 | 8.0 | 5.1 5.1 | 5.1 | 5.3 | 7.0 7.0 | 7.0 | 7.0 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 8.1 7.9 | 8.0 | 30.7 30.8 | 30.8 | 115.2 114.5 | 114.9 | 7.6 7.5 | 7.6 | | 5.2 5.0 | 5.1 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 9 | 26.1 26.1 | 26.1 | 7.4 7.5 | 7.5 | 30.1 30.1 | 30.1 | 104.5 104.5 | 104.5 | 6.8 6.8 | 6.8 | | 5.6 5.7 | 5.7 | | 8.0 8.0 | 8.0 | |
| 8-Aug-11 | Sunny | Calm | 08:08 | Surface | 1 | 27.9 27.8 | 27.9 | 8.6 8.5 | 8.6 | 29.8 29.7 | 29.8 | 132.7 132.2 | 132.5 | 9.0 8.9 | 9.0 | 8.8 | 5.2 5.2 | 5.2 | 5.3 | 11.0 11.0 | 11.0 | 9.7 |
| | | | | Middle | 3.5 | 27.2 27.2 | 27.2 | 8.3 7.7 | 8.0 | 28.9 28.6 | 28.8 | 126.6 127.6 | 127.1 | 8.6 8.6 | 8.6 | | 5.3 5.3 | 5.3 | | 14.0 12.0 | 13.0 | |
| | | | | Bottom | 6 | 27.2 27.2 | 27.2 | 12.2 12.6 | 12.4 | 29.2 29.8 | 29.5 | 114.6 115.6 | 115.1 | 7.0 7.1 | 7.1 | | 5.3 5.3 | 5.3 | | 5.0 5.0 | 5.0 | |
| 10-Aug-11 | Rainy | Rough | 11:02 | Surface | 1 | 28.0 28.1 | 28.1 | 6.2 6.2 | 6.2 | 27.2 27.3 | 27.3 | 114.4 114.6 | 114.5 | 7.9 7.9 | 7.9 | 7.6 | 2.5 2.5 | 2.5 | 2.6 | 3.0 3.0 | 3.0 | 4.3 |
| | | | | Middle | 4.5 | 27.9 27.9 | 27.9 | 7.2 7.2 | 7.2 | 28.0 28.0 | 28.0 | 104.5 103.0 | 103.8 | 7.2 7.1 | 7.2 | | 2.7 2.6 | 2.7 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 8 | 28.0 28.0 | 28.0 | 6.5 6.5 | 6.5 | 27.5 27.5 | 27.5 | 104.2 103.9 | 104.1 | 7.2 7.2 | 7.2 | | 2.5 2.4 | 2.5 | | 5.0 5.0 | 5.0 | |
| 12-Aug-11 | Sunny | Moderate | 11:19 | Surface | 1 | 27.3 27.3 | 27.3 | 7.7 7.9 | 7.8 | 29.3 29.3 | 29.3 | 112.1 112.0 | 112.1 | 8.1 8.1 | 8.1 | 7.8 | 4.5 4.4 | 4.5 | 4.5 | 7.0 6.0 | 6.5 | 5.8 |
| | | | | Middle | 5.5 | 26.4 26.4 | 26.4 | 8.1 8.0 | 8.1 | 29.9 29.9 | 29.9 | 102.3 101.3 | 101.8 | 7.5 7.4 | 7.5 | | 4.4 4.4 | 4.4 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 10 | 26.6 26.9 | 26.8 | 7.6 7.7 | 7.7 | 29.6 29.5 | 29.6 | 101.8 104.1 | 103.0 | 7.2 7.3 | 7.3 | | 4.8 4.6 | 4.7 | | 5.0 5.0 | 5.0 | |
| 15-Aug-11 | Sunny | Moderate | 12:43 | Surface | 1 | 27.7 27.8 | 27.8 | 7.6 7.1 | 7.4 | 28.7 28.7 | 28.7 | 101.6 100.3 | 101.0 | 6.7 8.0 | 7.4 | 7.0 | 2.5 2.5 | 2.5 | 2.6 | 5.0 5.0 | 5.0 | 7.2 |
| | | | | Middle | 5 | 27.2 27.2 | 27.2 | 7.4 7.4 | 7.4 | 29.1 29.1 | 29.1 | 95.1 93.3 | 94.2 | 6.7 6.4 | 6.6 | | 2.7 2.6 | 2.7 | | 8.0 7.0 | 7.5 | |
| | | | | Bottom | 9 | 27.1 26.8 | 27.0 | 8.4 8.6 | 8.5 | 29.6 29.6 | 29.6 | 88.8 86.9 | 87.9 | 6.1 6.1 | 6.1 | | 2.5 2.4 | 2.5 | | 9.0 9.0 | 9.0 | |
| 17-Aug-11 | Cloudy | Moderate | 13:49 | Surface | 1 | 27.8 27.8 | 27.8 | 7.7 7.4 | 7.6 | 29.3 29.3 | 29.3 | 115.7 115.1 | 115.4 | 7.7 8.3 | 8.0 | 7.6 | 2.8 2.8 | 2.8 | 2.9 | 10.0 10.0 | 10.0 | 10.2 |
| | | | | Middle | 5 | 27.0 27.0 | 27.0 | 7.7 8.0 | 7.9 | 29.9 29.9 | 29.9 | 106.6 105.4 | 106.0 | 7.3 7.1 | 7.2 | | 2.9 2.8 | 2.9 | | 10.0 10.0 | 10.0 | |
| | | | | Bottom | 9 | 26.6 26.4 | 26.5 | 7.4 7.4 | 7.4 | 29.9 29.8 | 29.9 | 101.1 100.2 | 100.7 | 6.9 6.9 | 6.9 | | 3.0 3.0 | 3.0 | | 11.0 10.0 | 10.5 | |
| 19-Aug-11 | Sunny | Moderate | 14:54 | Surface | 1 | 29.1 29.1 | 29.1 | 7.7 7.9 | 7.8 | 30.6 30.6 | 30.6 | 112.0 111.4 | 111.7 | 8.5 9.1 | 8.8 | 8.4 | 2.8 2.8 | 2.8 | 2.9 | 7.0 7.0 | 7.0 | 5.0 |
| | | | | Middle | 5 | 28.3 28.3 | 28.3 | 8.0 8.0 | 8.0 | 31.2 31.2 | 31.2 | 102.9 101.7 | 102.3 | 8.1 7.9 | 8.0 | | 2.9 2.8 | 2.9 | | 4.0 4.0 | 4.0 | |
| | | | | Bottom | 9 | 27.9 27.7 | 27.8 | 7.6 7.6 | 7.6 | 31.2 31.1 | 31.2 | 92.4 91.5 | 92.0 | 7.2 7.2 | 7.2 | | 3.0 3.0 | 3.0 | | 4.0 4.0 | 4.0 | |
| 22-Aug-11 | Sunny | Moderate | 16:59 | Surface | 1 | 26.4 26.4 | 26.4 | 7.9 7.8 | 7.9 | 30.9 30.9 | 30.9 | 102.1 101.7 | 101.9 | 7.2 7.2 | 7.2 | 6.8 | 3.4 3.3 | 3.4 | 3.2 | 3.0 3.0 | 3.0 | 3.7 |
| | | | | Middle | 5.5 | 24.9 25.0 | 25.0 | 8.0 8.0 | 8.0 | 31.6 31.5 | 31.6 | 86.0 84.3 | 85.2 | 6.3 6.2 | 6.3 | | 2.9 3.0 | 3.0 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 10 | 26.9 27.8 | 27.4 | 7.7 7.8 | 7.8 | 29.8 29.3 | 29.6 | 103.1 110.7 | 106.9 | 6.8 7.2 | 7.0 | | 3.3 2.8 | 3.1 | | 3.0 3.0 | 3.0 | |

Water Quality Monitoring Results at Intake A - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|------------|-----|-------------------------|--------------|-----|------|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | |
| 24-Aug-11 | Fine | Moderate | 08:34 | Surface | 1 | 27.8 27.8 | 27.8 | 8.3 7.7 | 8.0 | 29.3 29.3 | 29.3 | 120.7 120.1 | 120.4 | 8.2 8.8 | 8.5 | 8.1 | 2.8 2.8 | 2.8 | 2.9 | 6.0 7.0 | 6.5 | 6.5 | |
| | | | | Middle | 5 | 27.0 27.0 | 27.0 | 8.1 8.5 | 8.3 | 29.9 29.9 | 29.9 | 111.6 110.4 | 111.0 | 7.8 7.6 | 7.7 | | 2.9 2.8 | 2.9 | | 6.0 6.0 | 6.0 | | |
| | | | | Bottom | 9 | 26.6 26.4 | 26.5 | 7.7 8.0 | 7.9 | 29.9 29.8 | 29.9 | 101.1 100.2 | 100.7 | 6.9 6.9 | 6.9 | | 6.9 | 3.0 3.0 | | 3.0 | 7.0 7.0 | | 7.0 |
| 26-Aug-11 | Sunny | Moderate | 10:43 | Surface | 1 | 27.7 27.7 | 27.7 | 7.8 7.6 | 7.7 | 29.2 29.3 | 29.3 | 118.2 118.1 | 118.2 | 8.1 8.1 | 8.1 | 7.7 | 3.0 3.0 | 3.0 | 2.9 | 5.0 5.0 | 5.0 | 4.5 | |
| | | | | Middle | 5 | 26.8 26.9 | 26.9 | 7.7 8.0 | 7.9 | 29.9 29.0 | 29.5 | 106.7 105.6 | 106.2 | 7.3 7.3 | 7.3 | | 3.0 3.0 | 3.0 | | 5.0 5.0 | 5.0 | | |
| | | | | Bottom | 9 | 25.7 25.7 | 25.7 | 7.6 7.6 | 7.6 | 31.0 30.9 | 31.0 | 89.6 87.1 | 88.4 | 6.3 6.2 | 6.3 | | 6.3 | 2.7 2.7 | | 2.7 | 3.0 4.0 | | 3.5 |
| 29-Aug-11 | Sunny | Moderate | 11:14 | Surface | 1 | 25.5 25.5 | 25.5 | 7.9 7.9 | 7.9 | 33.7 33.7 | 33.7 | 108.0 106.6 | 107.3 | 7.8 7.7 | 7.8 | 7.0 | 3.2 3.3 | 3.3 | 3.6 | 6.0 6.0 | 6.0 | 8.5 | |
| | | | | Middle | 5.5 | 24.9 24.9 | 24.9 | 7.9 7.8 | 7.9 | 33.8 33.8 | 33.8 | 83.4 83.0 | 83.2 | 6.2 6.2 | 6.2 | | 4.2 4.1 | 4.2 | | 11.0 10.0 | 10.5 | | |
| | | | | Bottom | 10 | 24.6 24.6 | 24.6 | 7.9 7.7 | 7.8 | 33.9 33.9 | 33.9 | 78.5 78.1 | 78.3 | 6.2 6.2 | 6.2 | | 6.2 | 3.3 3.4 | | 3.4 | 9.0 9.0 | | 9.0 |
| 31-Aug-11 | Sunny | Moderate | 12:30 | Surface | 1 | 27.9 27.9 | 27.9 | 7.9 8.1 | 8.0 | 27.4 27.4 | 27.4 | 95.8 95.9 | 95.9 | 7.4 7.4 | 7.4 | 7.4 | 5.0 5.0 | 5.0 | 5.3 | 9.0 10.0 | 9.5 | 9.8 | |
| | | | | Middle | 5.5 | 27.6 27.6 | 27.6 | 8.2 8.1 | 8.2 | 27.7 27.7 | 27.7 | 94.2 93.6 | 93.9 | 7.3 7.3 | 7.3 | | 7.3 | 5.1 5.2 | | 5.2 | 11.0 11.0 | | 11.0 |
| | | | | Bottom | 10 | 27.2 27.2 | 27.2 | 7.8 7.9 | 7.9 | 29.4 29.4 | 29.4 | 86.2 85.5 | 85.9 | 6.7 6.7 | 6.7 | | 6.7 | 5.6 5.5 | | 5.6 | 9.0 9.0 | | 9.0 |

Remarks: The reporting limit for laboratory analysis of suspended solids is 2.5 mg/L. For the results below the reporting limit, the SS level will be taken as 2.5 mg/L.

* DA: Depth-Averaged

** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at Intake A - Mid-Flood Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|-------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|------|------|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | |
| 3-Aug-11 | Fine | Moderate | 08:05 | Surface | 1 | 27.8 | 27.8 | 7.8 | 7.4 | 7.6 | 29.9 | 29.9 | 124.2 | 124.6 | 8.3 | 8.3 | 8.1 | 5.0 | 5.0 | 5.1 | 9.0 | 9.0 | 6.3 |
| | | | | Middle | 5.5 | 26.9 | 26.9 | 7.7 | 7.6 | 7.7 | 31.2 | 31.2 | 118.8 | 118.5 | 7.9 | 7.9 | | 5.2 | 5.2 | | 6.0 | 6.0 | |
| | | | | Bottom | 10 | 25.8 | 25.8 | 7.4 | 7.5 | 7.5 | 30.7 | 30.8 | 100.8 | 100.3 | 6.7 | 6.7 | 6.7 | 6.7 | 5.1 | 5.1 | 4.0 | 4.0 | |
| 5-Aug-11 | Sunny | Moderate | 09:40 | Surface | 1 | 28.2 | 28.2 | 7.7 | 7.1 | 7.4 | 29.3 | 29.3 | 129.8 | 129.9 | 8.6 | 8.6 | 7.9 | 5.0 | 5.0 | 4.9 | 9.0 | 9.0 | 7.5 |
| | | | | Middle | 5.5 | 26.5 | 26.5 | 8.1 | 8.1 | 8.1 | 31.9 | 32.0 | 110.1 | 108.5 | 7.2 | 7.1 | | 4.9 | 4.9 | | 6.0 | 6.5 | |
| | | | | Bottom | 10 | 25.1 | 25.1 | 7.2 | 7.9 | 7.6 | 32.3 | 32.2 | 90.9 | 90.6 | 6.4 | 6.4 | 6.4 | 6.4 | 4.9 | 4.9 | 7.0 | 7.0 | |
| 8-Aug-11 | Sunny | Calm | 14:28 | Surface | 1 | 28.0 | 28.1 | 8.0 | 8.0 | 8.0 | 29.4 | 29.4 | 121.5 | 122.7 | 8.2 | 8.3 | 8.1 | 5.4 | 5.4 | 5.2 | 12.0 | 11.5 | 9.3 |
| | | | | Middle | 5.5 | 26.7 | 26.7 | 12.0 | 11.4 | 11.7 | 31.5 | 31.3 | 115.4 | 115.5 | 7.7 | 7.8 | | 5.0 | 5.0 | | 9.0 | 9.0 | |
| | | | | Bottom | 10 | 25.5 | 25.5 | 14.2 | 14.2 | 14.2 | 32.0 | 32.0 | 102.1 | 101.3 | 7.0 | 7.0 | 7.0 | 7.0 | 5.3 | 5.3 | 7.0 | 7.5 | |
| 10-Aug-11 | Rainy | Rough | 16:25 | Surface | 1 | 28.1 | 28.1 | 6.6 | 6.7 | 6.7 | 27.5 | 27.6 | 105.3 | 105.7 | 7.3 | 7.3 | 7.1 | 2.5 | 2.5 | 2.8 | 5.0 | 4.5 | 3.8 |
| | | | | Middle | 5.5 | 27.8 | 27.8 | 7.6 | 7.6 | 7.6 | 28.3 | 28.3 | 99.5 | 98.7 | 6.9 | 6.9 | | 2.6 | 2.7 | | 4.0 | 4.0 | |
| | | | | Bottom | 10 | 27.6 | 27.6 | 9.0 | 9.0 | 9.0 | 29.4 | 29.4 | 91.2 | 90.6 | 6.3 | 6.3 | 6.3 | 6.3 | 3.1 | 3.1 | 3.0 | 3.0 | |
| 12-Aug-11 | Sunny | Moderate | 17:23 | Surface | 1 | 27.8 | 27.7 | 7.8 | 7.5 | 7.7 | 28.4 | 28.7 | 120.6 | 119.2 | 8.6 | 8.5 | 8.1 | 4.3 | 4.3 | 4.3 | 6.0 | 6.0 | 5.5 |
| | | | | Middle | 5 | 26.9 | 26.8 | 8.0 | 8.0 | 8.0 | 29.9 | 30.1 | 108.6 | 105.1 | 7.8 | 7.6 | | 4.3 | 4.4 | | 7.0 | 7.0 | |
| | | | | Bottom | 9 | 26.2 | 26.5 | 7.7 | 7.9 | 7.8 | 30.1 | 29.8 | 92.1 | 92.0 | 6.6 | 6.6 | 6.6 | 6.6 | 4.4 | 4.3 | 3.0 | 3.5 | |
| 17-Aug-11 | Cloudy | Moderate | 08:35 | Surface | 1 | 27.9 | 28.0 | 7.7 | 7.3 | 7.5 | 29.0 | 29.0 | 117.2 | 116.9 | 7.8 | 8.1 | 7.6 | 2.7 | 2.7 | 2.7 | 13.0 | 12.5 | 11.2 |
| | | | | Middle | 5.5 | 26.9 | 26.9 | 7.7 | 7.6 | 7.7 | 30.5 | 30.6 | 104.1 | 102.8 | 7.1 | 7.0 | | 2.8 | 2.8 | | 7.0 | 7.0 | |
| | | | | Bottom | 10 | 26.1 | 26.1 | 7.3 | 7.4 | 7.4 | 31.0 | 31.0 | 98.8 | 98.2 | 7.1 | 7.1 | 7.1 | 7.1 | 2.7 | 2.7 | 14.0 | 14.0 | |
| 19-Aug-11 | Sunny | Moderate | 09:40 | Surface | 1 | 29.2 | 29.3 | 7.9 | 7.5 | 7.7 | 30.3 | 30.3 | 113.5 | 113.2 | 8.6 | 8.9 | 8.4 | 2.7 | 2.7 | 2.7 | 3.0 | 3.0 | 4.2 |
| | | | | Middle | 5.5 | 28.2 | 28.2 | 8.1 | 8.1 | 8.1 | 31.8 | 31.9 | 100.4 | 99.1 | 7.9 | 7.8 | | 2.8 | 2.8 | | 6.0 | 6.0 | |
| | | | | Bottom | 10 | 27.3 | 27.4 | 7.7 | 7.8 | 7.8 | 32.2 | 32.3 | 78.1 | 77.5 | 6.2 | 6.2 | 6.2 | 6.2 | 2.7 | 2.7 | 3.0 | 3.5 | |
| 22-Aug-11 | Sunny | Moderate | 11:45 | Surface | 1 | 27.8 | 27.4 | 7.9 | 7.7 | 7.8 | 29.2 | 29.8 | 115.5 | 111.0 | 7.9 | 7.6 | 7.2 | 2.8 | 2.8 | 2.9 | 10.0 | 10.0 | 7.8 |
| | | | | Middle | 5 | 26.9 | 26.6 | 7.9 | 8.1 | 8.0 | 30.3 | 30.7 | 106.2 | 97.8 | 7.3 | 6.7 | | 2.7 | 2.9 | | 9.0 | 9.0 | |
| | | | | Bottom | 9 | 26.1 | 26.9 | 8.0 | 7.9 | 8.0 | 31.0 | 30.2 | 90.9 | 91.0 | 6.3 | 6.3 | 6.3 | 6.3 | 3.0 | 3.0 | 5.0 | 4.5 | |
| 26-Aug-11 | Sunny | Moderate | 16:32 | Surface | 1 | 26.4 | 26.4 | 7.5 | 7.3 | 7.4 | 30.9 | 30.9 | 102.1 | 101.9 | 7.2 | 7.2 | 6.8 | 2.9 | 3.0 | 2.9 | 5.0 | 5.0 | 4.7 |
| | | | | Middle | 5.5 | 24.9 | 25.0 | 7.5 | 7.5 | 7.5 | 31.6 | 31.6 | 86.0 | 85.2 | 6.3 | 6.3 | | 3.0 | 2.9 | | 5.0 | 5.0 | |
| | | | | Bottom | 10 | 26.6 | 26.5 | 7.4 | 7.6 | 7.5 | 29.9 | 29.8 | 101.1 | 100.7 | 6.9 | 6.9 | 6.9 | 6.9 | 2.8 | 2.8 | 4.0 | 4.0 | |
| 29-Aug-11 | Sunny | Moderate | 16:55 | Surface | 1 | 25.7 | 25.7 | 8.0 | 7.8 | 7.9 | 33.6 | 33.6 | 92.1 | 92.2 | 6.8 | 6.9 | 6.8 | 3.0 | 3.0 | 3.2 | 3.0 | 3.0 | 4.5 |
| | | | | Middle | 5 | 25.1 | 25.1 | 7.9 | 8.0 | 8.0 | 33.7 | 33.7 | 89.4 | 89.4 | 6.7 | 6.7 | | 3.1 | 3.1 | | 4.0 | 4.0 | |
| | | | | Bottom | 9 | 24.7 | 24.7 | 7.8 | 7.7 | 7.8 | 33.9 | 33.9 | 78.6 | 78.1 | 6.3 | 6.3 | 6.3 | 6.3 | 3.6 | 3.6 | 6.0 | 6.5 | |

