



PROJECT NO.: TCS/00408/08

DSD CONTRACT NO. DC/2007/17  
DRAINAGE IMPROVEMENT WORKS IN CHEUNG PO,  
MA ON KONG, YUEN KONG SAN TSUEN AND TIN SAM  
TSUEN OF YUEN LONG DISTRICT AND SEWERAGE AT  
TSENG TAU CHUNG TSUEN, TUEN MUN

12<sup>TH</sup> QUARTERLY EM&A SUMMARY REPORT –  
KT13 (JULY – SEPTEMBER 2011)

PREPARED FOR  
CHINA ROAD & BRIDGE CORPORATION

Quality Index

Date	Reference No.	Prepared By	Certified by
24 November 2011	TCS00408/08/600/R1680v2	 Nicola Hon Environmental Consultant	 T.W. Tam Environmental Team Leader

Version	Date	Prepared by:	Certified by:	Description
1	17 Nov 2011	Nicola Hon	T.W. Tam	First submission
2	24 Nov 2011	Nicola Hon	T.W. Tam	Amended against IEC's comments on 23 Nov 2011

This report has been prepared by Action-United Environmental Services & Consulting with all reasonable skill, care and diligence within the terms of the Agreement with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

**By Post & Fax**

Black & Veatch Hong Kong Limited  
25/F, Millennium City 6  
392 Kwun Tong Road  
Kowloon  
Hong Kong

Attention: Ms. Jenny Lui

25 November 2011

Dear Ms. Lui,

Level 5 Festival Walk  
80 Tat Chee Avenue  
Kowloon Tong  
Kowloon  
Hong Kong  
PRC  
t +852 2528 3031  
d +852 2268 3097  
f +852 2268 3950  
coleman.ng@arup.com  
www.arup.com

Contract No. DC/2007/17 Drainage Improvement Works in Cheung Po, Ma On Kong, Yuen King San and Tin Sam Tsuen of Yuen Long District and Sewerage at Tseng Tau Chung Tsuen, Tuen Mun  
12<sup>th</sup> Quarterly EM&A Summary Report - KT13 (July - September 2011) – Version 2

We refer to the captioned report (ref.: TCS00408/08/600/R1680v2) and advise that we have no comments on the captioned submission.

We hereby endorse the captioned report for your onward submission.

If you require any further information, please do not hesitate to contact the undersigned.

Yours sincerely



Coleman Ng  
Independent Environmental Checker

cc China Road and Bridge Corporation (Mr. Raymond Mau) (Fax: 2478 9612)  
AUES (Mr. TW Tam / Ms. Nicola Hon) (Fax: 2959 6079)

Executive Summary

- ES01 This is the 12<sup>th</sup> quarterly EM&A summary report highlights the EM&A results for the Designated Project of Channel KT13. It contains key environmental monitoring results during the three-month period from 26 June to 25 September 2011 on air quality, construction noise, water quality, ecology, cultural heritage and waste management.

Progress of the EM&A Programme

- ES02 The impact EM&A program was undertaken in accordance with the relevant EM&A manuals. A summary of the monitoring activities in this quarter is listed below:

Environmental Issues	Channel KT13
1-hour TSP Monitoring	90 monitoring events
24-hour TSP Monitoring	30 monitoring events
Noise Monitoring	45 monitoring events
Water Quality Monitoring	38 monitoring days
Ecology	6 monitoring days
Site Inspection Audit	12 occasions

Breaches of Environmental Quality Criteria

- ES03 Monitoring results of the Reporting Period demonstrated no exceedance of environmental quality criteria for air quality, construction noise and ecology.
- ES04 For water quality monitoring, a total of 18 Limit level exceedances were recorded during the Reporting Period. In our investigation for the cause of exceedance, it was observed that high levels of Turbidity, Suspended solids, NH<sub>4</sub><sup>+</sup>-N and Zinc were also recorded at upstream and control station. It is believed that the exceedances were likely due to the discharge from the agriculture farm and livestock at the vicinity as water quality throughout the channel was affected. Therefore, it was concluded that the exceedances were not project related. The overall compliance rate of water quality monitoring in the quarter is 96.0%.
- ES05 During the Reporting Period, there was no construction work conducted within 100m of the cultural heritage site at KT13. Therefore, no cultural heritage monitoring was required in accordance with the approved methodology.
- ES06 No significant changes were observed for the identified landscape resources and visual sensitive receivers, except for minor changes due to channel excavation, site clearance and preparation work at the identified landscape resources including LR1, LR2.1, LR2.2, LCA1, LCA3 and LCA4.
- ES07 A summary of all environmental exceedances is presented as follows:

Issues	Parameters	Compliance Rate %	Investigation Results & Corrective Actions
		Channel KT13	
Air Quality	24-hour TSP	100%	N/A
	1-hour TSP	100%	N/A
Noise	Leq(30min) Daytime	100%	N/A
Water Quality	Suspended Solids	92.1%	Not project related
	Turbidity	96.1%	Not project related
	Dissolved Oxygen	100%	N/A
	pH	100%	N/A
	Ammonia	97.4%	Not project related

	Zinc	90.8%	Not project related
Cultural heritage	Settlement Monitoring	100%	N/A
Ecology	Decrease in number of breeding egrets since previous year	100%	N/A

Environmental Complaint, Notifications of Summons and Prosecutions

ES08 No documented complaint, notification of summons and successful prosecution was received during the Reporting Period. No major environmental impacts were observed during the weekly site inspection. Environmental audit of the Reporting Period, indicated that the implemented mitigation measures for air quality, construction noise and ecology were effective. Minor deficiencies found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.