Water Quality Monitoring Results at Intake A - Mid-Flood Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|------|------------------------|---------|-------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 31-Aug-11 | Sunny | Moderate | 09:19 | Surface | 1 | 27.8 | 27.8 | 7.9 | 7.9 | 27.3 | 27.3 | 105.1 | 105.2 | 8.0 | 8.1 | 7.9 | 5.1 | 5.1 | 5.1 | 8.0 | 8.0 | 8.5 |
| | | | | | 27.8 | 27.8 | 7.8 | 7.9 | 27.3 | 27.3 | 105.2 | 105.2 | 8.1 | 8.1 | 5.1 | | 5.1 | 8.0 | | 8.0 | | |
| | | | | Middle | 5.5 | 27.6 | 27.6 | 8.0 | 8.0 | 28.0 | 28.0 | 98.2 | 97.7 | 7.6 | 7.6 | | 5.3 | 5.3 | | 8.0 | 8.0 | |
| | | | | | 27.6 | 27.6 | 8.0 | 8.0 | 28.0 | 28.0 | 97.1 | 97.1 | 7.5 | 7.5 | 5.3 | 5.3 | 8.0 | 8.0 | | | | |
| | | | | Bottom | 10 | 27.8 | 27.8 | 7.9 | 8.0 | 27.5 | 27.5 | 97.9 | 97.8 | 7.6 | 7.6 | 5.0 | 5.0 | 10.0 | | 9.5 | | |
| | | | | | 27.8 | 27.8 | 8.0 | 8.0 | 27.5 | 27.5 | 97.7 | 97.7 | 7.5 | 7.5 | 5.0 | 5.0 | 9.0 | 9.5 | | | | |

Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at Intake B - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 1-Aug-11 | Fine | Moderate | 12:44 | Surface | 1 | 28.0 28.1 | 28.1 | 7.4 7.6 | 7.5 | 29.4 29.4 | 29.4 | 114.5 116.9 | 115.7 | 7.6 7.8 | 7.7 | 7.5 | 5.5 5.4 | 5.5 | 5.3 | 4.0 5.0 | 4.5 | 4.7 |
| | | | | Middle | 5.5 | 26.7 26.7 | 26.7 | 7.7 7.6 | 7.7 | 31.5 31.1 | 31.3 | 108.4 108.6 | 108.5 | 7.2 7.2 | 7.2 | | 5.3 5.2 | 5.3 | | 4.0 5.0 | 4.5 | |
| | | | | Bottom | 10 | 25.5 25.5 | 25.5 | 7.7 7.9 | 7.8 | 32.0 32.0 | 32.0 | 102.1 100.4 | 101.3 | 7.2 7.1 | 7.2 | | 5.0 4.9 | 5.0 | | 5.0 5.0 | 5.0 | |
| 3-Aug-11 | Fine | Moderate | 14:59 | Surface | 1 | 27.9 27.8 | 27.9 | 7.4 7.4 | 7.4 | 29.8 29.7 | 29.8 | 130.7 130.2 | 130.5 | 8.8 8.7 | 8.8 | 8.6 | 5.2 5.2 | 5.2 | 5.3 | 3.0 4.0 | 3.5 | 3.7 |
| | | | | Middle | 3.5 | 27.2 27.2 | 27.2 | 7.4 7.6 | 7.5 | 28.9 28.6 | 28.8 | 124.6 125.6 | 125.1 | 8.4 8.4 | 8.4 | | 5.3 5.3 | 5.3 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 6 | 27.2 27.2 | 27.2 | 7.4 7.6 | 7.5 | 29.2 29.8 | 29.5 | 116.6 117.6 | 117.1 | 7.2 7.3 | 7.3 | | 5.3 5.3 | 5.3 | | <2.5 <2.5 | <2.5 | |
| 5-Aug-11 | Sunny | Moderate | 16:24 | Surface | 1 | 28.0 28.0 | 28.0 | 8.0 7.5 | 7.8 | 30.0 30.0 | 30.0 | 125.8 127.4 | 126.6 | 8.3 8.4 | 8.4 | 8.0 | 5.3 5.3 | 5.3 | 5.3 | 8.0 8.0 | 8.0 | 7.2 |
| | | | | Middle | 6 | 26.7 26.7 | 26.7 | 8.1 7.7 | 7.9 | 32.0 32.0 | 32.0 | 114.1 112.9 | 113.5 | 7.5 7.5 | 7.5 | | 5.3 5.3 | 5.3 | | 7.0 6.0 | 6.5 | |
| | | | | Bottom | 11 | 25.4 25.4 | 25.4 | 7.3 7.5 | 7.4 | 31.5 31.5 | 31.5 | 95.8 94.8 | 95.3 | 6.6 6.4 | 6.5 | | 5.2 5.1 | 5.2 | | 7.0 7.0 | 7.0 | |
| 8-Aug-11 | Sunny | Calm | 08:45 | Surface | 1 | 27.8 27.8 | 27.8 | 8.3 8.3 | 8.3 | 29.6 29.6 | 29.6 | 119.3 119.4 | 119.4 | 8.1 8.1 | 8.1 | 8.2 | 5.1 5.2 | 5.2 | 5.2 | 7.0 8.0 | 7.5 | 8.5 |
| | | | | Middle | 5 | 26.9 26.9 | 26.9 | 12.1 11.1 | 11.6 | 31.6 30.9 | 31.3 | 120.7 121.5 | 121.1 | 8.1 8.2 | 8.2 | | 5.0 4.9 | 5.0 | | 10.0 10.0 | 10.0 | |
| | | | | Bottom | 9 | 25.9 25.9 | 25.9 | 13.5 13.4 | 13.5 | 31.4 31.4 | 31.4 | 108.0 106.6 | 107.3 | 7.2 7.1 | 7.2 | | 5.4 5.4 | 5.4 | | 8.0 8.0 | 8.0 | |
| 10-Aug-11 | Rainy | Rough | 11:34 | Surface | 1 | 27.9 27.9 | 27.9 | 7.1 7.4 | 7.3 | 28.0 28.2 | 28.1 | 98.1 97.2 | 97.7 | 6.8 6.7 | 6.8 | 6.6 | 2.6 2.6 | 2.6 | 2.6 | 8.0 8.0 | 8.0 | 7.7 |
| | | | | Middle | 5 | 27.7 27.7 | 27.7 | 8.5 8.5 | 8.5 | 29.0 29.0 | 29.0 | 90.2 89.1 | 89.7 | 6.3 6.2 | 6.3 | | 2.8 2.8 | 2.8 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 9 | 27.6 27.6 | 27.6 | 9.5 9.4 | 9.5 | 29.6 29.6 | 29.6 | 97.1 96.4 | 96.8 | 7.0 7.0 | 7.0 | | 2.5 2.5 | 2.5 | | 7.0 7.0 | 7.0 | |
| 12-Aug-11 | Sunny | Moderate | 11:53 | Surface | 1 | 27.7 27.5 | 27.6 | 8.0 7.7 | 7.9 | 28.9 29.1 | 29.0 | 116.8 117.5 | 117.2 | 8.3 8.3 | 8.3 | 8.1 | 4.3 4.3 | 4.3 | 4.4 | 7.0 7.0 | 7.0 | 7.5 |
| | | | | Middle | 5.5 | 27.0 27.0 | 27.0 | 8.1 7.9 | 8.0 | 29.9 29.6 | 29.8 | 111.2 110.6 | 110.9 | 7.9 7.9 | 7.9 | | 4.4 4.4 | 4.4 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 10 | 26.4 26.7 | 26.6 | 7.7 7.7 | 7.7 | 30.0 29.8 | 29.9 | 100.0 99.0 | 99.5 | 7.2 7.1 | 7.2 | | 4.6 4.5 | 4.6 | | 10.0 9.0 | 9.5 | |
| 15-Aug-11 | Sunny | Moderate | 12:11 | Surface | 1 | 27.3 27.2 | 27.3 | 7.0 7.1 | 7.1 | 29.5 29.6 | 29.6 | 103.0 101.0 | 102.0 | 7.0 6.9 | 7.0 | 6.7 | 2.6 2.6 | 2.6 | 2.6 | 8.0 8.0 | 8.0 | 6.2 |
| | | | | Middle | 5.5 | 26.7 26.5 | 26.6 | 8.2 8.1 | 8.2 | 29.4 29.4 | 29.4 | 92.0 88.4 | 90.2 | 6.4 6.1 | 6.3 | | 2.8 2.8 | 2.8 | | 4.0 5.0 | 4.5 | |
| | | | | Bottom | 10 | 25.7 25.7 | 25.7 | 8.7 8.8 | 8.8 | 31.0 31.1 | 31.1 | 89.2 86.4 | 87.8 | 6.7 6.5 | 6.6 | | 2.5 2.5 | 2.5 | | 6.0 6.0 | 6.0 | |
| 17-Aug-11 | Cloudy | Moderate | 14:23 | Surface | 1 | 27.6 27.6 | 27.6 | 7.6 7.5 | 7.6 | 29.8 29.8 | 29.8 | 119.9 119.7 | 119.8 | 8.2 8.2 | 8.2 | 7.8 | 2.9 2.9 | 2.9 | 2.9 | 9.0 9.0 | 9.0 | 8.7 |
| | | | | Middle | 6 | 26.7 26.6 | 26.7 | 7.4 7.5 | 7.5 | 30.7 30.7 | 30.7 | 107.5 105.1 | 106.3 | 7.4 7.2 | 7.3 | | 3.0 3.0 | 3.0 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 11 | 25.5 25.5 | 25.5 | 7.3 7.4 | 7.4 | 31.2 31.3 | 31.3 | 96.0 94.1 | 95.1 | 7.0 6.8 | 6.9 | | 2.8 2.8 | 2.8 | | 11.0 11.0 | 11.0 | |
| 19-Aug-11 | Sunny | Moderate | 15:28 | Surface | 1 | 28.9 28.9 | 28.9 | 8.2 7.8 | 8.0 | 31.1 31.1 | 31.1 | 111.2 111.0 | 111.1 | 8.5 8.5 | 8.5 | 8.1 | 2.9 2.9 | 2.9 | 2.9 | 3.0 4.0 | 3.5 | 4.2 |
| | | | | Middle | 6 | 28.0 27.9 | 28.0 | 8.0 7.8 | 7.9 | 32.0 32.0 | 32.0 | 98.8 96.4 | 97.6 | 7.7 7.5 | 7.6 | | 3.0 3.0 | 3.0 | | 5.0 5.0 | 5.0 | |
| | | | | Bottom | 11 | 26.8 26.8 | 26.8 | 7.7 7.6 | 7.7 | 32.5 32.6 | 32.6 | 85.3 83.4 | 84.4 | 7.1 6.9 | 7.0 | | 2.8 2.8 | 2.8 | | 4.0 4.0 | 4.0 | |
| 22-Aug-11 | Sunny | Moderate | 17:33 | Surface | 1 | 27.6 27.2 | 27.4 | 8.0 7.8 | 7.9 | 29.6 30.0 | 29.8 | 114.6 114.5 | 114.6 | 7.8 7.8 | 7.8 | 7.8 | 2.7 2.9 | 2.8 | 3.0 | 5.0 5.0 | 5.0 | 5.0 |
| | | | | Middle | 4.5 | 27.1 27.2 | 27.2 | 8.1 7.9 | 8.0 | 30.0 28.8 | 29.4 | 113.4 114.1 | 113.8 | 7.8 7.8 | 7.8 | | 3.3 3.3 | 3.1 | | 3.0 3.0 | 3.0 | |
| | | | | Bottom | 8 | 26.9 27.9 | 27.4 | 7.8 7.9 | 7.9 | 29.5 29.1 | 29.3 | 113.8 112.5 | 113.2 | 7.9 7.7 | 7.8 | | 3.3 3.1 | 3.2 | | 7.0 7.0 | 7.0 | |

Water Quality Monitoring Results at Intake B - Mid-Ebb Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | | Suspended Solids (mg/L) | | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|------------|-----|-------------------------|--------------|------|------|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | |
| 24-Aug-11 | Fine | Moderate | 09:11 | Surface | 1 | 27.6 27.6 | 27.6 | 7.9 7.7 | 7.8 | 29.8 29.8 | 29.8 | 119.9 119.7 | 119.8 | 8.2 8.2 | 8.2 | 7.8 | 2.9 2.9 | 2.9 | 2.9 | 6.0 6.0 | 6.0 | 6.3 | |
| | | | | Middle | 6 | 26.7 26.6 | 26.7 | 7.6 8.0 | 7.8 | 30.7 30.7 | 30.7 | 107.5 105.1 | 106.3 | 7.4 7.2 | 7.3 | | 3.0 3.0 | 3.0 | | 6.0 7.0 | 6.5 | | |
| | | | | Bottom | 11 | 25.5 25.5 | 25.5 | 7.7 7.9 | 7.8 | 31.2 31.3 | 31.3 | 90.0 88.1 | 89.1 | 6.4 6.2 | 6.3 | | 6.3 | 2.8 2.8 | | 2.8 | 6.0 7.0 | | 6.5 |
| 26-Aug-11 | Sunny | Moderate | 11:20 | Surface | 1 | 27.8 27.8 | 27.8 | 7.7 7.6 | 7.7 | 29.3 29.3 | 29.3 | 108.7 108.1 | 108.4 | 7.0 7.6 | 7.3 | 6.9 | 2.8 2.8 | 2.8 | 2.9 | 3.0 3.0 | 3.0 | 3.7 | |
| | | | | Middle | 5 | 27.0 27.0 | 27.0 | 7.5 7.7 | 7.6 | 29.9 29.9 | 29.9 | 99.6 98.4 | 99.0 | 6.6 6.4 | 6.5 | | 2.9 2.8 | 2.9 | | 3.0 3.0 | 3.0 | | |
| | | | | Bottom | 9 | 27.6 27.6 | 27.6 | 7.5 7.6 | 7.6 | 29.6 29.6 | 29.6 | 114.2 114.6 | 114.4 | 7.8 7.8 | 7.8 | | 7.8 | 3.0 2.7 | | 2.9 | 5.0 5.0 | | 5.0 |
| 29-Aug-11 | Sunny | Moderate | 11:57 | Surface | 1 | 25.7 25.7 | 25.7 | 7.9 7.6 | 7.8 | 33.6 33.6 | 33.6 | 98.1 97.3 | 97.7 | 7.1 7.1 | 7.1 | 6.8 | 2.8 2.8 | 2.8 | 3.0 | 10.0 10.0 | 10.0 | 8.2 | |
| | | | | Middle | 5.5 | 25.2 25.2 | 25.2 | 7.9 8.0 | 8.0 | 33.7 33.7 | 33.7 | 87.2 87.0 | 87.1 | 6.4 6.4 | 6.4 | | 2.9 2.9 | 2.9 | | 8.0 8.0 | 8.0 | | |
| | | | | Bottom | 10 | 24.8 24.8 | 24.8 | 7.8 7.9 | 7.9 | 33.9 33.9 | 33.9 | 79.6 79.3 | 79.5 | 6.3 6.3 | 6.3 | | 6.3 | 3.4 3.4 | | 3.4 | 7.0 6.0 | | 6.5 |
| 31-Aug-11 | Sunny | Moderate | 12:55 | Surface | 1 | 27.8 27.8 | 27.8 | 8.2 7.9 | 8.1 | 27.6 27.7 | 27.7 | 98.7 99.2 | 99.0 | 7.6 7.6 | 7.6 | 7.5 | 4.9 4.8 | 4.9 | 5.0 | 8.0 8.0 | 8.0 | 10.0 | |
| | | | | Middle | 5.5 | 27.6 27.5 | 27.6 | 8.1 8.1 | 8.1 | 28.3 28.3 | 28.3 | 94.7 93.5 | 94.1 | 7.3 7.3 | 7.3 | | 7.3 | 4.8 4.8 | | 4.8 | 10.0 10.0 | | 10.0 |
| | | | | Bottom | 10 | 27.4 27.3 | 27.4 | 8.0 7.9 | 8.0 | 29.3 29.3 | 29.3 | 88.8 88.0 | 88.4 | 6.9 6.9 | 6.9 | | 6.9 | 5.3 5.3 | | 5.3 | 12.0 12.0 | | 12.0 |

Remarks: The reporting limit for laboratory analysis of suspended solids is 2.5 mg/L. For the results below the reporting limit, the SS level will be taken as 2.5 mg/L.