Reporting Changes

ES09 No reporting changes were made during the Reporting Period.

Future key issues

ES10 In viewing that the major construction activities of the Project are substantially completed, the Contractor is reminded to maintain the housekeeping of the site in good standard.

ES11 The Contractor is reminded that all environmental issues identified in the EM&A Manual as recommended in the EIA and summarized in Mitigation Measure Implementation Schedule shall be implemented properly until the monitoring programme end.

END OF TEXT

Table of Contents

1	INTRODUCTION.....	1
1.1	BASIC PROJECT BACKGROUND .....	1
1.2	REPORT STRUCTURE.....	1
1.3	ENVIRONMENTAL MANAGEMENT ORGANIZATION.....	1
1.4	WORKS UNDERTAKEN DURING THE QUARTER REPORTING PERIOD .....	1
1.5	ENVIRONMENTAL LICENSING STATUS.....	2
2	SUMMARY OF IMPACT ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS .....	3
2.1	MONITORING PARAMETERS .....	3
2.2	MONITORING LOCATIONS .....	3
2.3	MONITORING FREQUENCY.....	4
2.4	ENVIRONMENTAL QUALITY CRITERIA.....	6
2.5	ENVIRONMENTAL MITIGATION MEASURES .....	7
3	MONITORING RESULTS AND BREACHES OF ENVIRONMENTAL QUALITY CRITERIA .....	8
3.1	AIR QUALITY .....	8
3.2	CONSTRUCTION NOISE .....	8
3.3	WATER QUALITY .....	8
3.4	ECOLOGY.....	10
3.5	OTHER MONITORING AND AUDIT .....	11
3.6	CULTURAL HERITAGE .....	11
3.7	LANDSCAPE AND VISUAL .....	11
3.8	WEATHER CONDITIONS .....	12
4	NON-COMPLIANCE, COMPLAINT, NOTIFICATION OF SUMMONS & SUCCESSFUL PROSECUTION..	13
4.1	NON-COMPLIANCE .....	13
4.2	ENVIRONMENTAL COMPLAINTS .....	13
4.3	NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS .....	13
4.4	OTHERS.....	13
4.5	SITE INSPECTION AND ENVIRONMENTAL AUDIT .....	13
5	CONCLUSION.....	15

**LIST OF TABLES**

Table 1-1	Status of Environmental Licenses and Permits
Table 2-1	Summary of Monitoring Parameters
Table 2-2	Summary of Monitoring Locations
Table 2-4-1	Action and Limit Levels of Air Quality Monitoring
Table 2-4-2	Action and Limit Levels of Construction Noise Monitoring (Leq <sub>(30min)</sub> )
Table 2-4-3	Water Quality Action and Limit Levels
Table 2-4-4	Action and Limit Levels for Cultural Heritage Resources
Table 2-4-5	Ecological Action and Limit Levels
Table 3-1	Summary of 1-hour and 24-hour TSP at KT13 in the Reporting Period
Table 3-2	Summary of Construction Noise at Channel KT13 in the Reporting Period
Table 3-3-1	Summaries of Breaches of the Existing Water Quality A/L Levels
Table 3-3-2	Summaries of Breaches of the Existing Water Quality A/L Levels at KT13
Table 4-4-1	Summary of Findings of Site Inspection and Environmental Audit

**LIST OF APPENDICES**

Appendix A	Location Plan of the Project and Environmental Monitoring Locations
Appendix B	Environmental Management Organization and Contacts of Key Personnel
Appendix C	Construction Program
Appendix D	Mitigation Measures Implementation Schedule
Appendix E	Graphic Plot of Air Quality, Construction Noise and Water Quality
Appendix F	Monthly Summary Waste Flow Table

## 1 INTRODUCTION

### 1.1 BASIC PROJECT BACKGROUND

CRBC has been awarded the DSD Contract No. DC/2007/17 (the Project) for a package of drainage improvement works in areas located in Kam Tin, Pat Heung and Tuen Mun as shown in **Appendix A**.

The Project involves construction of five drainage channels, namely Channels KT12, KT13 (under Environmental Permit No. EP263/2007), KT14A (under Environmental Permit No. EP231/2005A), KT14B and KT14C in Kam Tin and Pat Heung and the sewerage works at Tseng Tau Chung Tsuen in Tuen Mun. For ease of reporting, the EM&A report under the Project is split to the following three stand-alone parts:

EM&A Report – Channel KT13 (under EP No. EP263/2007);

EM&A Report – Channel KT14A (under EP No. EP231/2005A); and

EM&A Report – Channels KT12, KT14B and KT14C (Non-Designated works, under no Environmental Permit)

This report presents the EM&A results of the Designated Projects works for Channel KT13. It is the 12<sup>th</sup> Quarterly EM&A Summary Report covering a three-month period from **26 June to 25 September 2011** (the Reporting Period).

### 1.2 REPORT STRUCTURE

This Report is structured as follows:

**Section 1** Introduction

**Section 2** Summary of Impact Environmental Monitoring and Audit Requirements

**Section 3** Monitoring Results and Breaches of Environmental Quality Criteria

**Section 4** Non-compliance, Complaint, Notifications of Summons and Successful Prosecution

**Section 5** Conclusion

### 1.3 ENVIRONMENTAL MANAGEMENT ORGANIZATION

The environmental management team comprises: DSD (Project Proponent), CRBC (main Contractor), EPD and AFCD (supervisory departments in Government), BVHKL (ER); ARUP (IEC) and AUES (ET). Detailed management organization including organisation structure and key personnel contacts is presented in **Appendix B**.

### 1.4 WORKS UNDERTAKEN DURING THE QUARTER REPORTING PERIOD

Construction activities implemented during the Reporting Period are presented in **Appendix C**. In addition to the preparation works and site clearance, including underground utility investigation, tree survey, tree pruning and tree transplant, major construction activities are summarized as follows:

#### **26 June to 25 July 2011**

- Gabion installation at Section B of KT13;
- Construction of surface drainage system at Section B of KT13;
- Compensatory planting;
- Remedial works.

#### **26 July to 25 August 2011**

- Gabion installation at Section B of KT13;
- Construction of surface drainage system at Section B of KT13;

- Compensatory planting;
- Remedial works

**26 August to 25 September 2011**

- Compensatory planting;
- Remedial works

1.5 ENVIRONMENTAL LICENSING STATUS

The environmental licensing status in the quarter reporting period is summarized in **Table 1-1**.

Table 1.1 Status of Environmental Licenses and Permits

Item	License / Permit Description	Status
1	Air Pollution Control (Construction Dust)	Notified EPD on 14-Feb-08
2	Water Pollution Control (Discharge License) License No. 1U461/1	Valid
3	Chemical Waste Producer Registration WPN: 5611-531-C3124-28	Registration on 2-May-08
4	Construction Waste Disposal Billing Account Number 7006524	Valid on 9 Jan 2008



## 2 SUMMARY OF IMPACT ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

### 2.1 MONITORING PARAMETERS

The ET has compiled the EM&A requirements set out in the associated EM&A Manuals in the **Environmental Monitoring Methodology**, which has been agreed by the ER and IEC. The monitoring parameters are summarized below.

Table 2-1 Summary of Monitoring Parameters

Environmental Issues	Monitoring Parameters	
Air Quality	(a) 1-hour Total Suspended Particulate (1-hour TSP); and (b) 24-hour Total Suspended Particulate (24-hour TSP).	
Construction Noise	(a) A-weighted equivalent continuous sound pressure level (30min) (Leq(30min) during the normal working hours; and (b) A-weighted equivalent continuous sound pressure level (5min) (Leq(5min) for construction work during the Restricted Hours.	
Water Quality	(a) In Situ Measurement	temperature, dissolved oxygen (DO), pH & Turbidity
	(b) Laboratory Analysis	suspended solids (SS), Ammonia Nitrogen (NH <sub>3</sub> -N) and Zinc (Zn)
Ecology	Vegetation, All bird species of wetland, Ho Pui Egret, Ma On Hong Egret and Flight Line Survey	
Waste Management	Inspection and the document audit	
Cultural Heritage	Condition survey for a historical grave	
Landscape & Visual	To audit the implementation of the proposed construction phase mitigation measure stipulated in EIA.	

### 2.2 MONITORING LOCATIONS

Details of monitoring locations are summarized in **Table 2-2** and shown in **Appendix A**.

Table 2-2 Summary of Monitoring Locations

Environmental Issue	Monitoring Location ID	Identified Address / Co-ordinates	Status of Monitoring Locations / Rationale for Recommended Replacement
Air	A1(a)	No.68 Ho Pui Village	The original location of EM&A Manuals A1 has permanently been abandoned. No access can be acquired in the vicinity of A1. Taken into consideration that Ho Pui Village is one of the most important sensitive receivers near KT-13 without monitoring, the most fronting house, No. 68 Ho Pui Village, is therefore recommended as the replacement location <b>A1(a)</b> .
	A2	No.1 Ma On Kong Village	Original location of the EM&A Manual; access granted.
Noise	N1(a)	168-169 Kam Ho Road, Ma On Kong Village,	Original location of N1 identified in the EM&A Manual was relocated to proposed area as recommended by IEC.