* DA: Depth-Averaged

** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Water Quality Monitoring Results at Intake B - Mid-Flood Tide

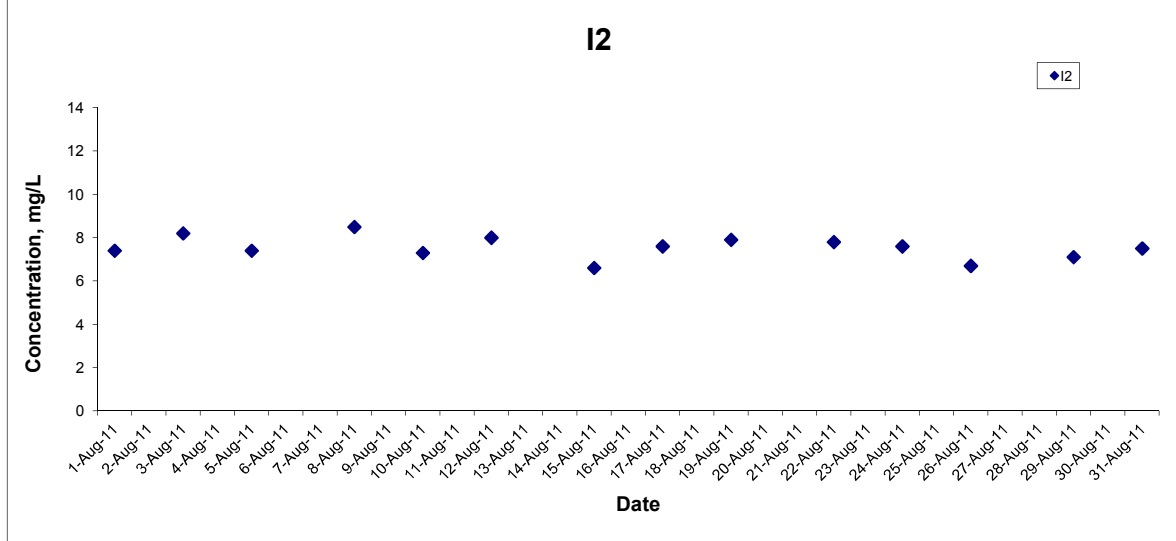
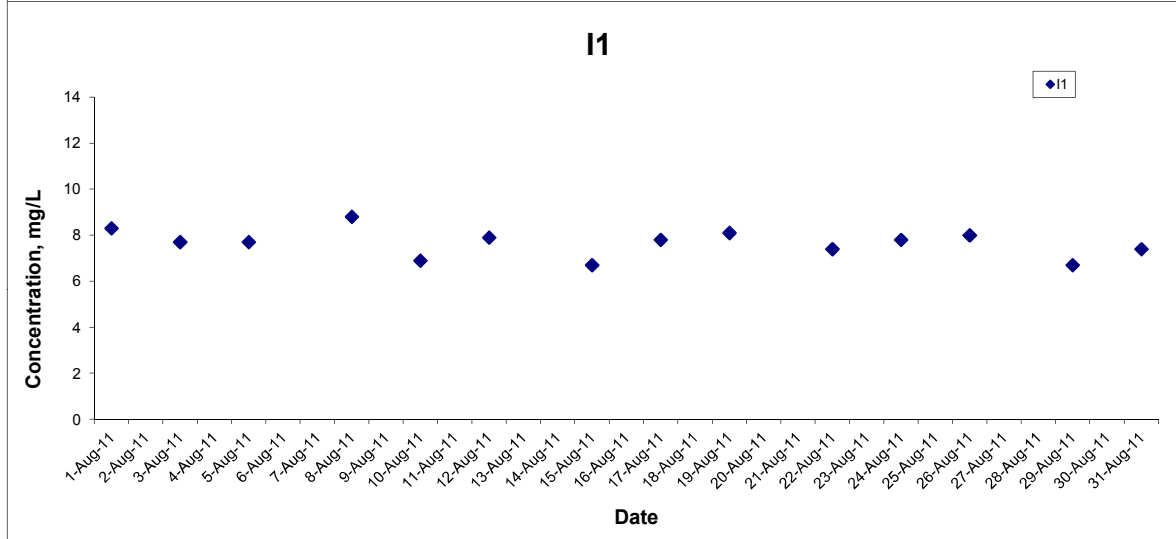
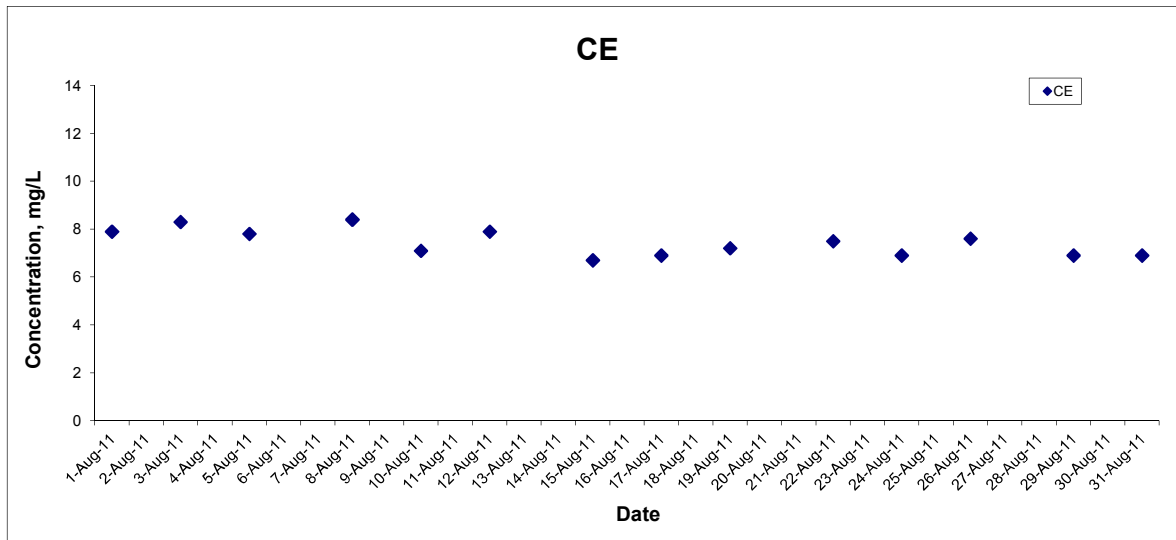
| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------------|---------|--------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* |
| 3-Aug-11 | Fine | Moderate | 08:42 | Surface | 1 | 28.0 28.1 | 28.1 | 7.3 7.4 | 7.4 | 29.4 29.4 | 29.4 | 119.5 121.9 | 120.7 | 8.0 8.1 | 8.1 | 7.9 | 5.4 5.3 | 5.4 | 5.2 | 8.0 8.0 | 8.0 | 6.5 |
| | | | | Middle | 5.5 | 26.7 26.7 | 26.7 | 7.8 7.7 | 7.8 | 31.5 31.1 | 31.3 | 113.4 113.6 | 113.5 | 7.5 7.6 | 7.6 | | 5.0 4.9 | 5.0 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 10 | 25.5 25.5 | 25.5 | 7.8 7.8 | 7.8 | 32.0 32.0 | 32.0 | 102.1 100.4 | 101.3 | 7.0 6.9 | 7.0 | | 5.3 5.3 | 5.3 | | 4.0 5.0 | 4.5 | |
| 5-Aug-11 | Sunny | Moderate | 10:17 | Surface | 1 | 28.1 28.1 | 28.1 | 7.4 7.3 | 7.4 | 28.9 29.0 | 29.0 | 122.5 124.2 | 123.4 | 8.1 8.2 | 8.2 | 7.9 | 5.5 5.4 | 5.5 | 5.3 | 9.0 9.0 | 9.0 | 7.2 |
| | | | | Middle | 5.5 | 26.9 27.4 | 27.2 | 7.2 7.5 | 7.4 | 30.4 28.5 | 29.5 | 112.5 113.9 | 113.2 | 7.4 7.5 | 7.5 | | 5.3 5.2 | 5.3 | | 6.0 6.0 | 6.0 | |
| | | | | Bottom | 10 | 25.7 25.8 | 25.8 | 7.3 7.4 | 7.4 | 31.0 30.8 | 30.9 | 100.0 97.8 | 98.9 | 6.9 6.8 | 6.9 | | 5.0 4.9 | 5.0 | | 7.0 6.0 | 6.5 | |
| 8-Aug-11 | Sunny | Calm | 15:02 | Surface | 1 | 27.8 27.8 | 27.8 | 7.8 7.9 | 7.9 | 29.9 29.9 | 29.9 | 126.2 127.0 | 126.6 | 8.5 8.5 | 8.5 | 8.3 | 5.0 5.0 | 5.0 | 5.1 | 10.0 10.0 | 10.0 | 8.7 |
| | | | | Middle | 5.5 | 26.9 26.9 | 26.9 | 9.9 9.9 | 9.9 | 31.2 31.2 | 31.2 | 120.8 120.2 | 120.5 | 8.1 8.1 | 8.1 | | 5.2 5.1 | 5.2 | | 6.0 7.0 | 6.5 | |
| | | | | Bottom | 10 | 25.8 25.8 | 25.8 | 12.1 12.1 | 12.1 | 30.7 30.8 | 30.8 | 102.8 101.8 | 102.3 | 6.9 6.8 | 6.9 | | 5.1 5.1 | 5.1 | | 10.0 9.0 | 9.5 | |
| 10-Aug-11 | Rainy | Rough | 16:50 | Surface | 1 | 28.2 28.2 | 28.2 | 6.5 6.5 | 6.5 | 27.5 27.5 | 27.5 | 103.5 104.0 | 103.8 | 7.2 7.2 | 7.2 | 7.1 | 2.4 2.3 | 2.4 | 2.5 | 7.0 6.0 | 6.5 | 8.3 |
| | | | | Middle | 5.5 | 27.9 27.9 | 27.9 | 7.2 7.2 | 7.2 | 28.0 28.0 | 28.0 | 99.4 98.7 | 99.1 | 6.9 6.8 | 6.9 | | 2.3 2.3 | 2.3 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 10 | 27.5 27.5 | 27.5 | 7.3 7.3 | 7.3 | 30.3 30.3 | 30.3 | 89.3 87.7 | 88.5 | 6.2 6.1 | 6.2 | | 2.8 2.8 | 2.8 | | 11.0 10.0 | 10.5 | |
| 12-Aug-11 | Sunny | Moderate | 18:00 | Surface | 1 | 27.5 27.2 | 27.4 | 7.7 7.6 | 7.7 | 28.6 29.2 | 28.9 | 113.5 110.6 | 112.1 | 8.1 7.9 | 8.0 | 7.7 | 4.5 4.6 | 4.6 | 4.5 | 3.0 4.0 | 3.5 | 6.0 |
| | | | | Middle | 5.5 | 26.7 26.5 | 26.6 | 7.7 7.8 | 7.8 | 30.1 29.6 | 29.9 | 105.4 102.5 | 104.0 | 7.4 7.4 | 7.4 | | 4.6 4.5 | 4.6 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 10 | 25.9 26.8 | 26.4 | 7.6 7.8 | 7.7 | 30.6 29.7 | 30.2 | 90.1 88.8 | 89.5 | 6.6 6.5 | 6.6 | | 4.4 4.3 | 4.4 | | 7.0 6.0 | 6.5 | |
| 17-Aug-11 | Cloudy | Moderate | 09:12 | Surface | 1 | 27.7 27.7 | 27.7 | 7.6 7.3 | 7.5 | 29.2 29.3 | 29.3 | 118.2 118.1 | 118.2 | 8.1 8.1 | 8.1 | 7.7 | 3.0 3.0 | 3.0 | 2.9 | 3.0 3.0 | 3.0 | 3.0 |
| | | | | Middle | 5.5 | 26.8 26.9 | 26.9 | 7.5 7.5 | 7.5 | 29.9 29.0 | 29.5 | 106.7 105.6 | 106.2 | 7.3 7.3 | 7.3 | | 3.0 3.0 | 3.0 | | 3.0 3.0 | 3.0 | |
| | | | | Bottom | 10 | 25.7 25.7 | 25.7 | 7.6 7.8 | 7.7 | 31.0 30.9 | 31.0 | 95.6 93.1 | 94.4 | 6.9 6.8 | 6.9 | | 2.7 2.7 | 2.7 | | 3.0 3.0 | 3.0 | |
| 19-Aug-11 | Sunny | Moderate | 10:17 | Surface | 1 | 29.0 29.0 | 29.0 | 7.6 7.8 | 7.7 | 30.5 30.6 | 30.6 | 109.5 109.4 | 109.5 | 8.4 8.4 | 8.4 | 8.0 | 3.0 3.0 | 3.0 | 2.9 | 6.0 6.0 | 6.0 | 6.5 |
| | | | | Middle | 5.5 | 28.1 28.2 | 28.2 | 7.7 8.0 | 7.9 | 31.2 30.3 | 30.8 | 98.0 96.9 | 97.5 | 7.6 7.6 | 7.6 | | 3.0 3.0 | 3.0 | | 3.0 4.0 | 3.5 | |
| | | | | Bottom | 10 | 27.0 27.0 | 27.0 | 7.8 8.0 | 7.9 | 32.3 32.2 | 32.3 | 84.9 82.4 | 83.7 | 7.0 6.9 | 7.0 | | 2.7 2.7 | 2.7 | | 10.0 10.0 | 10.0 | |
| 22-Aug-11 | Sunny | Moderate | 12:22 | Surface | 1 | 27.2 26.4 | 26.8 | 7.8 7.8 | 7.8 | 29.4 31.0 | 30.2 | 113.0 103.3 | 108.2 | 7.7 7.1 | 7.4 | 7.1 | 3.1 3.3 | 3.2 | 3.2 | 13.0 13.0 | 13.0 | 8.0 |
| | | | | Middle | 5.5 | 26.3 25.1 | 25.7 | 7.8 7.9 | 7.9 | 31.4 31.6 | 31.5 | 104.1 94.6 | 99.4 | 6.7 6.7 | 6.7 | | 3.3 3.1 | 3.2 | | 8.0 8.0 | 8.0 | |
| | | | | Bottom | 10 | 25.2 27.8 | 26.5 | 7.8 8.0 | 7.9 | 31.6 29.3 | 30.5 | 87.6 86.5 | 87.1 | 6.5 6.4 | 6.5 | | 3.1 3.0 | 3.1 | | 3.0 3.0 | 3.0 | |
| 26-Aug-11 | Sunny | Moderate | 17:36 | Surface | 1 | 27.9 28.0 | 28.0 | 7.5 7.4 | 7.5 | 29.0 29.0 | 29.0 | 110.2 109.6 | 109.9 | 7.1 7.7 | 7.4 | 6.9 | 2.7 2.7 | 2.7 | 2.7 | 3.0 3.0 | 3.0 | 4.2 |
| | | | | Middle | 5.5 | 26.9 26.9 | 26.9 | 7.7 7.8 | 7.8 | 30.5 30.6 | 30.6 | 97.1 94.5 | 95.8 | 6.4 6.2 | 6.3 | | 2.8 2.7 | 2.8 | | 4.0 5.0 | 4.5 | |
| | | | | Bottom | 10 | 26.1 26.0 | 26.1 | 7.7 7.9 | 7.8 | 31.0 30.9 | 31.0 | 92.8 91.6 | 92.2 | 6.5 6.5 | 6.5 | | 2.7 2.6 | 2.7 | | 5.0 5.0 | 5.0 | |
| 29-Aug-11 | Sunny | Moderate | 17:39 | Surface | 1 | 25.7 25.7 | 25.7 | 7.8 7.9 | 7.9 | 33.6 33.6 | 33.6 | 92.8 92.1 | 92.5 | 6.8 6.7 | 6.8 | 6.7 | 3.3 3.3 | 3.3 | 3.3 | 13.0 13.0 | 13.0 | 8.5 |
| | | | | Middle | 5.5 | 25.2 25.2 | 25.2 | 7.8 8.0 | 7.9 | 33.7 33.7 | 33.7 | 89.9 89.7 | 89.8 | 6.6 6.6 | 6.6 | | 3.5 3.5 | 3.5 | | 7.0 7.0 | 7.0 | |
| | | | | Bottom | 10 | 25.0 25.0 | 25.0 | 7.6 7.6 | 7.6 | 33.8 33.8 | 33.8 | 88.5 88.1 | 88.3 | 6.8 6.8 | 6.8 | | 3.2 3.2 | 3.2 | | 5.0 6.0 | 5.5 | |

Water Quality Monitoring Results at Intake B - Mid-Flood Tide

| Date | Weather Condition | Sea Condition** | Sampling Time | Depth (m) | | Water Temperature (°C) | | pH | | Salinity ppt | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | | Suspended Solids (mg/L) | | | |
|-----------|-------------------|-----------------|---------------|-----------|------|------------------------|---------|-------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|------|------|
| | | | | | | Value | Average | Value | Average | Value | Average | Value | Average | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | |
| 31-Aug-11 | Sunny | Moderate | 08:46 | Surface | 1 | 27.6 | 27.6 | 8.1 | 7.9 | 28.0 | 28.1 | 93.7 | 93.4 | 7.3 | 7.3 | 7.1 | 5.1 | 5.1 | 5.2 | 10.0 | 10.0 | 11.8 | |
| | | | | | 27.6 | 27.6 | 7.7 | 7.9 | 28.2 | 28.1 | 93.0 | 93.4 | 7.2 | 7.3 | 5.1 | | 5.1 | 10.0 | | 10.0 | | | |
| | | | | Middle | 5.5 | 27.4 | 27.4 | 8.2 | 8.2 | 29.0 | 29.0 | 88.1 | 87.8 | 6.9 | 6.9 | 5.3 | 5.3 | 5.2 | | 14.0 | 14.0 | | |
| | | | | | 27.4 | 27.4 | 8.1 | 8.2 | 29.0 | 29.0 | 87.4 | 87.8 | 6.8 | 6.9 | 5.2 | | 5.3 | | | 14.0 | 14.0 | | |
| | | | | Bottom | 10 | 27.3 | 27.3 | 7.9 | 8.0 | 29.6 | 29.6 | 86.0 | 85.8 | 6.7 | 6.7 | 6.7 | 5.1 | 5.1 | | 5.2 | 11.0 | | 11.5 |
| | | | | | 27.3 | 27.3 | 8.1 | 8.0 | 29.6 | 29.6 | 85.5 | 85.8 | 6.7 | 6.7 | 5.0 | | 5.1 | 12.0 | | | 11.5 | | |

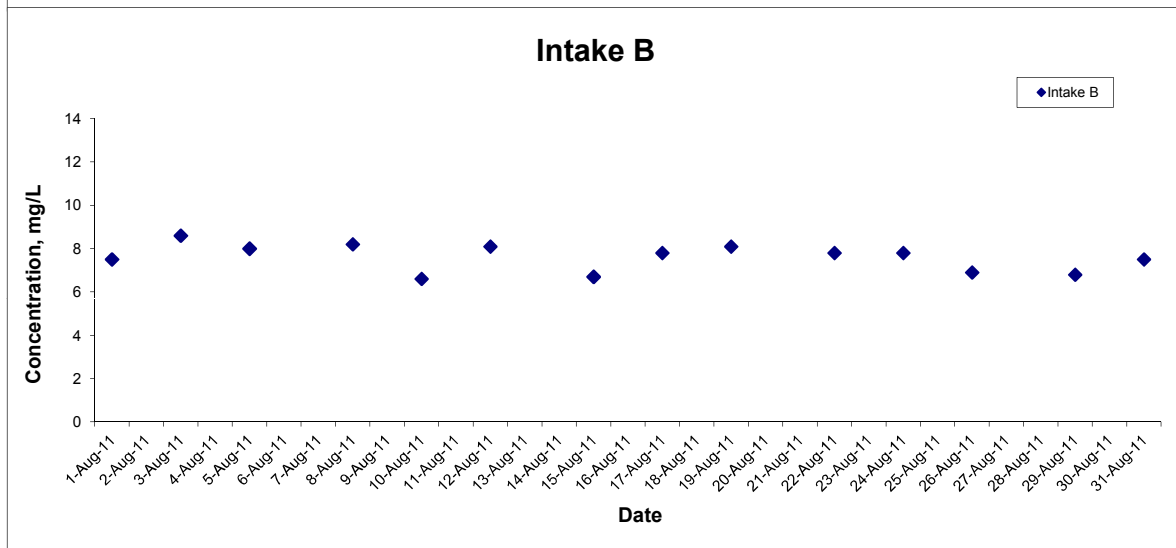
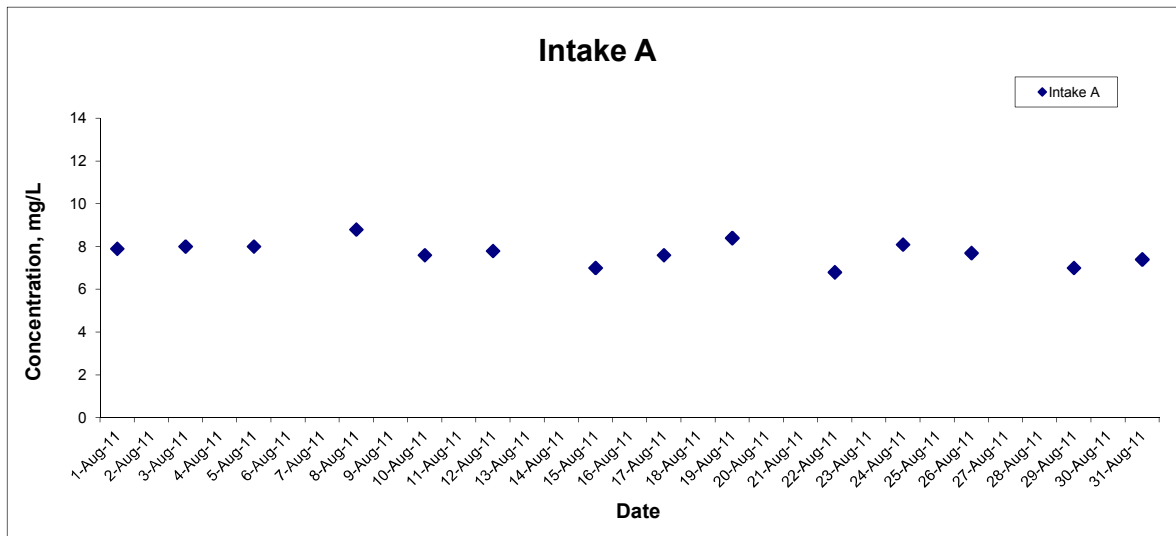
Remarks: * DA: Depth-Averaged
 ** Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



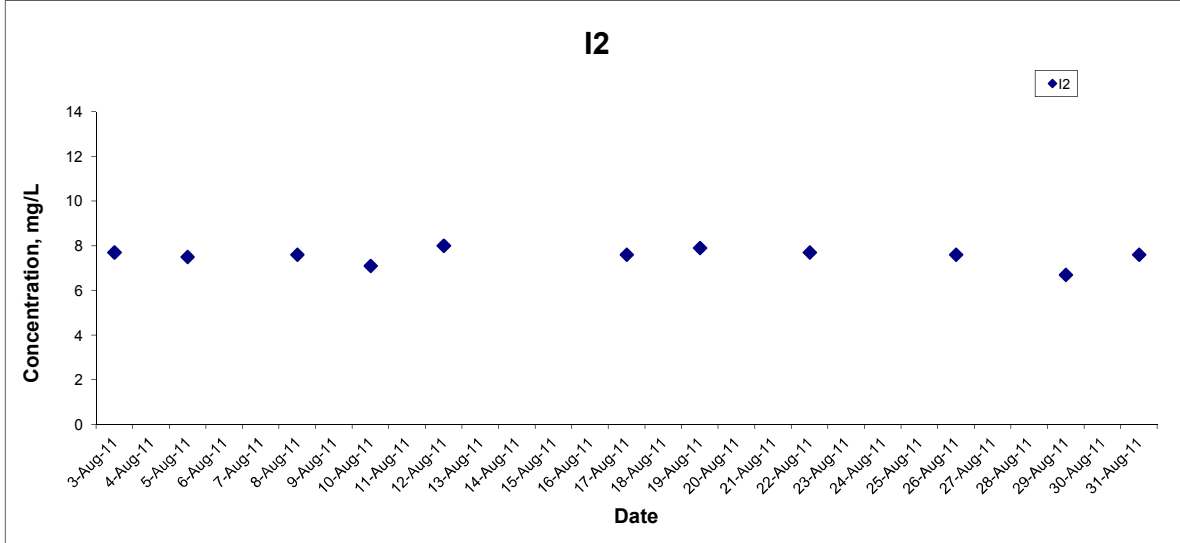
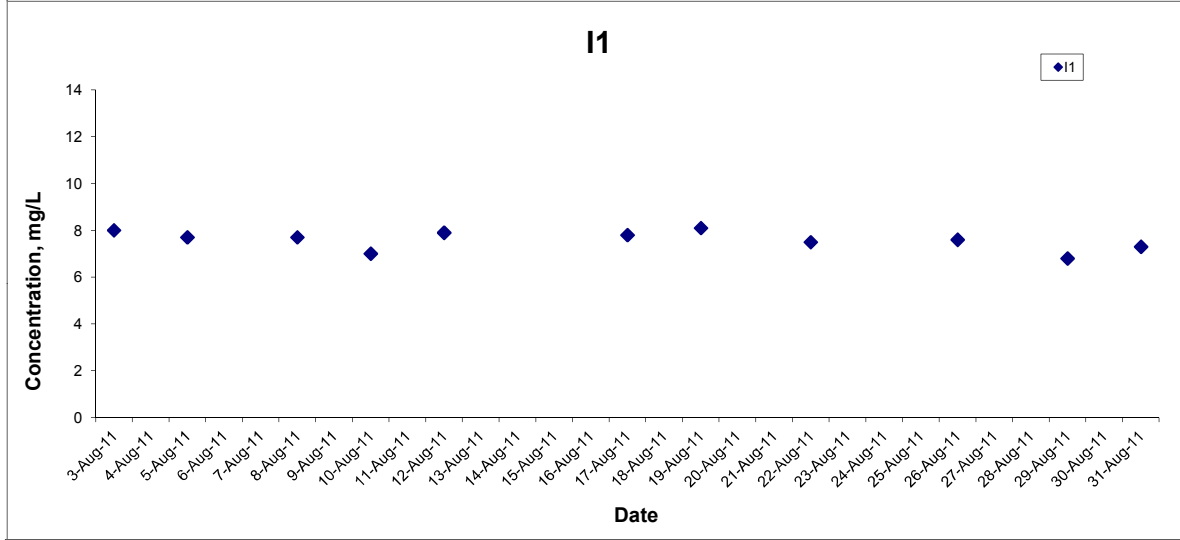
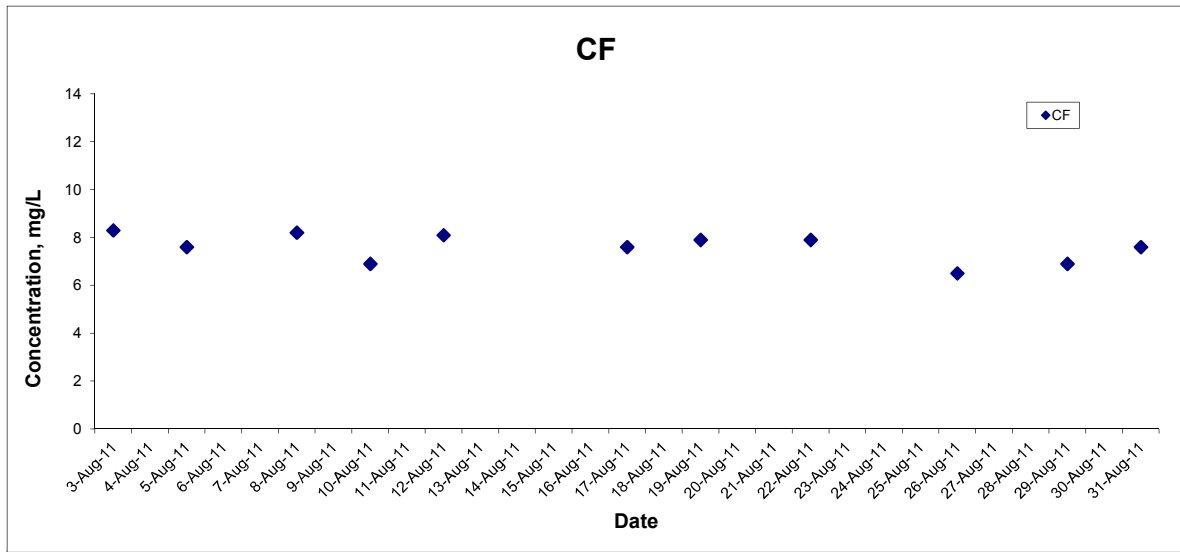
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|--|----------------|-----------------------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | CINOTECH |
| | Date Aug 11 | Appendix P | |

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



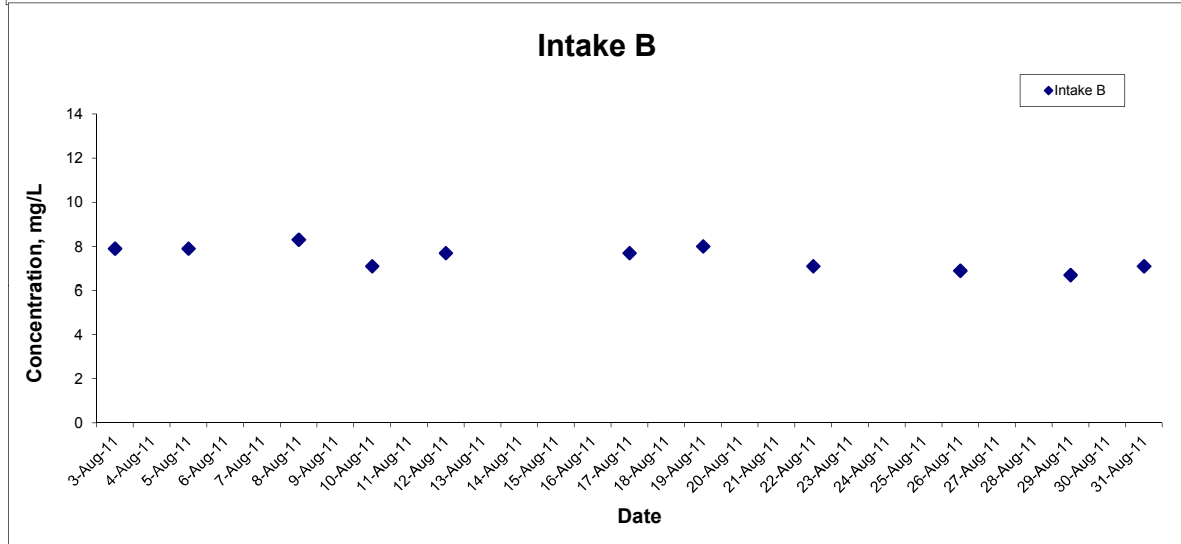
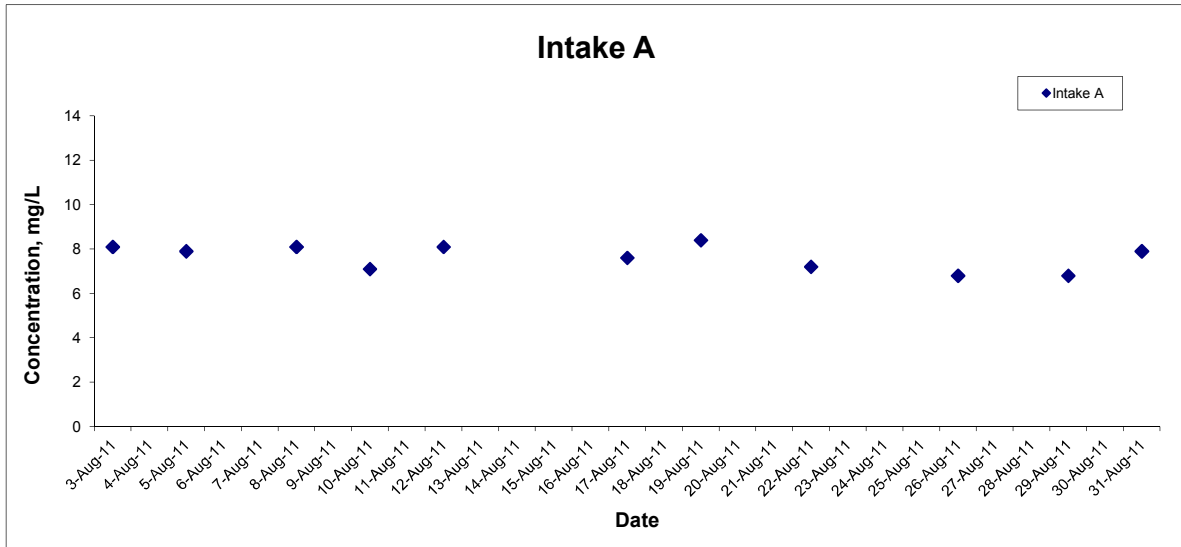
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|--|----------------|-----------------------|--|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | |
| | Date Aug 11 | Appendix P | |

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



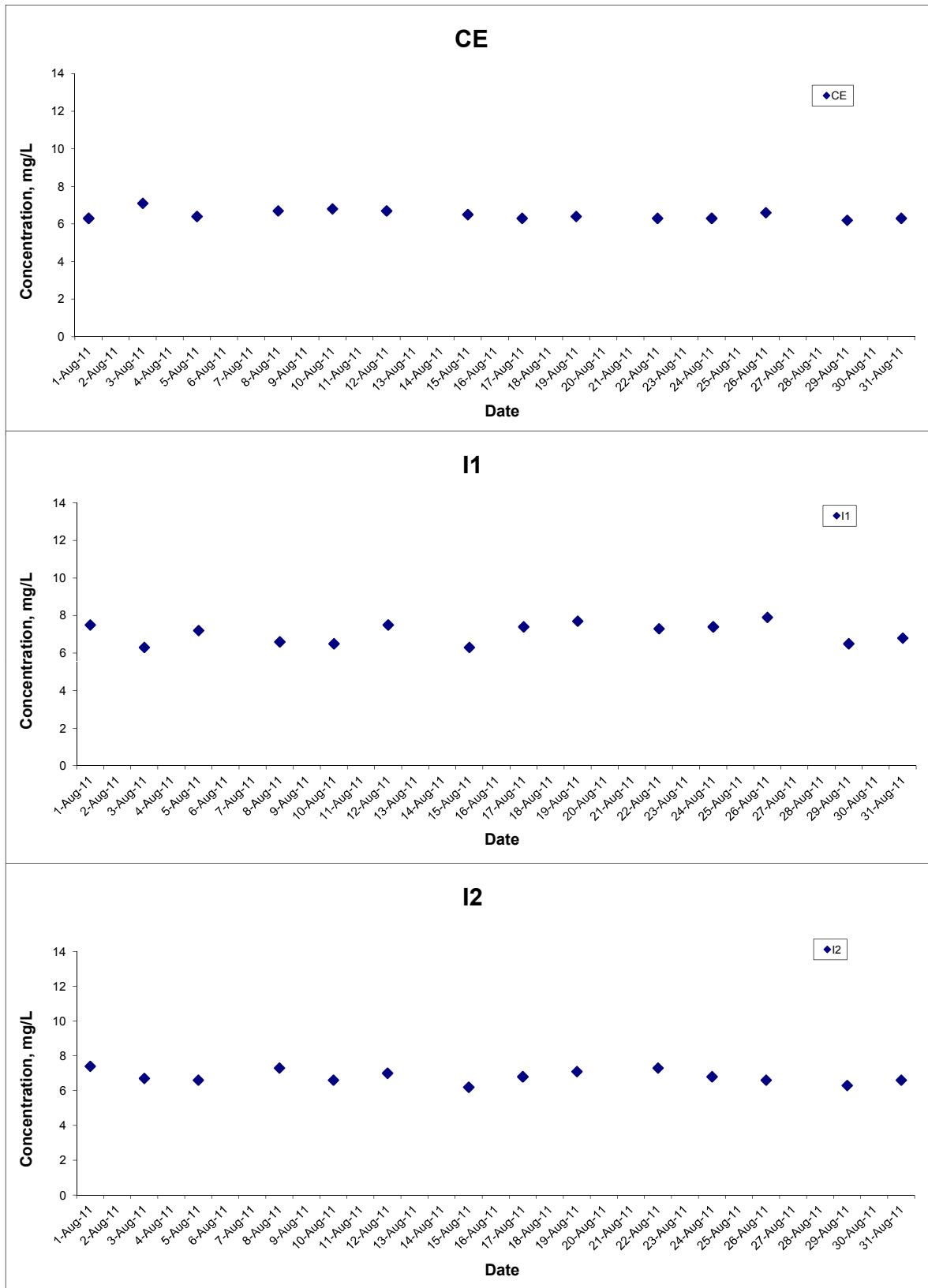
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| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | |
| | Date Aug 11 | Appendix P | |

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



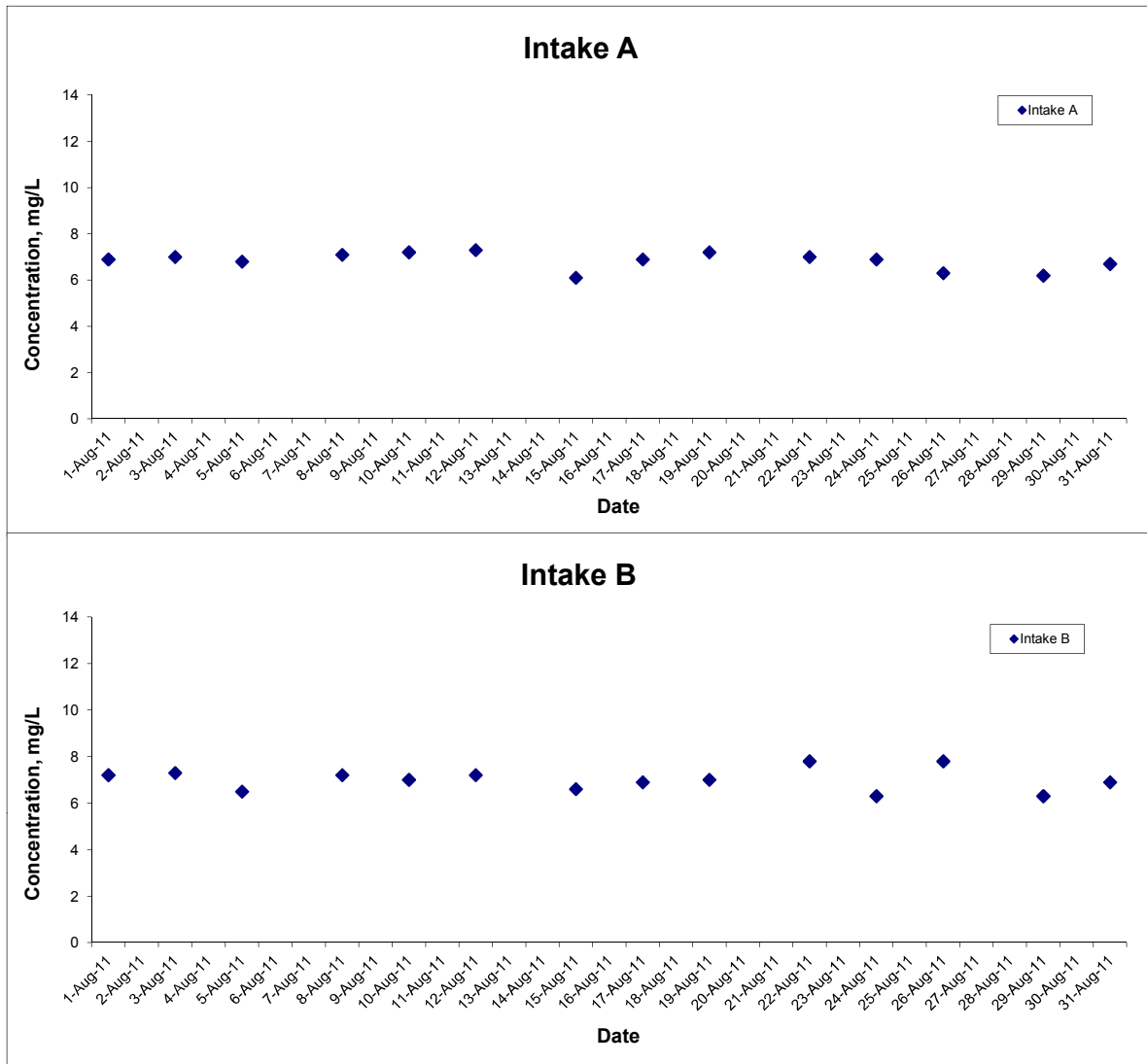
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| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | CINOTECH |
| | Date Aug 11 | Appendix P | |

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



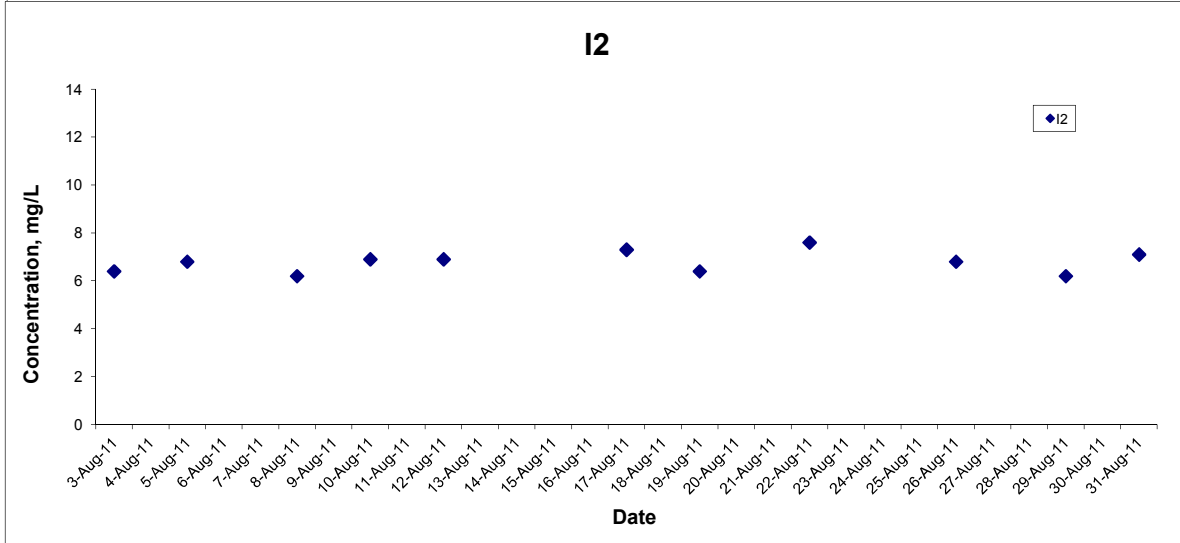
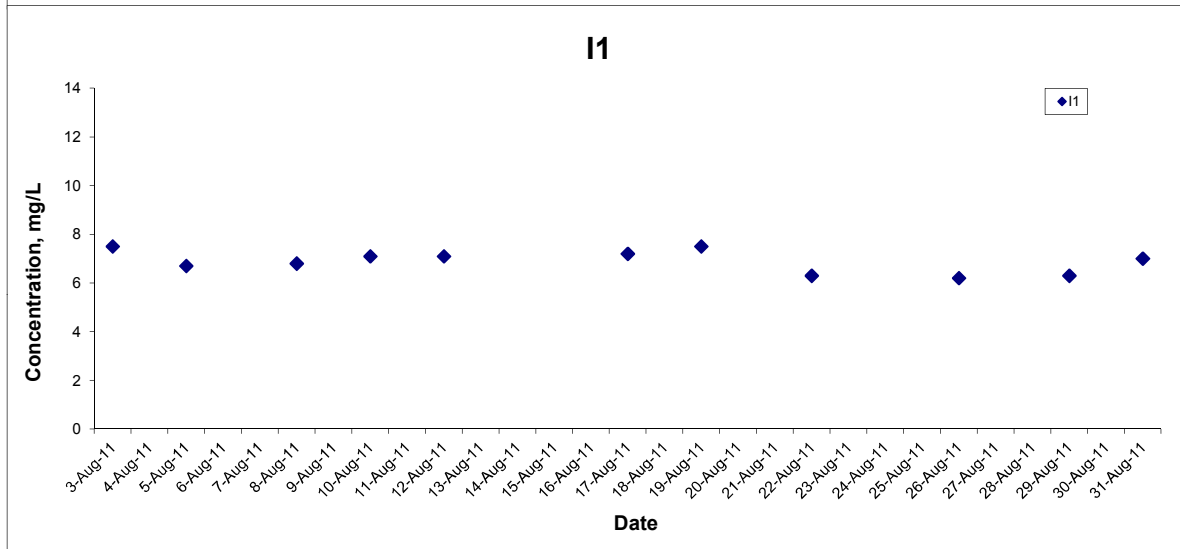
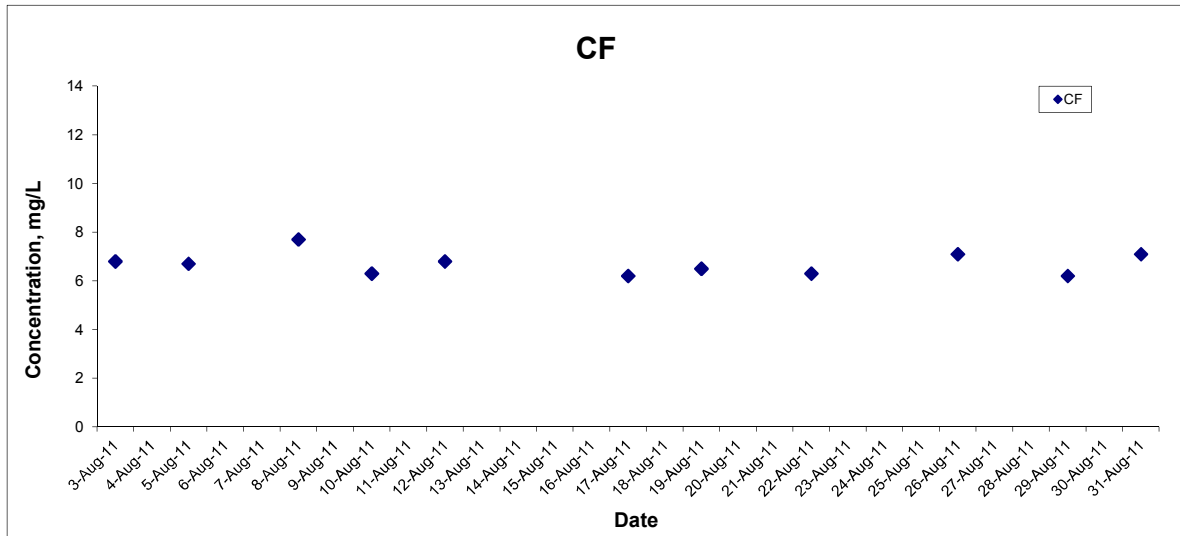
| | | | | |
|--|-------|--------|-----------------------|----------|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale | N.T.S | Project No. MA8001 | CINOTECH |
| | Date | Aug 11 | Appendix P | |