Environmental Issue	Monitoring Location ID	Identified Address / Co-ordinates	Status of Monitoring Locations / Rationale for Recommended Replacement
	N2(a)	No. 68 Ho Pui Village,	The original location of EM&A Manuals N2 has permanently been abandoned. No access can be acquired in the vicinity of N2. Taken into consideration that Ho Pui Village is one of the most important sensitive receivers near KT-13 without monitoring, the most fronting house, No. 68 Ho Pui Village, is therefore recommended as the replacement location <b>N2(a)</b> .
	N3	No.1 Ma On Kong Village	Original locations of the EM&A Manual; access granted.
Water	W1	E824539 / N830283	Original locations of the EM&A Manual; access resolved.
	W2	E824693 / N830258	Original locations of the EM&A Manual; access resolved.
	W3(a)	E824833 / N830374	The W3 is proposed to be relocated about 55 m down stream to W3(a) for safety reason as there is no any discharge point observed between W3 and the proposed W3(a).
	W4	E824936 / N830618	Original locations of the EM&A Manual; access resolved.
	W5	E825008 / N830812	Original locations of the EM&A Manual; access resolved.
	W6	E825100 / N830987	Original locations of the EM&A Manual; access resolved.
Ecology	<p>Monthly monitoring along the boundary of the works area to confirm that there are no adverse impacts on habitats outside the site in particular the Conservation Area (CA) zone and Ho Pui Egretty.</p> <p>Photographic records at six-month intervals;</p> <p>Monthly monitoring of all bird numbers including wetland species and species identified as being of conservation importance;</p> <p>Monitoring of Ho Pui egretty during March to August. The Ma On Kong egretty is also surveyed to provide reference information on the breeding egrets nearby; and</p> <p>Flight line surveys twice per month during April to June.</p>		
Waste Management	Whole construction site and document		
Cultural Heritage	Ma On Kong	Refer to EM&A Manual (KT13) Figure 7.1.	
Landscape & Visual	Refer to EIA Section 10		

## 2.3 MONITORING FREQUENCY

The impact monitoring frequency and duration for air quality, construction noise, water quality, ecology and other parameters are summarized below.

### 2.3.1 Air Quality

**Frequency:** Once every 6 days for 24-hour TSP and three times every 6 days for 1-hour TSP, when the highest construction dust impacts are anticipated.

**Duration:** Throughout the construction period

### 2.3.2 Construction Noise

**Frequency:** Measurement of Leq 30min: Once a week during 0700-1900 hours on normal weekdays for Leq30min

If the construction work is undertaken at restricted hour, the frequency of noise monitoring will be conducted in accordance with the requirements under the related Construction Noise Permit issued by EPD as follows:

- 3 consecutive Leq5min at restricted hour from 1700 – 2300;
- 3 consecutive Leq5min for restricted hour from 2300 – 0700 next day;
- 3 consecutive Leq5min for Sunday or public holiday from 0700 – 1900;

**Duration:** Throughout the construction period

### 2.3.3 Water Quality

**Frequency:** Three times a week with at least 36 hour intervals between any two consecutive monitoring events

**Depths:** As the water columns in the stream water within KT13 is generally less than 3 m, measurement is performed at the mid-depths of the monitoring locations. In case the water columns are deeper than 6 m, measurement shall be carried out at three water depths, namely, 1 m below water surface, mid-depth, and 1 m above river bed. If the water depths are between 3 to 6 m, the mid-depth measurement is omitted.

**Duration:** Throughout the construction period.

### 2.3.4 Ecology

The Ecology Monitoring is required in accordance with the EM&A Manual.

**Parameters:** Vegetation, All bird species including wetland birds, Ho Pui and Ma On Hong Egrettries and Flight line survey

**Frequency:** Vegetation – Impact monitoring – monthly;

Photographic records/checks against baseline records – six monthly

Wetland Bird survey – Monthly of half-day survey;

Ma On Kong egrettry – Monthly between March to August; and

Ho Pui egrettry – Bi-weekly between March and August;

Flight line Survey – Twice per month during the period from April to June

**Duration:** Throughout the whole construction period

### 2.3.5 Waste Management Audit

**Frequency:** Once per month

**Duration:** Throughout the construction period.

### 2.3.6 Cultural Heritage

**Frequency:** Bi-monthly for condition survey

Bi-weekly for settlement monitoring

**Requirement:** Condition survey and settlement monitoring of a Qing Dynasty Grave.

**Duration:** Throughout the construction phase period. (When construction work entered the 100m of the cultural heritage site)

### 2.3.7 Landscape & Visual

**Frequency:** Bi-weekly

**Duration:** Throughout the construction phase period.

## 2.4 ENVIRONMENTAL QUALITY CRITERIA

The environmental quality criteria i.e. Action and Limit levels (A/L levels) are summarized as follows:

Table 2-4-1 Action and Limit Levels of Air Quality Monitoring

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )		Limit Level ( $\mu\text{g}/\text{m}^3$ )	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
KT13(A1(a))	309	144	500	260
KT13(A2)	307	141	500	260

Table 2-4-2 Action and Limit Levels of Construction Noise Monitoring (Leq<sub>(30mins)</sub>)

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

Note: \* Reduces to 70 dB(A) for schools and 65dB(A) during the school examination periods.