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



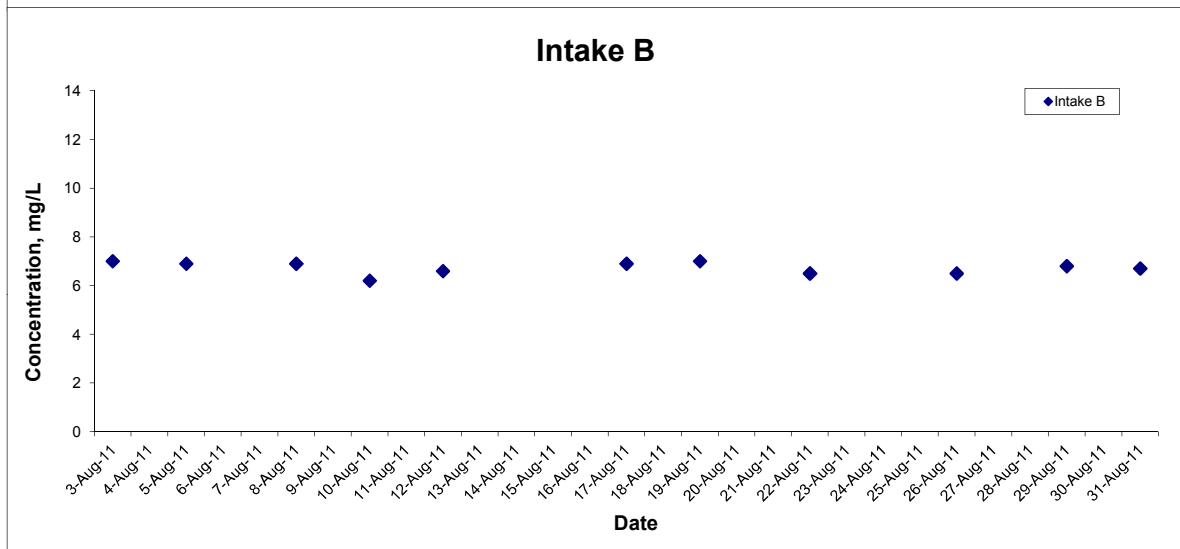
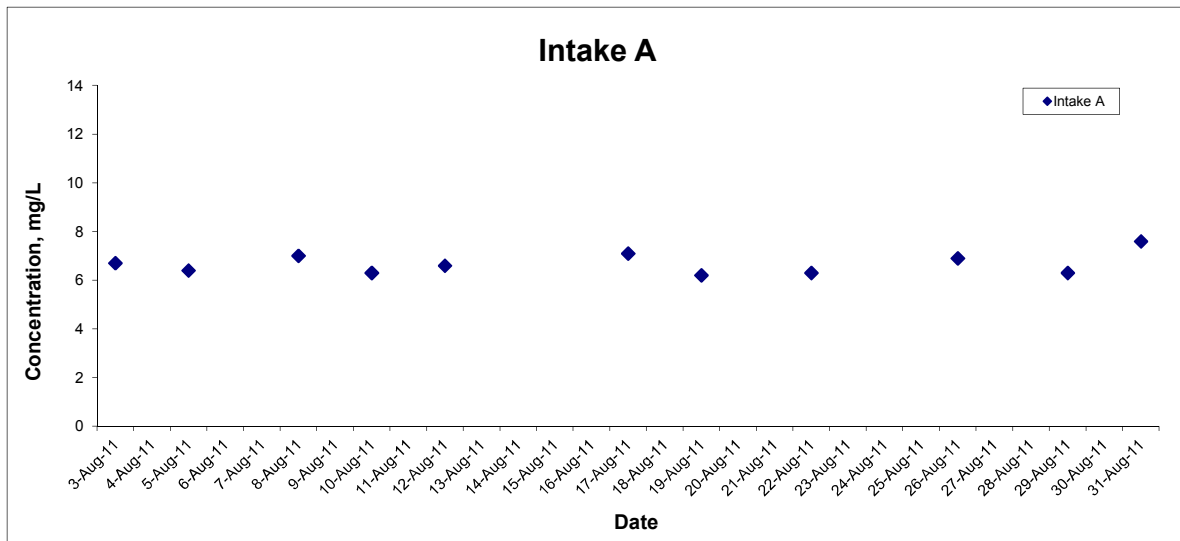
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|--|----------------|-----------------------|--|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | |
| | Date Aug 11 | Appendix P | |

Dissolved Oxygen (Bottom) at Mid-Flood Tide



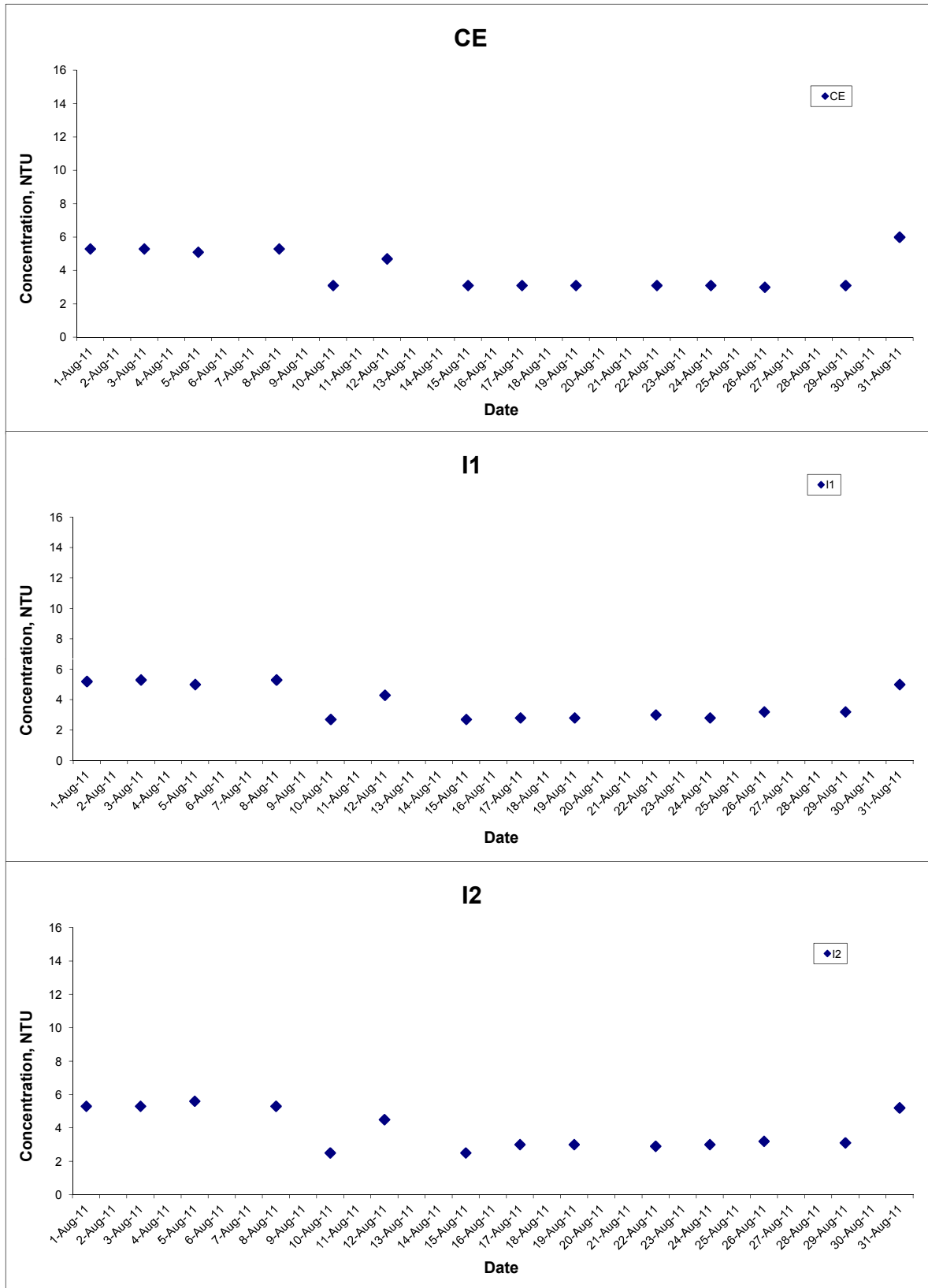
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|--|----------------|-----------------------|--|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | |
| | Date Aug 11 | Appendix P | |

Dissolved Oxygen (Bottom) at Mid-Flood Tide



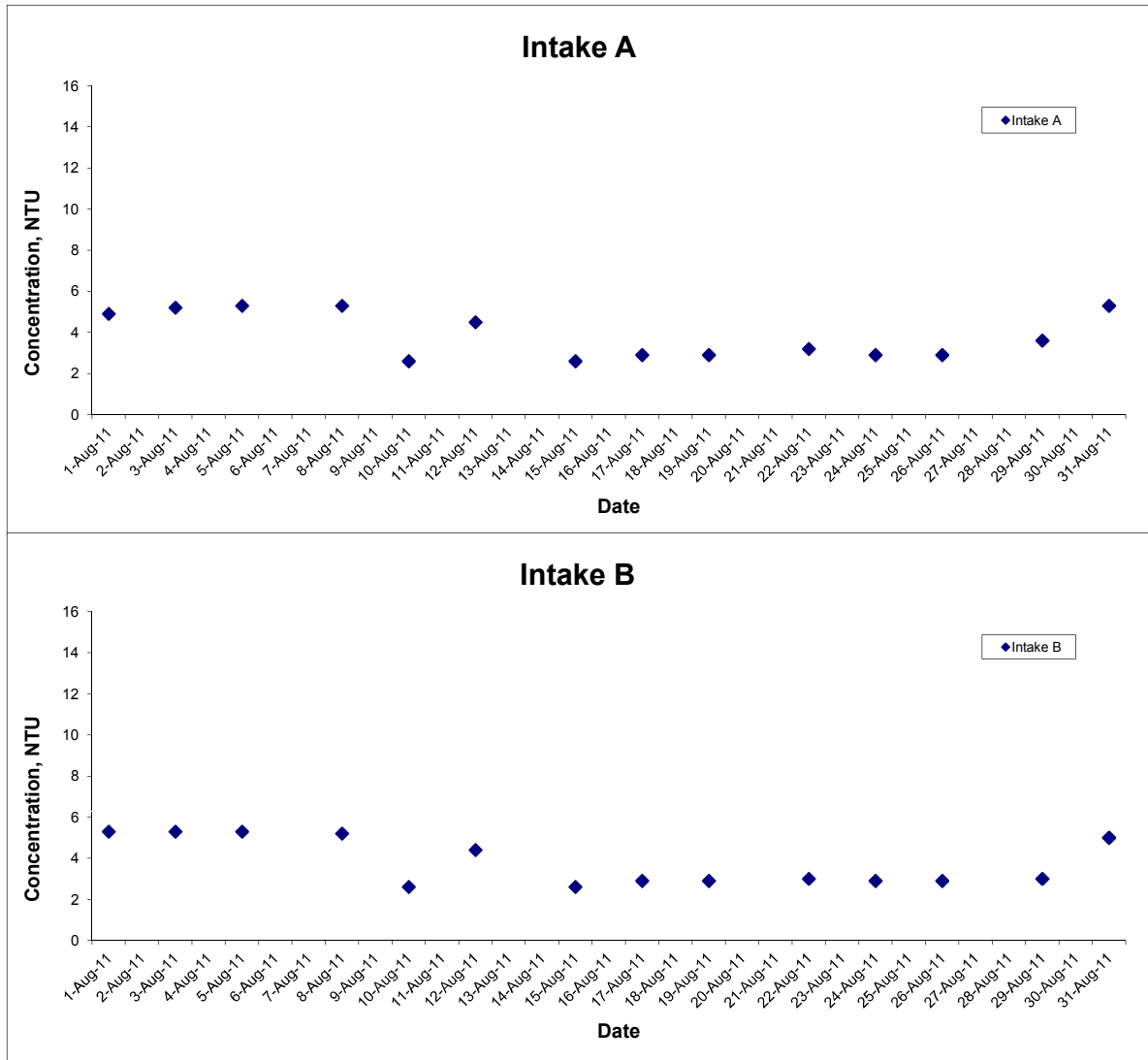
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|--|----------------|-----------------------|--|
| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | |
| | Date Aug 11 | Appendix P | |

Turbidity (Depth-averaged) at Mid-Ebb Tide



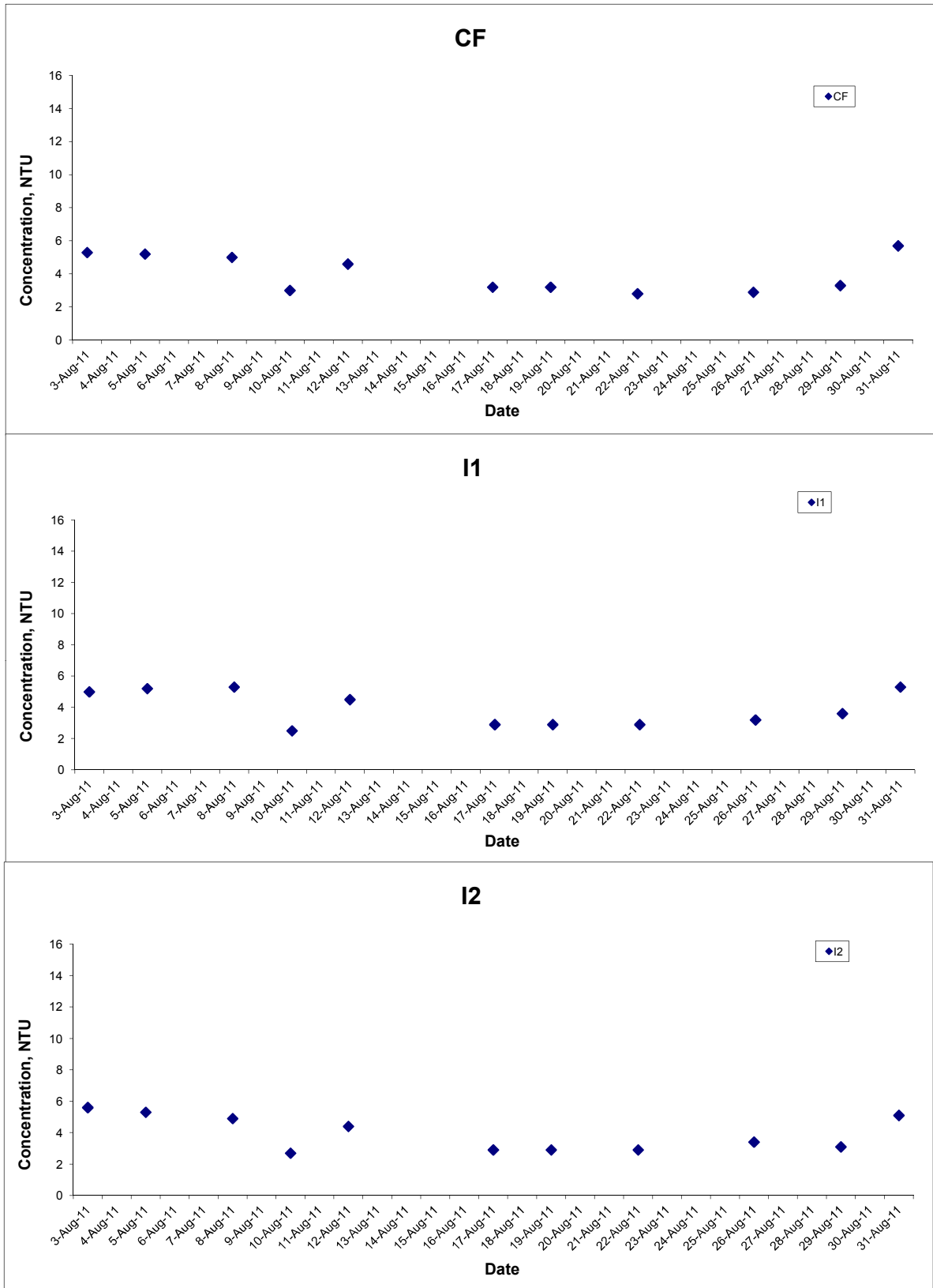
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| Title Contract No. DC/2007/10 Design and Construction of Hong Kong West Drainage Tunnel Graphical Presentation of Water Quality Monitoring Results | Scale N.T.S | Project No. MA8001 | |
| | Date Aug 11 | Appendix P | |

Turbidity (Depth-averaged) at Mid-Ebb Tide



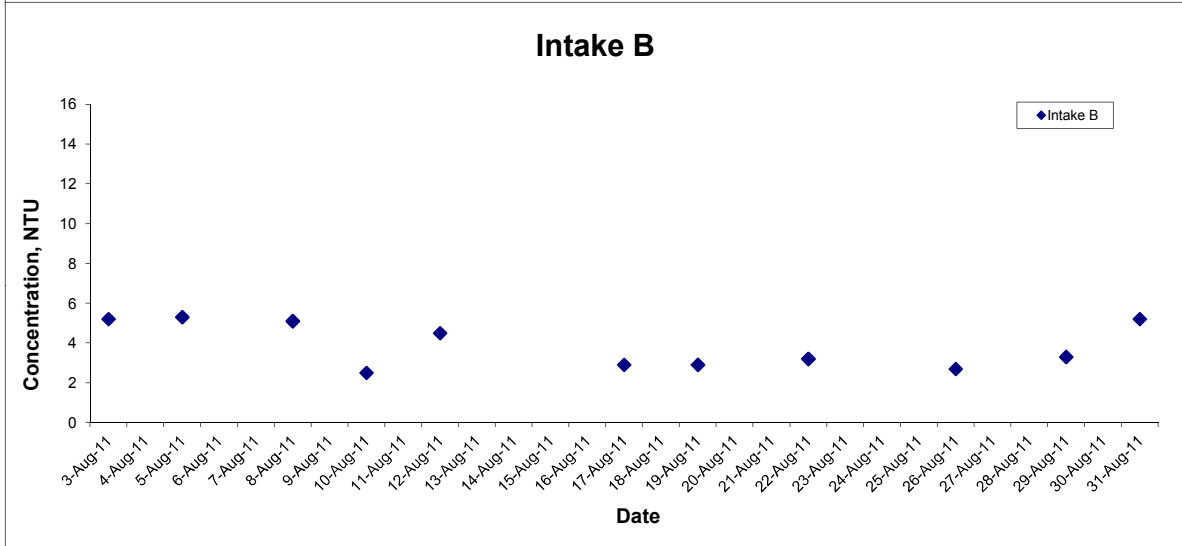
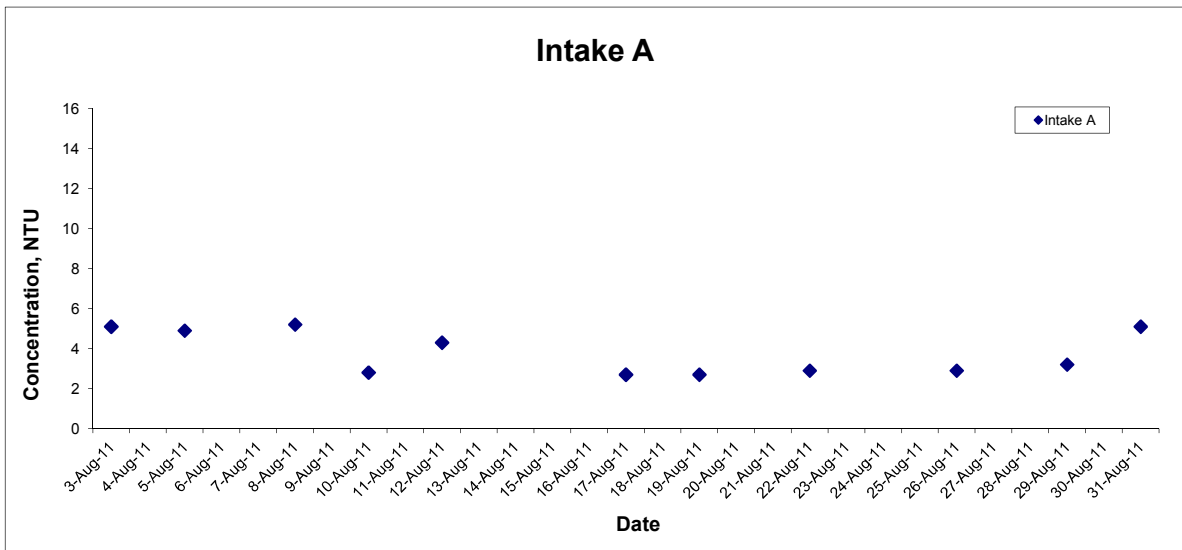
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| | Date Aug 11 | Appendix P | |

Turbidity (Depth-averaged) at Mid-Flood Tide



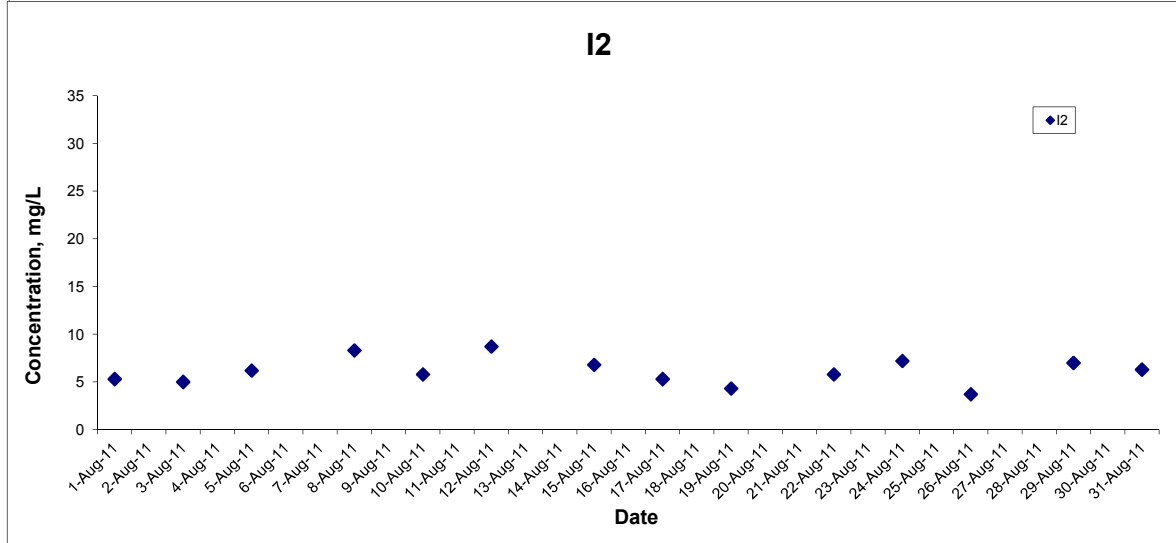
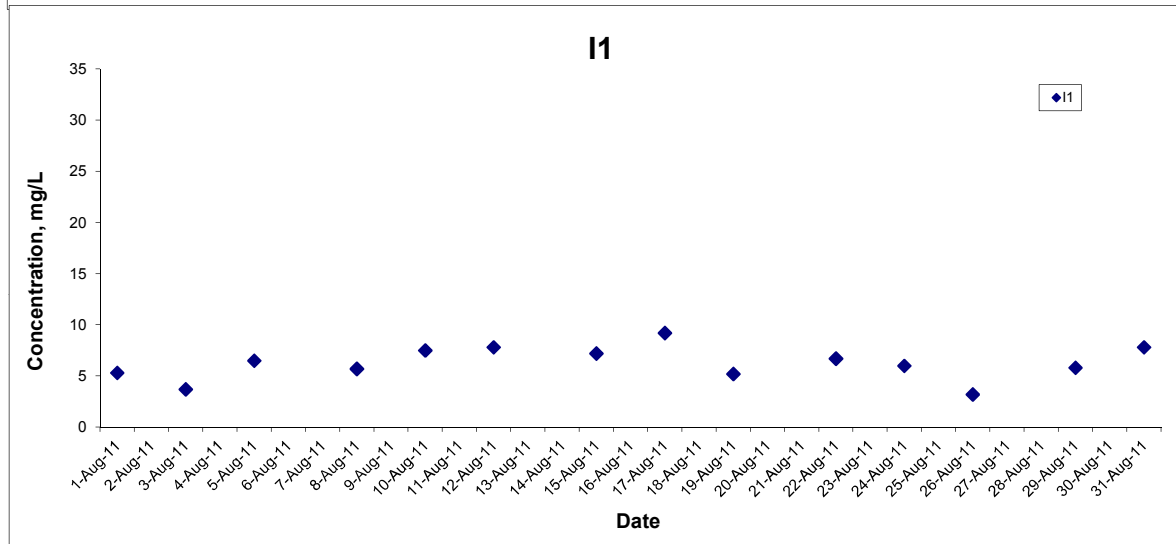
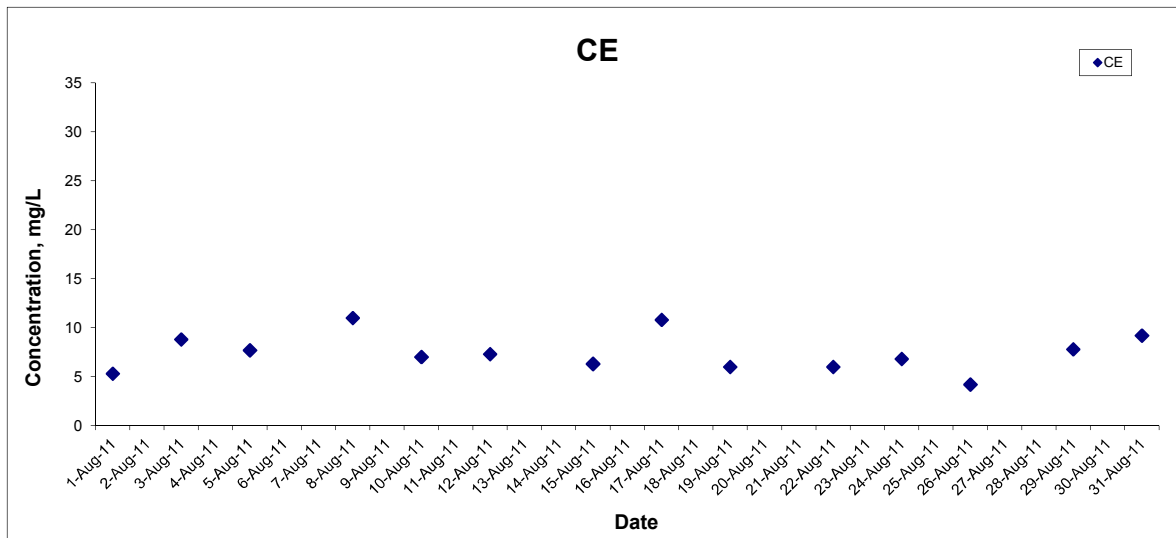
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| | Date Aug 11 | Appendix P | |

Turbidity (Depth-averaged) at Mid-Flood Tide



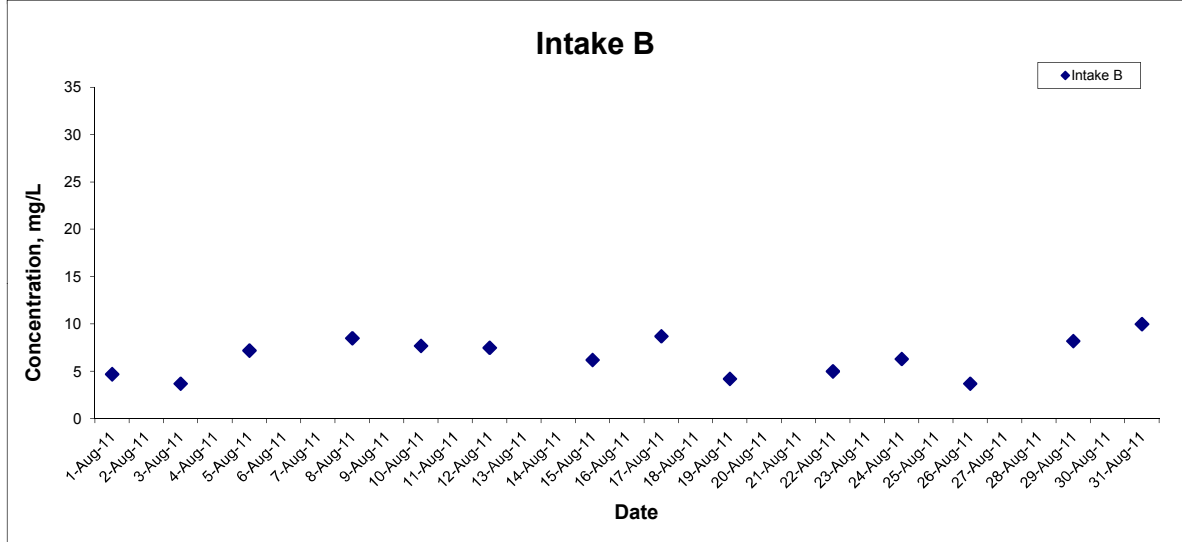
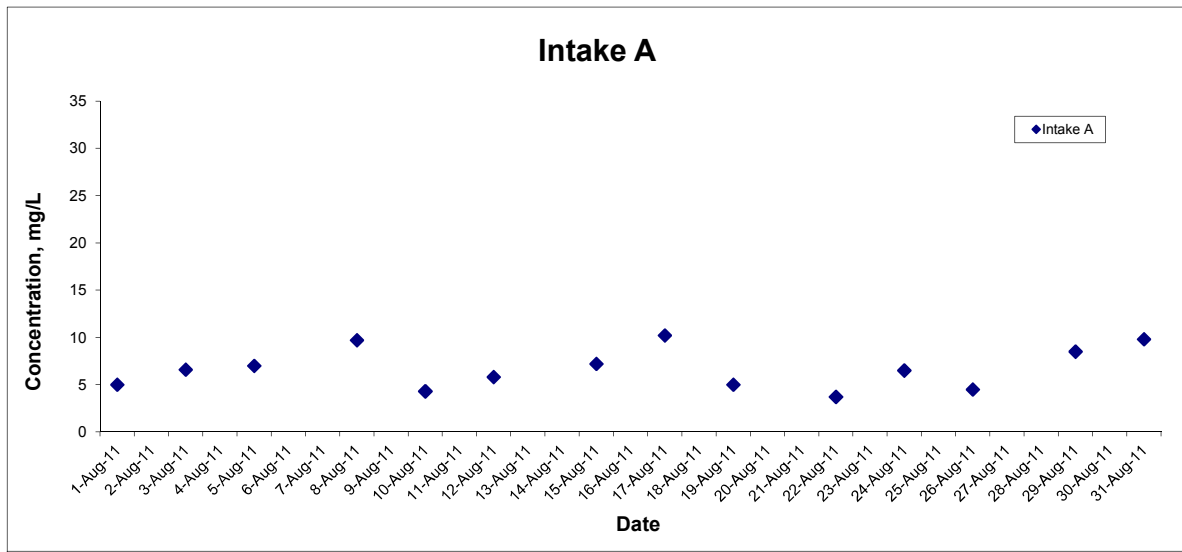
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| | Date Aug 11 | Appendix P | |

Suspended Solids (Depth-averaged) at Mid-Ebb Tide



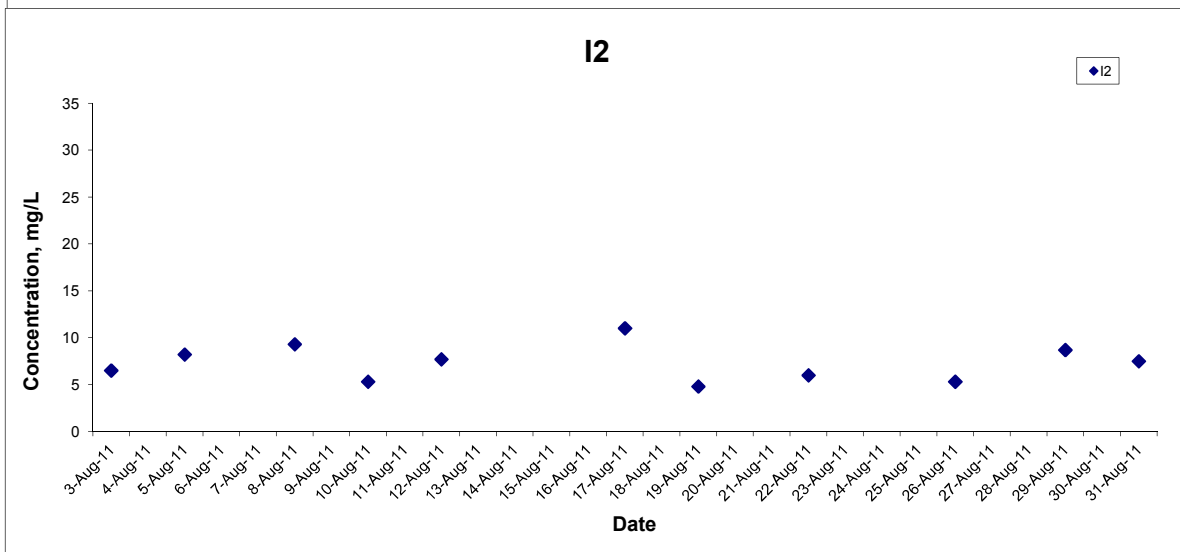
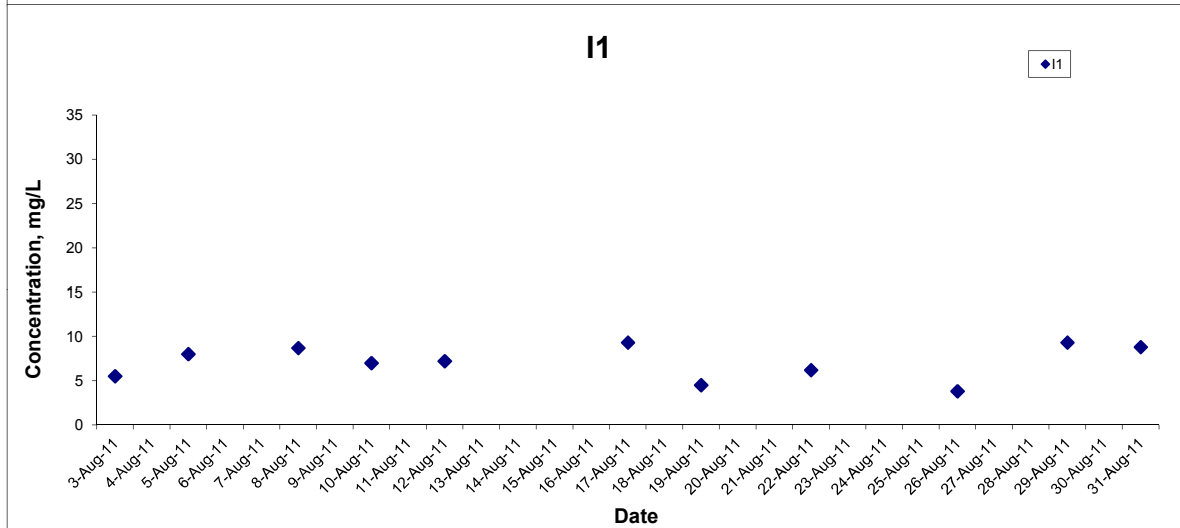
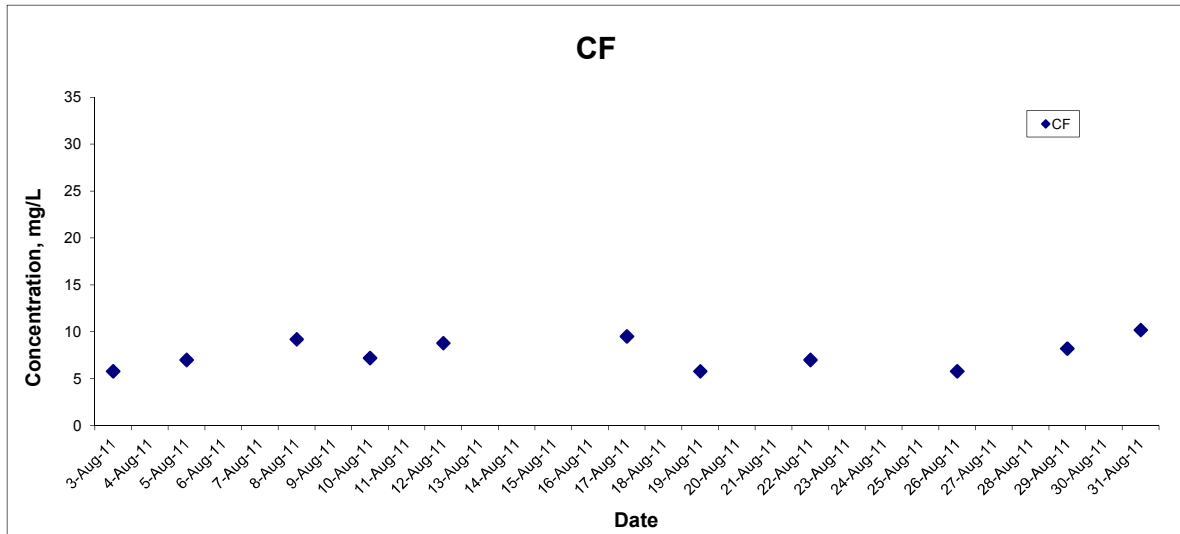
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Suspended Solids (Depth-averaged) at Mid-Ebb Tide



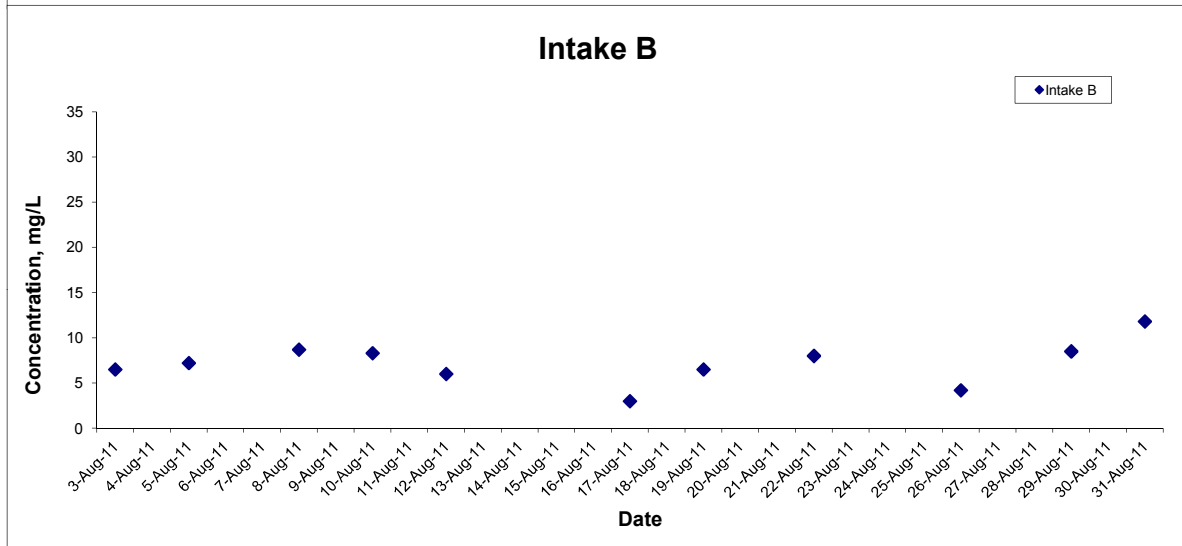
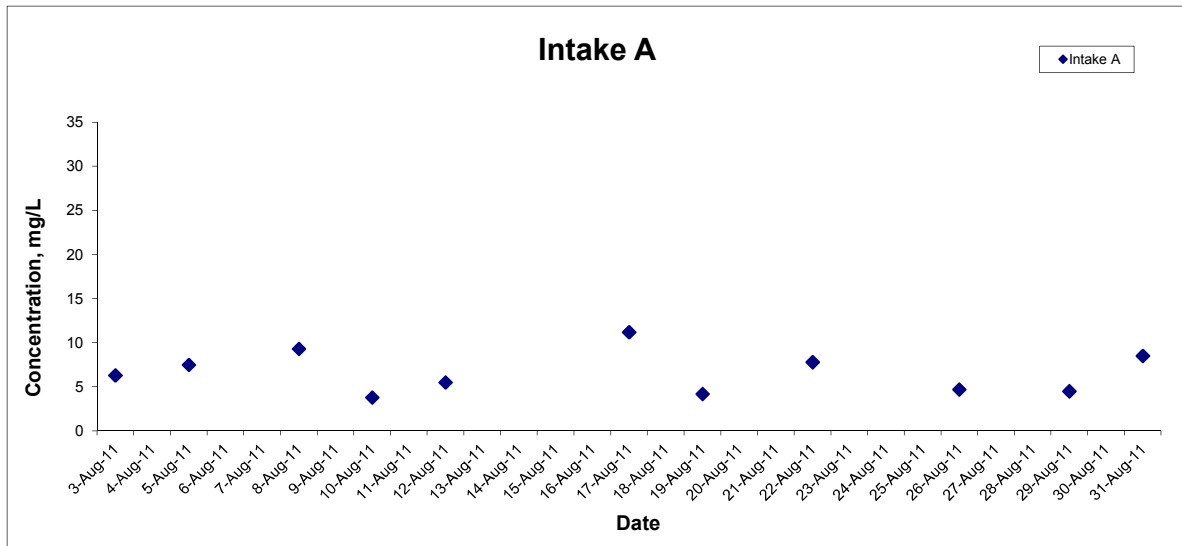
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Suspended Solids (Depth-averaged) at Mid-Flood Tide



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| | Date Aug 11 | Appendix P | |

**ANNEX I
REVIEW REPORT FOR “HANDLING &
DELIVERY OF EXCAVATED
MATERIALS AT THE WESTERN
PORTAL”**

HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

Background

1. Project

“Dragages - Nishimatsu Joint Venture (DNJV)” is the principal contractor undertaking the contract work (DSD Contract No.: DC/2007/10) for the construction of:

- A drainage tunnel (Main Tunnel) from Tai Hang to Cyberport, having an internal diameter from 6.25m to 7.25m;
- A network of adits connecting to the Main Tunnel; and
- 32 intakes to collect surface runoffs into the Main Tunnel via the adit network. The water collected will be discharged into the sea at Cyberport.