Table 2-4-3 Water Quality Action and Limit Levels

Monitoring Location	DO (mg/L)		Turbidity (NTU)		pH		SS (mg/L)		Ammonia (mg/L)		Zinc ( $\mu\text{g}/\text{L}$ )	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
W1 (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W2 (Downstream) Impact Station	1.04	1.00	36.81	37.16	8.65	8.69	79.0	86.2	16.85	16.89	234.95	266.19
W3(a) (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W4 (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W5 (Upstream) Control Station	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W6 (Downstream) Impact Station	0.93	0.91	27.88	30.02	8.7	8.7	73.40	78.68	51.62	54.56	191.90	201.58

Notes: # Act as Control Station for the Impact Water Quality Monitoring.

\* Alternative Action Level of the Turbidity, pH, Suspended Solid, Ammonia Nitrogen and Zinc are 120% of upstream control station of same day.

\*\* Alternative Action Level of the Turbidity, pH, Suspended Solid, Ammonia Nitrogen and Zinc are 130% of upstream control station of same day.

Table 2-4-4 Action and Limit Levels for Cultural Heritage Resources

Action Level	Limit Level
When damage or structural instability is first detected	Signs of deterioration and structural instability continues on subsequent visits after action level is triggered

Table 2-4-5 Ecological Action and Limit Levels

Parameters	Action Level	Limit Level
Decrease in number of breeding egrets since previous year	> 20%	> 40%

## 2.5 ENVIRONMENTAL MITIGATION MEASURES

CRBC has committed to implement environmental protection and pollution control and mitigation measures, as recommended in the EIA, EP and the EM&A Manuals, summarized in the Mitigation Measures Implementation Schedules in the EM&A Manual and enclosed in **Appendix D**. The implemented mitigation measures include:

- (a) Watering of stockpiles of rip-rap at KT13;
- (b) Covering of the loose soil at KT13 to minimize water quality impacts;
- (c) Hard pavement of haul road leading to public roads at KT13;
- (d) Classification and disposal of illegally dumped construction and demolition materials at KT13;
- (e) Construction of noise barriers; and
- (f) Erection of dams with sand bags downstream the excavation site within the water course of KT13 to enhance sedimentation of Turbidity and SS,

### 3 MONITORING RESULTS AND BREACHES OF ENVIRONMENTAL QUALITY CRITERIA

The environmental monitoring results will be compared against the Action and Limit Levels established based on the baseline monitoring results and statutory criteria. In case the measured data exceed the environmental quality criteria, remedial actions will be triggered according to the Event and Action Plan. In the report quarter, the graphical plots of the trends of monitored parameter over the past four months are presented in **Appendix E**.

#### 3.1 AIR QUALITY

Results of air quality monitoring at the identified locations during the Reporting Period are summarized in **Tables 3-1** below. Two (2) events of power failure incident of HVS were occurred at Location A2 in 31 August and 6 September 2011. It is reported that no exceedances of Action or Limit Levels recorded during the Reporting Period. No Notification of Exceedance (NOE) of air quality criteria or corrective action was required.

Table 3-1 Summary of 1-hour and 24-hour TSP at KT13 in the Reporting Period

Channel	Station	1-hour TSP			24-hour TSP		
		Max	Min	Mean	Max	Min	Mean
KT13	A1(a)	77	33	56	134	13	36
<b>Record Date</b>		16-Aug-11	12-Jul-11	45 events	6-Sep-11	4-Jul-11 8-Aug-11	16 events
KT13	A2	79	26	55	28	10	19
<b>Record Date</b>		8-Sep-11	18-Jul-11	45 events	9-Jul-11	2-Aug-11	14 events

#### 3.2 CONSTRUCTION NOISE

Summary of construction noise monitoring at the identified locations during the Reporting Period are summarized in **Table 3-2** below and graphic plots are presented in **Appendix E**. In this reporting quarter, a total of 45 events of construction noise measurement were conducted while no documented construction complaint was received and all the construction noise results were below the Limit level. No NOE or corrective action was recommended for this parameter.