The entire drainage tunnel network is built in rock strata, composed of granite and volcanic rocks. Two tunnel boring machines (TBM) are employed for the excavation of the Main Tunnel – one TBM is driving from the East to West whereas the other TBM is operating from West to East. The two tunnels will be broken through at a point near Stubb Road. The conventional drill and blast method is adopted for the excavation of the adits. The excavation of the Main Tunnels and the adits are concurrently carried out.

In addition, mechanical excavation, raise boring method, reverse circulation drilling and hand-dug caisson are used for the excavation of intakes cofferdam and dropshafts.

To facilitate the operation of the TBM and tunnel excavation, a temporary barging point was formed at the Western Portal in Cyberport to provide support for the supplies to both TBM; for handling of excavated materials; and for the berthing of vessels.

In the West Tunnel, the excavated materials generated from the TBM operations are delivered by a conveyor belt to the tunnel portal and are discharged either onto the barge or the TBM Spoil Basin. On the other hand, materials generated by drill-and-blast method in the adits are delivered to the Adit Spoil Basin at the portal for subsequent discharge onto the barge.

All excavated materials generated from tunneling operations at the West Portal are delivered by barges to the approved disposal ground for recycling use.

2. Environmental Impact Assessment (EIA)

The Work is a “designated project” under Schedule 2 of Environmental Impact Assessment Ordinance, Cap. 499. An EIA Study has been undertaken by Black & Veatch Hong Kong Ltd. for the Project to provide information on the nature and extent of potential environmental impacts arising from the construction and operation of the Project and related activities taking place concurrently, and to contribute to decisions on the overall environmental acceptability of the Project.

The EIA Report was issued in January 2006, and was approved by EPD under the EIAO (Register No.: AEIAR-099/2006 dated 7-Apr-06). In March 2006, Drainage Services Department (DSD) commissioned Ove Arup and Partners Hong Kong Limited (Arup) to undertake the consultancy assignment of Agreement No. CE 17/2005 (DS), based upon more detailed design information. The Technical Note on Supplementary Environmental Assessment was issued on 29-Mar-07 to highlight the changes since the approval of the EIA Report; evaluate the associated environmental implications; and review the mitigation measures required.

HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

The following is mentioned in Chapter 6: Air Quality Assessment of the EIA Report (Register No.: AEIAR-099/2006) prepared by Black & Veatch:

“6.5.7 For Western portal, spoil generated will be delivery to barges by means of a covered conveyor belt. As a result, the number of vehicles entering the site will be reduced hugely and no vehicle-generated air pollution problems will arise. However, dust may be emitted from the transfer points of the conveyor. Proper design and maintenance of the conveyor will reduce dust emissions from the transfer points to ensure low dust impact.”

The intent of this Clause is to reduce the impact on air quality arising from handling and delivery of spoil to a minimum.

There are comments from concerned groups over the site arrangements for the handling and delivery of excavated materials from the tunnel and adits.

3. Environmental Permit

The Environmental Permit (EP-272/2007) was first issued to DSD on 26-Apr-07. An application for construction and operation of the designated project was subsequently made and the revised Permit (EP-272/2007/A) was issued on 26-Oct-07. After the award of the Contract, DNJV applied for the issue of Further Environmental Permit (FEP-01/272/2007/A) which was subsequently issued on 28-Jan-08. A variation to the Further Environmental Permit was made in June 2009 and the revised Permit (FEP-01/272/2007/B) was issued on 25-Jun-09.

Purpose and Scope

A review was performed on the current site arrangements on the delivery and handling of excavated materials, particularly the Western Portal, within the context of the EIA Report and over their impact on the environment.

Delivery and Handling of Excavated Materials

1. Excavated Materials from TBM

Excavated materials generated from the operation of the tunnel boring machine are small (often less than 100mm) and the sizes are quite uniform. These materials are carried by a covered conveyor belt system installed near the crown of the Main Tunnel; and are discharged directly onto the barge berthed at the seawall. *Owing to the mode of TBM operation, there are times that TBM excavated materials must be re-handled.*

Typical examples include:

- A barge is already full and has to leave the Site. When there is no barge at the seawall, the materials will be discharged into the TBM Spoil Basin.

HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

- When the TBM operates during night time, we have to discharge the TBM excavated materials into the TBM Spoil Basin in accordance with the conditions of the Construction Noise Permit in force.

When the next barge comes during daytime, the materials stored in the TBM Spoil Basin will be picked up by a backhoe and are transferred into a side conveyor. The side conveyor carried the materials to the main conveyor for discharge onto the barge (*Photo 1*).

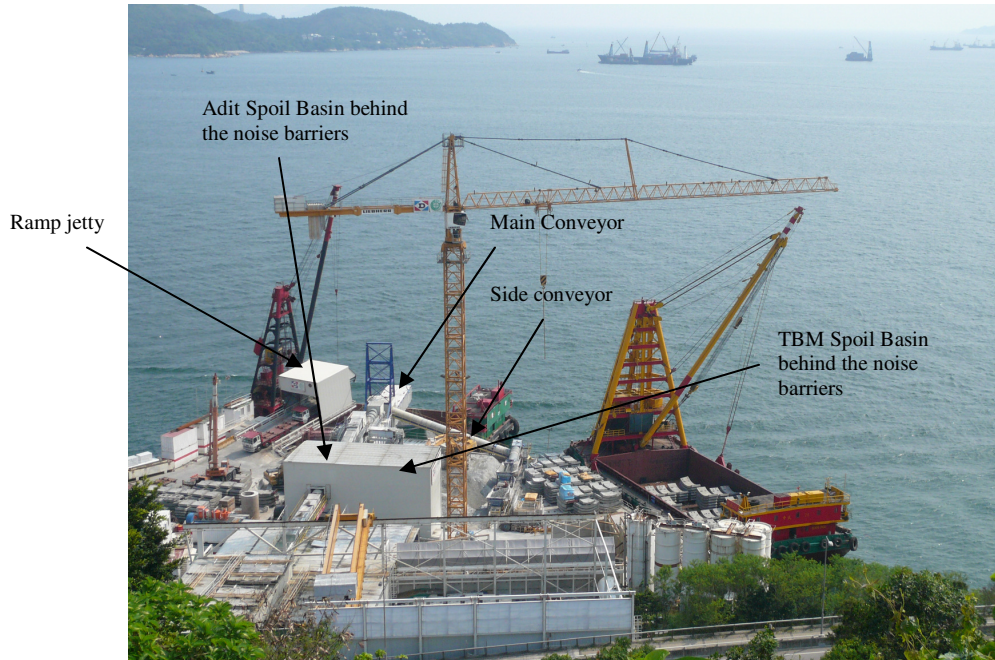


Photo 1: View of the Western Portal

The Main Conveyor and the Side Conveyor are fully enclosed by sound absorptive panels.

2. Excavated Materials from Drill-and-Blast Adits

Excavated materials generated by drill-and-blast are bigger (over 200mm) and they are of irregular sizes and shapes.

The materials are picked up by either the Häggloader (*Photo 2*) or the John Deere skid loader (*Photo 3*) at the adit face; and they are then transferred onto train cars (Shuttle Cars as in *Photo 4*). These Shuttle Cars will be brought to the Adit Spoil Basin at the tunnel portal (*Photo 5*). A backhoe is deployed at the surface adjacent to the Adit Spoil Basin transferring the excavated materials from the Adit Spoil Basin onto a 24-T dump truck that travels less than 100m within the Site from the Adit Spoil to the ramp jetty and vice versa.

The Adit Spoil Basin is provided with noise covers such that the entire basin is fully enclosed for nighttime operation.

The ramp jetty is enclosed at 3 sides – the top and the lateral sides. It is equipped with curtains and water sprinkler system for dust suppression. (*Photo 6 & 7*)

HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL



Photo 2: Hägglöader



Photo 5: Shuttle car discharging excavated materials at the Adit Spoil Basin



Photo 3: John Deere Skid Loader



Photo 6: The Ramp Jetty



Photo 4: Shuttle Car



Photo 7: Dump truck discharging excavated materials onto the barge at the ramp jetty

HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

Environmental Considerations

DNJV chooses the current mode of handling and delivery of excavated materials after careful consideration to its impact on the environment. (i.e. TBM excavated materials by conveyor belt onto barge or the TBM Spoil Basin; and Adit excavated materials by trains to the Adit Spoil Basin and onto the barge by dump trucks)

It is because excavated materials from Drill-and-Blast Adits cannot be handled by a conveyor system due to their big sizes and heavy weight. If a conveyor system was used, we need to mechanically break the materials into small chunks at the portal surface, using hydraulic breakers or by other means. That will certainly have an impact to the environment (e.g. more noise produced, more dust generated, more diesel fuel consumed).

All wastewater collected from surface runoffs and from the spoil basins are pumped into Wetsep and the water treatment plant at the Western Portal for treatment before discharge into the sea in accordance with the conditions of the Effluent Discharge Licences in force.

The current mode of operation has the least impact to the environment in terms of noise, air and water. Mitigating measures in place at the Western Portal are described in details in the next section. Moreover, excavated materials from TBM operation (uniform size) and those from drill-and-blast operations in the adits (irregular sizes) are delivered to the approved disposal locations for reuse (e.g. site formation).

Environmental Mitigation Measures at Western Portal

1. Covered Conveyors

Both the main and side conveyors (*Photo 8*) are entirely covered to mitigate noise propagation and avoid fugitive dust during the transportation of excavated materials.

2. Dust Suppression

- A sprinkler system (*Photo 9*) was installed underneath the ramp jetty for dust suppression when excavated materials are being loaded onto the barge.
- Dust curtains (*Photo 10*) were also installed at the outer rims of the conveyor enclosure in order to shield fugitive dust, if any, arising from the discharge of excavated materials from the conveyor.
- The 24T dump truck transporting materials from the Adit Spoil Basin to the ramp jetty is fitted with mechanical covers.

3. Noise Enclosure at Western Portal and the Adit Spoil Basin

All logistics movements take place inside a sophisticated and purposely-built acoustic enclosure. Mobile plant such as locomotives and train cars are travelling inside the noise enclosure and into the tunnel under construction. In addition, movable noise covers (*Photo 11*) were provided in the Adit Spoil basin to block noise propagation during the unloading of excavated materials from the shuttle cars.

HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

4. Noise Barriers at Western Portal

In addition to the noise enclosure erected at the Western Portal, a row of noise barrier was built in the Western Portal adjacent the pea gravel storage yard (*Photo 12*). The barrier does not only screen the mobile plant at the pea gravel storage yard from the views of the Aegean Terrace residents, but it shields part of the noise generated from the operation of such plant. There is another row of barriers erected at the side abutting the Cyberport Road (*Photo 13*).



Photo 8: Covered Conveyors



Photo 11: Noise covers at the Adit Spoil Basin



Photo 9: Sprinkler system installed at the ramp jetty



Photo 12: Noise barrier at the pea gravel storage yard at the side facing Aegean Terrace

**HANDLING & DELIVERY OF EXCAVATED
MATERIALS AT THE WESTERN PORTAL**



Photo 10: Dust curtains at the discharge point



Photo 13: Noise barrier along Cyberport Road

HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

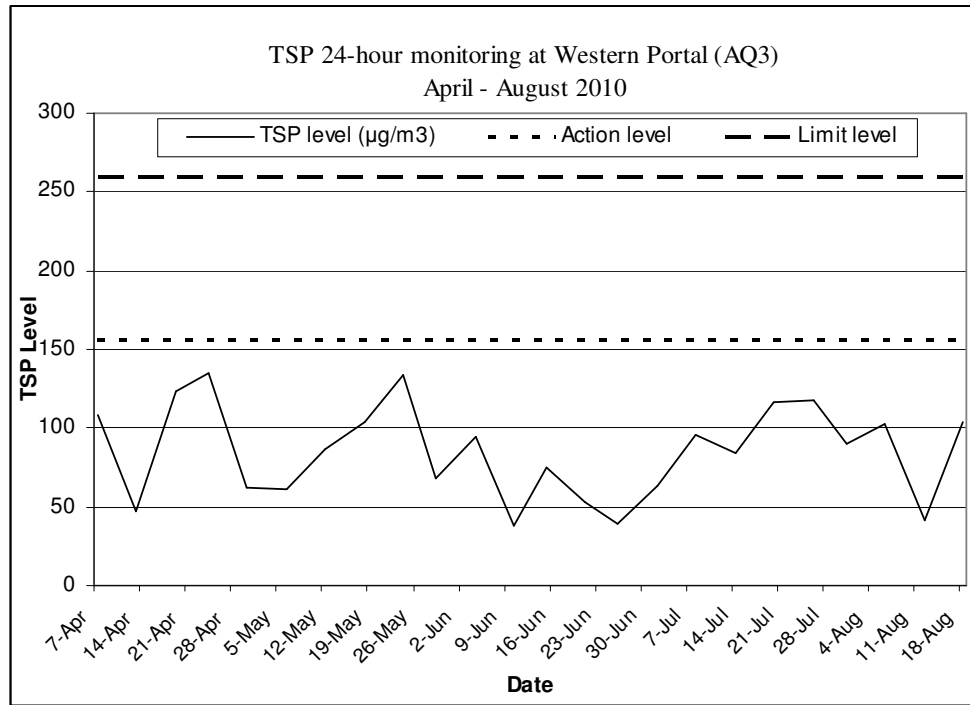
Air Quality Monitoring

DNJV has been undertaking the 24-hour Total Suspended Particulates (TSP) monitoring since commencement of the Work. The TSP station is installed within our site boundaries rather than the designated location at Aegean Terrace as stipulated in the E&MA Manual. The reason is that residents at Aegean Terrace refused to allow the environmental team to set up the instrument on their premises. Sampling and analysis are conducted by an HOKLAS laboratory to collect TSP filtering sample in a frequency of once every 6 days.

The 24-hour TSP monitoring results indicate that the TSP levels are all below Action ($156 \mu\text{g}/\text{m}^3$). No exceedance on monitoring limits was recorded. The agreed and pre-set Action and Limit levels and the actual TSP monitoring levels in the past 4 months are shown below.

The impact on air quality arising from the handling and delivery of excavated material is insignificant.

| Date | TSP level ($\mu\text{g}/\text{m}^3$) |
|--------|--|
| 7-Apr | 108 |
| 13-Apr | 47.6 |
| 19-Apr | 123.9 |
| 24-Apr | 135.5 |
| 30-Apr | 62.2 |
| 6-May | 60.7 |
| 12-May | 86.5 |
| 18-May | 103.6 |
| 24-May | 133.5 |
| 29-May | 68.5 |
| 4-Jun | 94.9 |
| 10-Jun | 38.0 |
| 15-Jun | 74.5 |
| 21-Jun | 53.4 |
| 26-Jun | 39.0 |
| 2-Jul | 63.9 |
| 8-Jul | 95.9 |
| 14-Jul | 84.6 |
| 20-Jul | 116.6 |
| 26-Jul | 117.8 |
| 31-Jul | 89.7 |
| 6-Aug | 102.8 |
| 12-Aug | 42.0 |
| 18-Aug | 103.8 |



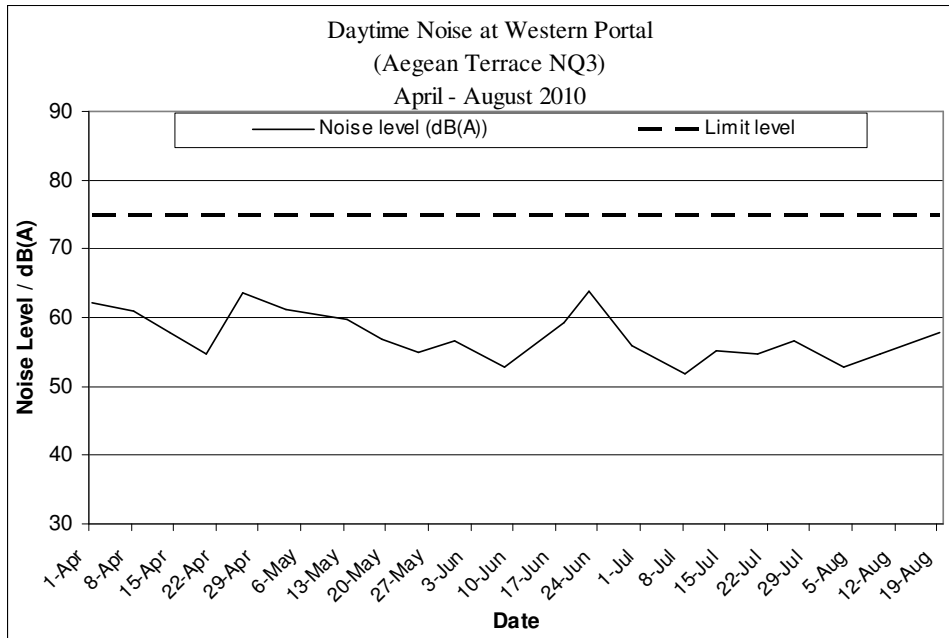
HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

Environmental Noise Monitoring

The E&MA Programme requires the carrying out of baseline noise monitoring prior to the commencement of construction work and impact noise monitoring when actual construction work started on the Site. DNJV employs an environmental team to conduct periodic noise monitoring during daytime, evening and nighttime. The designated noise monitoring station is adjacent to the Aegean Terrace, the nearest noise sensitive receiver. The daytime noise levels in the months from April to August as well as corresponding readings during daytime, evening and nighttime in the previous quarter are tabulated and graphically illustrated below.

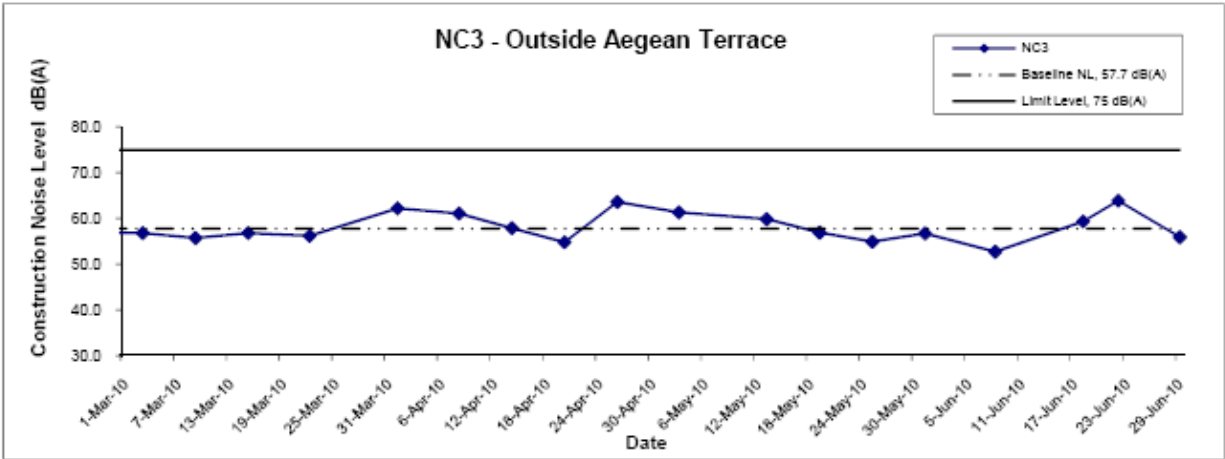
There is no exceedance of noise levels recorded in the past 4 months. The noise impact arising from the handling and delivery of excavated material is insignificant.

| Date | Noise level (dB(A)) |
|--------|---------------------|
| 1-Apr | 62.2 |
| 8-Apr | 61.0 |
| 14-Apr | 57.9 |
| 20-Apr | 54.8 |
| 26-Apr | 63.6 |
| 3-May | 61.3 |
| 13-May | 59.8 |
| 19-May | 56.9 |
| 25-May | 54.9 |
| 31-May | 56.7 |
| 8-Jun | 52.7 |
| 18-Jun | 59.3 |
| 22-Jun | 63.9 |
| 29-Jun | 55.9 |
| 8-Jul | 51.8 |
| 13-Jul | 55.3 |
| 20-Jul | 54.7 |
| 26-Jul | 56.7 |
| 3-Aug | 52.7 |
| 9-Aug | 54.8 |
| 19-Aug | 57.8 |