Table 3-2 Summary of Construction Noise at Channel KT13 in the Reporting Period

Channel	Station	Leq(30min)	
		Max	Min
KT13	N1(a)	<b>58.5</b>	<b>54.8</b>
<b>Record Date</b>		30-Jun-11	2-Sep-11
KT13	N2(a)	<b>62.6</b>	<b>58.8</b>
<b>Record Date</b>		30-Jun-11	29-Jul-11
KT13	N3	<b>62.1</b>	<b>57.7</b>
<b>Record Date</b>		14-Sep-11	16-Aug-11

#### 3.3 WATER QUALITY

In this reporting quarter, a total of 38 days of water quality monitoring were conducted. Breaches of water quality A/L levels and statistics of the compliance status during the Reporting Period are summarized in **Table 3-3-1 and 3-3-2**.

Table 3-3-1 Summaries of Breaches of the Existing Water Quality A/L Levels

Location	Exceedance	DO	Turbidity	pH	SS	NH <sub>4</sub> <sup>+</sup> -N	Zn	Total
July 2011								
W2	Action Level	0	0	0	0	0	0	0
	Limit Level	0	0	0	0	0	0	0
W6	Action Level	0	0	0	0	0	0	0
	Limit Level	0	0	0	0	0	0	0
August 2011								
W2	Action Level	0	0	0	0	0	0	0
	Limit Level	0	0	0	0	1	0	1
W6	Action Level	0	0	0	0	0	0	0
	Limit Level	0	0	0	1	0	1	2
September 2011								
W2	Action Level	0	0	0	0	0	0	0
	Limit Level	0	0	0	2	1	2	5
W6	Action Level	0	0	0	0	0	0	0
	Limit Level	0	3	0	3	0	4	10
Total	Action Level	0	0	0	0	0	0	0
	Limit Level	0	3	0	6	2	7	18

Table 3-3-2 Summaries of Breaches of the Existing Water Quality A/L Levels at KT13

Parameter	Channel KT13	
	No. of Exceedances	Compliance%
Suspended Solids	6	92.1%
Turbidity	3	96.1%
Dissolved Oxygen	0	100%
pH	0	100%
Ammonia	2	97.4%
Zinc	7	90.8%
Overall	18	96.0%

In this reporting period, the readings of DO recorded at impact stations W2 and W6 fluctuated within 2.00mg/L to 7.63mg/L and the pH fluctuated well within 6.80 and 8.58. For turbidity, the measured readings fluctuated between 2.70NTU to 225.0 NTU. Finally, the laboratory results showed that concentration of suspended solids fluctuated between 2.0 to 204.0 mg/L.

According to the existing Action/Limit Levels, a total of 18 Limit level exceedances, namely 6 exceedances in suspended solids, 3 exceedances in turbidity, 2 exceedances in NH<sub>4</sub><sup>+</sup>-N and 7 exceedances in Zinc were recorded during the Reporting Period as shown in **Table 3-3-2**. NOEs were issued upon confirmation of the monitoring results, and investigation was conducted upon receipt of the information of construction activities and implementation status of mitigation measures provided by CRBC.

#### Exceedance in August 2011

In stream water quality monitoring, 3 Limit Level exceedances were recorded which namely 1 exceedance at upstream Location W2 and 2 exceedances downstream Location W6. According to the observation during site inspections by ET and information provided by the Contractor, installation of gabion lining was conducted at upstream. No direct disturbance was made to the stream but pigsty discharge was observed near monitoring location W2. Since high levels of Turbidity, Suspended Solids, NH<sub>4</sub><sup>+</sup>-N and Zinc were also recorded at upstream and control station, it is believed that the exceedances were likely due to the discharge from the agriculture farm and livestock at the vicinity as water quality throughout the channel was affected. Therefore, it is concluded that the

exceedances were not related to the works under the Project.

#### Exceedance in September 2011

In stream water quality monitoring, 15 Limit Level exceedances were recorded which namely 5 exceedance at upstream Location W2 and 10 exceedances downstream Location W6. According to the observation during site inspections by ET and information provided by the Contractor, only tree planting work is remaining and no direct disturbance was made to the stream but pigsty discharge was observed near monitoring location W2. Since high levels of Turbidity, Suspended Solids,  $NH_4^+-N$  and Zinc were also recorded at upstream and control station, it is believed that the exceedances were likely due to the discharge from the agriculture farm and livestock at the vicinity as water quality throughout the channel was affected. Therefore, it is concluded that the exceedances were not related to the works under the Project.

### 3.4 ECOLOGY

Ecological monitoring were conducted on 23, 30 July, 20, 28 August 2011 and 20, 25 September 2011. No breaches of ecological A/L levels were recorded during the Reporting Period.

#### July 2011

53 individuals of birds from 17 species were recorded during the survey for monthly monitoring on 23 July 2011. Among the birds recorded, 9 individuals of wetland dependent birds (from 4 species) were recorded. Monthly egretty surveys on Ho Pui Egretty were conducted on 30 July 2011. No nest was found at the Ho Pui egretty during these surveys. Ma On Kong egretty was also surveyed July 2011 to provide reference information on the breeding. No nest was found at Ma On Kong egretty neither. As no nest was found in either egretty, no flight line was recorded in the present monitoring. During the walk through survey on 23 July 2011, other than the bamboo trees which are within the Ho Pui Egretty boundary which was found to be cleared by villagers during a site inspection on 11 July 2009, no further adverse impacts on the habitats outside the boundary of the works area including the Conservation Area and the remaining Ho Pui Egretty was found.

#### August 2011

61 individuals of birds from 20 species were recorded during the survey for monthly monitoring on 20 August 2011. Among the birds recorded, 5 individuals of wetland dependent birds (from 3 species) were recorded. Monthly egretty surveys on Ho Pui Egretty were conducted on 28 August 2011. No nest was found at the Ho Pui egretty during these surveys. Ma On Kong egretty was also surveyed 28 August to provide reference information on the breeding. No nest was found at Ma On Kong egretty neither. As no nest was found in either egretty, no flight line was recorded in the present monitoring. During the walk through survey on 28 August, other than the bamboo trees which are within the Ho Pui Egretty boundary which was found to be cleared by villagers during a site inspection on 11 July 2009, no further adverse impacts on the habitats outside the boundary of the works area including the Conservation Area and the remaining Ho Pui Egretty was found.

#### September 2011

65 individuals of birds from 21 species were recorded during the survey for monthly monitoring on 20 September 2011. Among the birds recorded, 5 individuals of wetland dependent birds (from 3 species) were recorded. No egretty surveys for Ho Pui Egretty nor Ma On Kong egretty were required in the Reporting Period. During the walk through survey on 25 September, other than the bamboo trees which are within the Ho Pui Egretty boundary which was found to be cleared by villagers during a site inspection on 11 July 2009, no further adverse impacts on the habitats outside the boundary of the works area including the Conservation Area and the remaining Ho Pui Egretty was found.



### 3.5 OTHER MONITORING AND AUDIT

#### 3.5.1 Waste Management

Waste management audit was performed regularly on a monthly basis. A Billing Account (The account number 7006524) under the **Waste Disposal (Charges for Disposal of Construction Waste) Regulation** has already been assigned on 9 Jan 2008, a discharge license No. 1U461/1 under Section 20 of the **Water Pollution Control Ordinance** has been issued. CRBC has also registered as a Chemical Waste Producer with EPD under the Waste Disposal (Chemical Waste) (General) Regulation and the Waste Producer Number assigned is WPN: 5611-531-C3124-28 dated 2 May 08.

#### 3.6 CULTURAL HERITAGE

During the Reporting Period, there was no construction work conducted within 100m area from the cultural heritage site within KT13, and therefore no cultural heritage monitoring was required in accordance with the approved methodology.

#### 3.7 LANDSCAPE AND VISUAL

A total of six (6) occasions of landscape and visual audit was undertaken on **7, 21 July, 6, 20 August and 9, 23 September 2011**. The landscape and visual audit confirmed that the conditions of the identified landscape resources during the Reporting Period remained the same as those of the baseline, except minor changes of river/stream/fish pond landscape character area at LR1, LR2.1, LR2.2, LCA3 and LCA4 due to site clearance, soil stockpiling and preparation work within KT13.

Detailed landscape and visual reports and the associated mitigation measures can be found in the appendix of the corresponding previous monthly EM&A reports of the Reporting Period.

### 3.8 WEATHER CONDITIONS

#### **July 2011**

The effect of a prolonged rainy period in the middle of the month was more than compensated by two fine spells occurring before and after the episode, making July 2011 drier than usual. The monthly total rainfall recorded at the Hong Kong Observatory was 226.8 millimetres, about 61 percent of the normal figure. The accumulated rainfall since 1 January was only 934.7 millimetres, a deficit of 35 percent compared to the normal figure of 1429.1 millimetres for the same period. On the other hand, the month has a near-normal mean temperature of 28.8 degrees.

#### **August 2011**

Under the prolonged dominance of the sub-tropical ridge, Hong Kong experienced one of the hottest August since records began in 1884. The monthly mean temperature soared to 29.5 degrees, equaling the record set in 1990 and 1998 and was 1.1 degrees above normal. The month was sunnier than usual. The monthly total duration of bright sunshine was 242.0 hours, 52.3 hours higher than normal. The month was also dry with a total rainfall of 157.6 millimetres, only 35 percent of the normal figure and the accumulated rainfall since 1 January of 1092.3 millimetres suffered a deficit of 42 percent compared to the normal figure of 1873.7 millimetres for the same period.

#### **September 2011**

In spite of a major tropical cyclone affecting Hong Kong during September 2011, the total rainfall recorded for the month was only 123.1 millimetres or 43 percent of the normal figure. The accumulated rainfall since 1 January of 1215.4 millimetres still suffers a deficit of 44 percent compared to the normal figure of 2161.2 millimetres for the same period. The month was also warmer than usual with a monthly mean temperature of 28.0 degrees which was 0.4 degrees above normal.