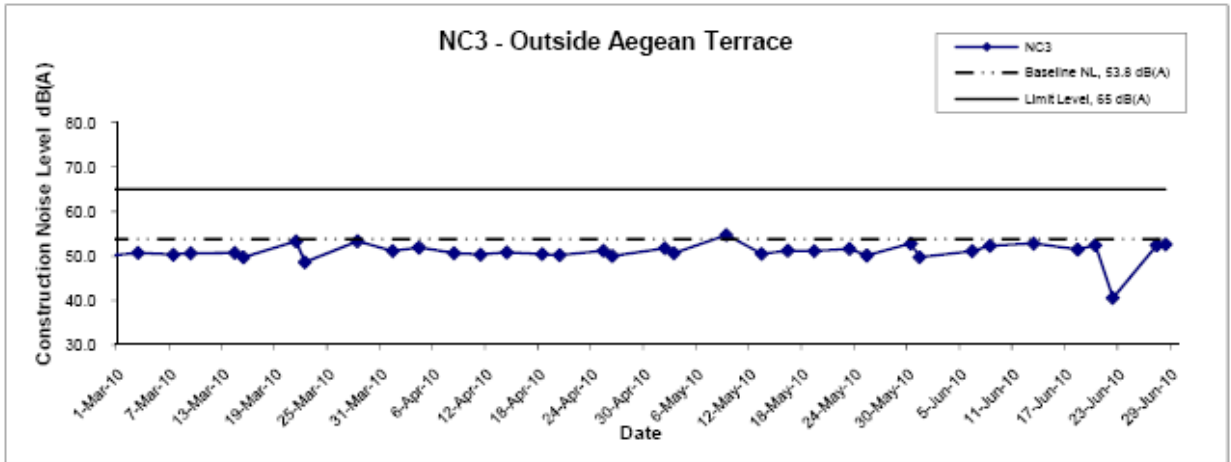


HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

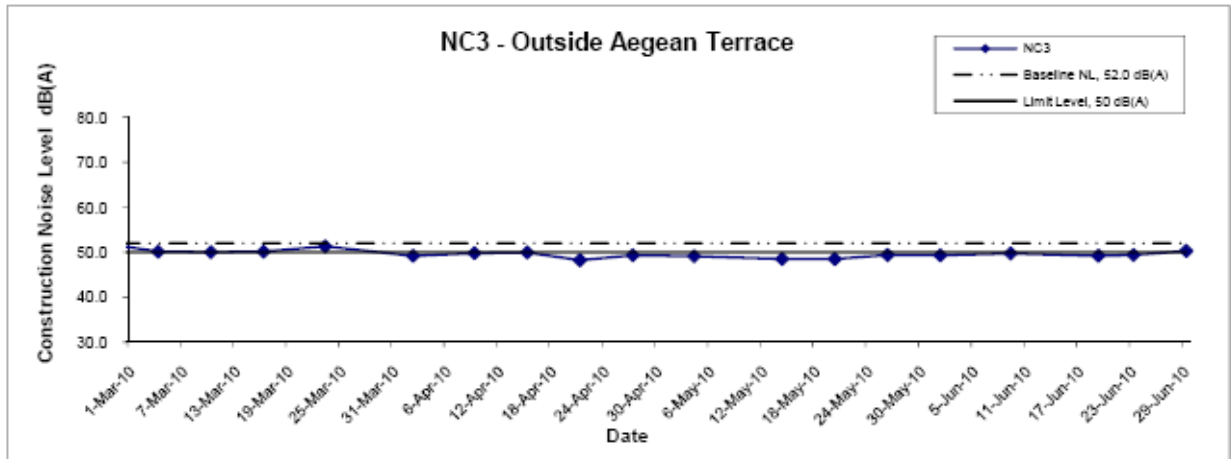
Noise Levels



Noise Levels (Restricted Hours - 07:00 - 23:00 holidays & 19:00 - 23:00 on all other days)



Noise Levels (Restricted Hours - 23:00 to 07:00 on all days)



HANDLING & DELIVERY OF EXCAVATED MATERIALS AT THE WESTERN PORTAL

Conclusion

The current mode of handling and delivery of excavated materials from TBM operation and adit excavation (drill-and-blast) has insignificant impact to the environment. It does not deviate from the intent of the EIA Report on the control of air quality – Clause 6.5.7 of the Report, and does not constitute material change of the EIA of Hong Kong West Drainage Tunnel Project.

It also concludes that the current spoil transportation arrangement does not constitute a breach of Condition 1.7 of the Further Environmental Permit that the HKWDT Project is designed and constructed in accordance with the information and all recommendations described in the EIA Report.

Appropriate mitigation measures are designed and implemented with due consideration of actual work method and site constraints to ensure compliance with the respective air quality and noise emission limits at the nearby sensitive receivers. These are in line with the recommendations of the EIA Report and comply with the conditions of the Further Environmental Permit.

**ANNEX II
PROPOSAL OF TWO BLASTS PER DAY
IN WESTERN ADITS**

Proposal of Two Blasts Per Day in Western Adits

1. Objectives

The objectives of this document are to:

- Explain the proposed arrangement of 2 blasts per day and the construction sequence,
- Review environmental implications and mitigation of the proposed arrangement,
- Review the related documents under EIA Ordinance to check whether there are any conditions/restrictions applicable to the proposed blasting arrangement.

2. The Project

The Hong Kong West Drainage Tunnel (DSD Contract No.: DC/2007/10) is a stormwater drainage tunnel running between Tai Hang (Eastern Portal) and Cyberport (Western Portal) with a network of adit tunnels. It is designed to collect stormwater from the upper catchments by a system of intake points, dropshafts and adits to relieve the flooding problem at the lower catchments of northern Hong Kong Island during heavy rainstorms. The Main Tunnel comprises 2 tunnel sections, namely:

- A main tunnel with internal diameter of 6.25m from Ch+43 (Eastern Portal) to Ch3+955.
- A main tunnel with internal diameter of 7.25m from Ch3+955 to Ch10+534 (Western Portal)

The 2 Main Tunnel Sections are excavated by the operation of 2 tunnel boring machines (TBM). On the other hand, the adits are excavated by drill and blast method.

3. Blasting in the West Adits

DNJV is currently adopting drill and blast method for the construction of the Western Adits. The blasting direction is from the Main Tunnel towards the intake dropshafts. For safety reason and full evacuation of personnel from the TBM, blasting can only be commenced when the TBM excavation has progressed some 200m beyond the adit and tunnel junction. This criterion is a restriction to the progress of adit excavation (especially when hard ground conditions or fault zones are encountered) though a number of adits can be excavated concurrently by drill and blast (*concurrent blasting*).

At present, drill and blast operation is now being conducted at 8 adits (including SM1, P5, HKU1, RR1, W5, TP4, TP5 and TP789) concurrently during daytime. It is worthwhile noting that the blasting faces are located from 2,100m to 4,200m from the tunnel portal.

Figure 1 illustrates the alignment of the West Tunnel and West Adits and the progress of TBM excavation in the West Tunnel.

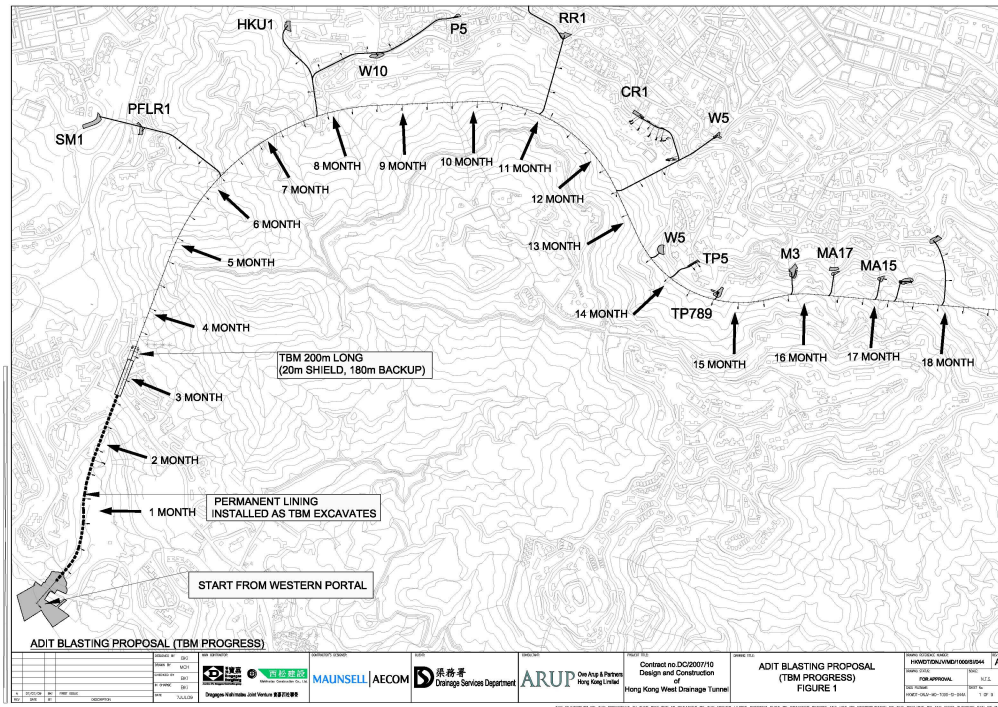


Figure 1: West Tunnel/Adit Alignment and TBM Progress

Lockable blast doors are installed at each main tunnel and adit junction where blasting is to be carried out. Besides, ventilation fans are installed to induce forced ventilation during mucking out and extraction ventilation immediately after blasting.

All daily blasting are carried out at the same time and therefore all adit working faces will be cleared prior to blasting the charged adits along the entire section of the tunnel. The daytime blasting window is somewhere between 13:00 hours and 19:00 hours. A typical work cycle includes the following activities:

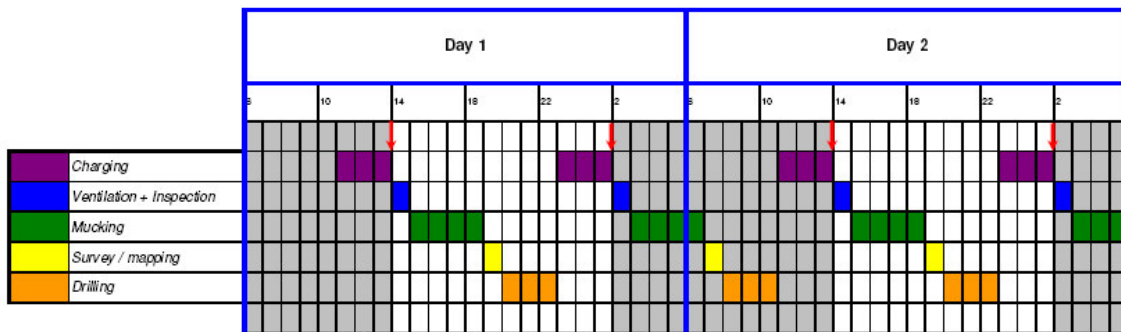
- (1) Drilling
- (2) Charging
- (3) Blasting
- (4) Ventilation (extraction of blast fumes)
- (5) Inspection (check for misfire and loose rocks)
- (6) Mucking
- (7) Installation of temporary tunnel support
- (8) Survey/mapping

Owing to the working cycle for a single concurrent blast and the progress of the tunneling works (the adits to be blasted are getting deeper and deeper in the Main Tunnel), the daytime blasting schedule is pushed to the latter part of the blasting window.

4. Two Blasts Per Day

The Hong Kong West Drainage Tunnel Project is a flood relief programme for the northern shore of Hong Kong Island. The timely completion of the Project is important to the safety of the people living in the low-lying areas along the northern shore of Hong Kong Island. DNJV proposes to increase the blasting work to two times per day to ensure timely completion of the Project, especially when unexpected ground conditions are encountered during adit excavation. Two blasts per days are planned initially for the Adits leading to Intakes HKU1, W10 and P5.

Because of the time taken for a typical work cycle, it is anticipated that the second blast will take place in the early hours of the day (around 01:00 to 03:00 hours).



For the planned arrangement for two blasts per day, it is important to note the following points: -

- (1) The blasting faces are currently located from 2,100m to 4,200m from the tunnel portal and 120m – 150m below the surface. The distances will increase as tunnel and adit excavation progress. Besides, the blast faces
- (2) For nighttime blasting, DNJV will attempt to limit the number of blast faces (1 to 2).
- (3) There is no change in construction methodology for adit excavation. As mentioned in the EIA Report, blasting is seen as the most suitable method of excavation for adits.
- (4) There is no change in the number and type of prescribed powered mechanical equipment used in the nighttime blasting.
- (5) There is no overnight storage of explosives on Site. There will be two deliveries of explosives to Site by the Mines Division – one in the morning and the other in late afternoon. The explosives will be delivered to the blasting locations inside tunnel by means of a special train and under the strict supervision by the Mines Department.

5. Environmental Implications and Mitigations

Air Quality

- Water sprinklers and water spraying are used to suppress dust and fumes generated by blasting.
- A fume scrubber is installed at the tunnel portal for further dust and fume suppression.
- The TSP monitoring station is now installed within the site boundaries at the Western Portal. Air monitoring has been carried out since the commencement of construction work. No exceedance has been registered even after adit blasting was conducted inside the tunnel.

Noise

- No new plant and equipment will be introduced as a result of 2 blasts per day or nighttime blasting. The existing powered mechanical plant pertaining to works under restricted hours both at the surface and inside tunnel still apply. A Construction Noise Permit (GW-RS0774-10) was granted to cover all PME essential for the drill & blast works and nighttime operation.
- Blast doors will be installed at the tunnel and adit junctions to confine the blast areas.
- As the blasting faces are all deep inside the tunnel (the rock cover 120m -150m), the number of blast faces is limited and the noise generated during blasting is transient in nature, the noise impact on the nearby communities will be insignificant.
- The noise enclosure at the tunnel portal area will remain, allowing for operation of PME within the enclosure during restricted hours.
- Noise monitoring at designated locations as described in the EM&A Manual will continue.

Photos of Mitigation Measures for Blasting Works



Blast door at tunnel and adit junction



Blast door at tunnel and adit junction for micro-blasting



Water sprinkler system for dust & fumes suppression



Fume scrubber in the Western Portal

Water Treatment and Handling of Excavated Materials

- Water collected from the main tunnel will either be treated before discharge or temporarily stored for reuse.
- Valid effluent discharge licences are in force at the Western Portal and periodic water samplings are performed in accordance with the licence conditions.
- Excavated materials from adit blasting will be transported to the tunnel portal (inside the noise enclosure) for overnight storage in the Adit Spoil Basin which is fully covered by noise panels. Removal of excavated materials from the Adit Spoil Basin to the barge will only be done in the following morning.

6. Environmental Document Review

The following environmental documents under EIA Ordinance and related to the Project have been reviewed:

- (1) The EIA Report (Register No.: AEIAR-099/2006) prepared by Black & Veatch Co.
- (2) The Technical Notes on Supplementary Environmental Assessment prepared by Ove Arup in March 2007.
- (3) The Technical Notes to Support VEP Application, prepared by Ove Arup in October 2007.
- (4) The Environmental Permit (EP-272/2007/B) previously held by DSD and the Further Environmental Permit (FEP-01/272/2007/B) currently held by DNJV.

EIA Report

The following clauses are relevant the subject matter:

- “2.4.5 Blasting is seen as the most suitable method of excavation for the adits due to the relative cost of alternative methods of construction. Blasting is not seen as a suitable method of excavation or the shafts due to the noise generated. Given the proximity of the intake shaft locations to sensitive receivers, blasting would need to be severely restricted to remain within the noise restrictions. Construction of shafts by drill and blast would also necessitate the shafts to be constructed larger than the 2.3 diameter required enabling spoil to be removed. This would consequently lead to slower progress

and would also cause difficulties at many intake locations, where the working area is very restricted.

6.5.9(ii) No blasting shall be carried out when the strong wind signal or tropical cyclone warning signal No. 3 or higher is hoisted (unless prior permission of the Commissioner of Mines is obtained).

13.3.2 For the adit construction, drill and blast method will be adopted for the majority of the works. As the storage of explosives relates to the extent of the drill and blast component of works, it is important to review the rate of work, storage/delivery arrangements and the duration of the works. The blasting works will require about 30 months to complete. Based on the proposed construction programme and the blasting frequencies, there will be no requirement for overnight storage of explosive on site. The delivery of the explosive will be once per day. The delivery of explosives from Government Explosives Depots to the blasting site is controlled by the Explosives Delivery Unit of the Mines Division. Explosives are classified as Category I Dangerous Goods and use of explosives is controlled under the Dangerous Good Ordinance (Chapter 295). Since there will be no overnight storage of explosive on site, no Quantitative Risk Assessment is required for this study.”

Technical Notes on Supplementary Environmental Assessment

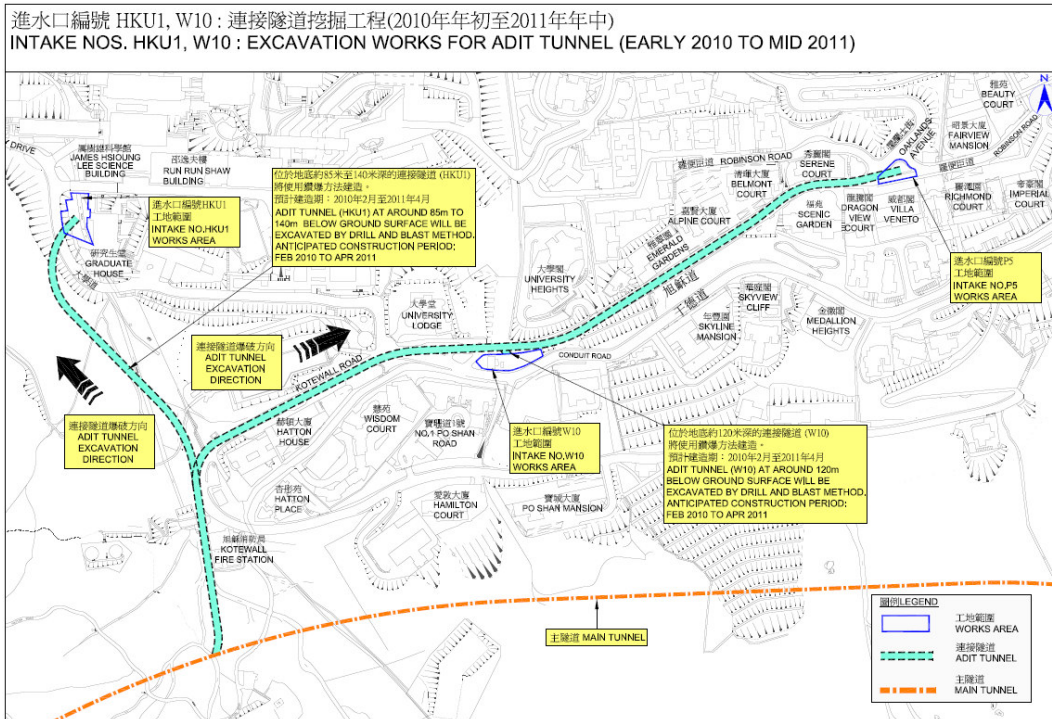
Table 1-1: ‘Summary of General Design Changes Since Approval of EIA’ in page 2 of the Technical Notes states the following:

| EIA Assumptions | Proposed Improvements | Justifications | Environmental Concerns |
|-------------------------------------|---|---|--|
| Delivery of explosives once per day | Delivery of explosive once or twice per day | Additional delivery and blasting will expedite the progress of construction | No impact on the EIA is anticipated since there are still no overnight storage of explosive (see Section 12) |

The proposed improvement in the Technical Notes does allow for 2 blasts per day and confirms no environmental concerns with such an improvement.

Technical Notes to Support VEP Application

The Technical Notes were prepared to address the impact of the proposed slight southward shift of the HKU1-W10-P5 Adit Junction due to the corresponding shift of the main tunnel alignment. However, there is no change in the HKU1-W10-P5 intake locations. The Notes do not mention anything about the blasting along the adits and in particular the HKU1-W10-P5 Adits.



Environmental Permit & Further Environmental Permit

There are no General Conditions or Special Conditions in the EP and FEP for blasting works on Site.

7. Environmental Team Leader's Comments

The Environmental Team Leader (Dr. Priscilla Choy) expressed her professional opinion in her letter of 8 September 2010 that there is no specific restriction on 2 blasts per day including nighttime blasting work.

8. Conclusion

DNJV proposes 2 blasts per day in the West Adits – one in the daytime and the other one during nighttime. The review concludes that there is no restriction in all relevant environmental documents under the EIA Ordinance on 2 blasts per day (even nighttime blasting).

In addition, there is no adverse impact on the environment as a result of 2 blasts per day and nighttime blasting.

End of Text

Our Ref: CCL/MA8001/Corres/Out/pc100908

Dragages-Nishimatsu Joint Venture
27/F., 625 King's Road
North Point, Hong Kong

Attn: Mr. Daniel Altier

By Fax (2671 9300) & E-mail
8th September 2010

Dear Sir,

Contract No. DC/2007/10
Design and Construction of Hong Kong West Drainage Tunnel
Proposal for 2 blasts in the West Adits

We refer to your message regarding the environmental aspects for proposing 2 blasts per day in the West Adits via e-mail on 3rd September 2010 for the captioned project.

After reviewing the relevant Environmental Permit, EIA Reports (including Technical Notes on Supplementary Environmental Assessment) for the captioned Contract, we would like to confirm that there is no specific restriction for 2 blasts per day including nighttime blasting for the Project. However, the EIA Report specifies that there will be no overnight storage of explosives for this project.

Although there is no restriction for 2 blasts per day, the following mitigation measures are recommended in the EIA Report for blasting operation:

Air Quality

- No blasting shall be carried out when the strong wind signal or tropical cyclone warning signal No. 3 or higher is hoisted (unless prior permission of the Commissioner of Mines is obtained).

Hazard to Life

- No overnight storage of explosives for this project.

If you have queries, please contact the undersigned at 2151 2089.

Yours faithfully,
Cinotech Consultants Limited



Dr. Priscilla Choy
Environmental Team Leader

Directors: Dr H F Chan (Managing Director), Dr Priscilla Choy
A MEMBER OF CINOTECH GROUP