#### 4 NON-COMPLIANCE, COMPLAINT, NOTIFICATION OF SUMMONS & SUCCESSFUL PROSECUTION

##### 4.1 NON-COMPLIANCE

Apart from the exceedances of water quality A/L levels summarized in **Table 3-3**, no non-compliance or deficiency was identified during regular site inspection and environmental audit. No associated remedial actions were recommended. No other non-compliance or deficiency was identified during regular site inspection and environmental audit. No associated remedial actions were recommended.

##### 4.2 ENVIRONMENTAL COMPLAINTS

No written or verbal complaints were received for each environmental issue during the Reporting Period. No associated remedial actions were recommended.

##### 4.3 NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

No notifications of summons and successful prosecutions were recorded during the Reporting Period. No associated remedial actions were recommended.

##### 4.4 OTHERS

###### 4.4.1 Waste Management Status

All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil and sediment

Waste generated, re-used, recycled and disposed of during the Reporting Period is shown in **Appendix F: Monthly Summary Waste Flow Table**.

##### 4.5 SITE INSPECTION AND ENVIRONMENTAL AUDIT

A total of 13 occasions of weekly environmental site inspection and audit were conducted jointly by the ER, EO and ET during the Reporting Period. As no major construction activities were undertaken, no adverse environmental impacts were registered, indicating the mitigation measures implemented were effective and sufficient for the construction activities or preparation work and site clearance undertaken. Minor deficiencies found in the site inspection and audit were in general rectified within the specified deadlines. Findings of the site inspection and environmental audit are listed in **Table 4-4-1**.

Table 4-4-1 Summary of Findings of Site Inspection and Environmental Audit

Date	Findings / Deficiencies	Follow-Up Status
28 June 2011	• No adverse environmental impact was observed during site inspection.	N.A.
6 July 2011	• Stockpile of soil materials was observed. The Contractor was reminded to provide impermeable cover to prevent potential dust generation.	Recommendation based on the observation on 13 July 2011 was followed.
13 July 2011	• A timber was observed inside the channel, the Contractor is reminded to remove it to prevent blocking of the channel.	Recommendation based on the observation on 22 July 2011 was followed.
22 July 2011	• Construction material was observed on the gabion blocks, the Contractor should remove them to maintain housekeeping of the site.	Recommendation based on the observation on 27 July 2011 was followed.

27 July 2011	<ul style="list-style-type: none"> <li>Used timber was observed inside the channel, the Contractor should remove them to prevent blocking of the channel.</li> </ul>	Recommendation based on the observation on 2 August 2011 was followed.
2 August 2011	<ul style="list-style-type: none"> <li>Construction material placed inside the channel should be removed to prevent blocking during rainstorm.</li> </ul>	Recommendation based on the observation on 10 August 2011 was followed.
10 August 2011	No adverse environmental impact was observed during site inspection.	N.A.
16 August 2011	No adverse environmental impact was observed during site inspection.	N.A.
23 August 2011	No adverse environmental impact was observed during site inspection.	N.A.
31 August 2011	No adverse environmental impact was observed during site inspection.	N.A.
8 September 2011	No adverse environmental impact was observed during site inspection.	N.A.
16 September 2011	No adverse environmental impact was observed during site inspection.	N.A.
23 September 2011	No adverse environmental impact was observed during site inspection.	N.A.

## 5 CONCLUSION

This is the 12<sup>th</sup> Quarterly EM&A Report for Designated Project works during the period from 26 June to 25 September 2011 summarizing the environmental impact monitoring and audit results on air quality, construction noise, water quality, ecology, cultural heritage and waste management.

Monitoring results demonstrated that no exceedances of environmental quality criteria of air quality, construction noise and ecology were recorded during the Reporting Period.

For water quality monitoring, a total of 18 Limit level exceedances were recorded during the Reporting Period. In our investigation for the cause of exceedance, it was observed that high levels of Turbidity, Suspended solids, NH<sub>4</sub><sup>+</sup>-N and Zinc were also recorded at upstream and control station. It is believed that the exceedances were likely due to the discharge from the agriculture farm and livestock at the vicinity as water quality throughout the channel was affected. Therefore, it was concluded that the exceedances were not project related. The overall compliance rate of water quality monitoring in the quarter is 96.0%.

During the Reporting Period, there was no construction work conducted within 100m of the cultural heritage site at KT13. Therefore, no cultural heritage monitoring was required in accordance with the approved methodology.

The conditions of the landscape resources during the Reporting Period remained the same as the baseline, except minor changes of river/stream/fish pond landscape character area at LR1, LR2.1, LR2.2, LCA3 and LCA4 due to site clearance, soil stockpiling and preparation work within KT13.

No written or verbal complaints, notifications of summons and successful prosecutions were received (written or verbal) from any medium during the Reporting Period. No adverse environmental impacts were observed during the weekly site inspection and environmental audit which indicated that the implemented mitigation measures for air quality, construction noise, water quality and ecology were effective. Minor deficiencies were found in the weekly site inspection and audit which were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.

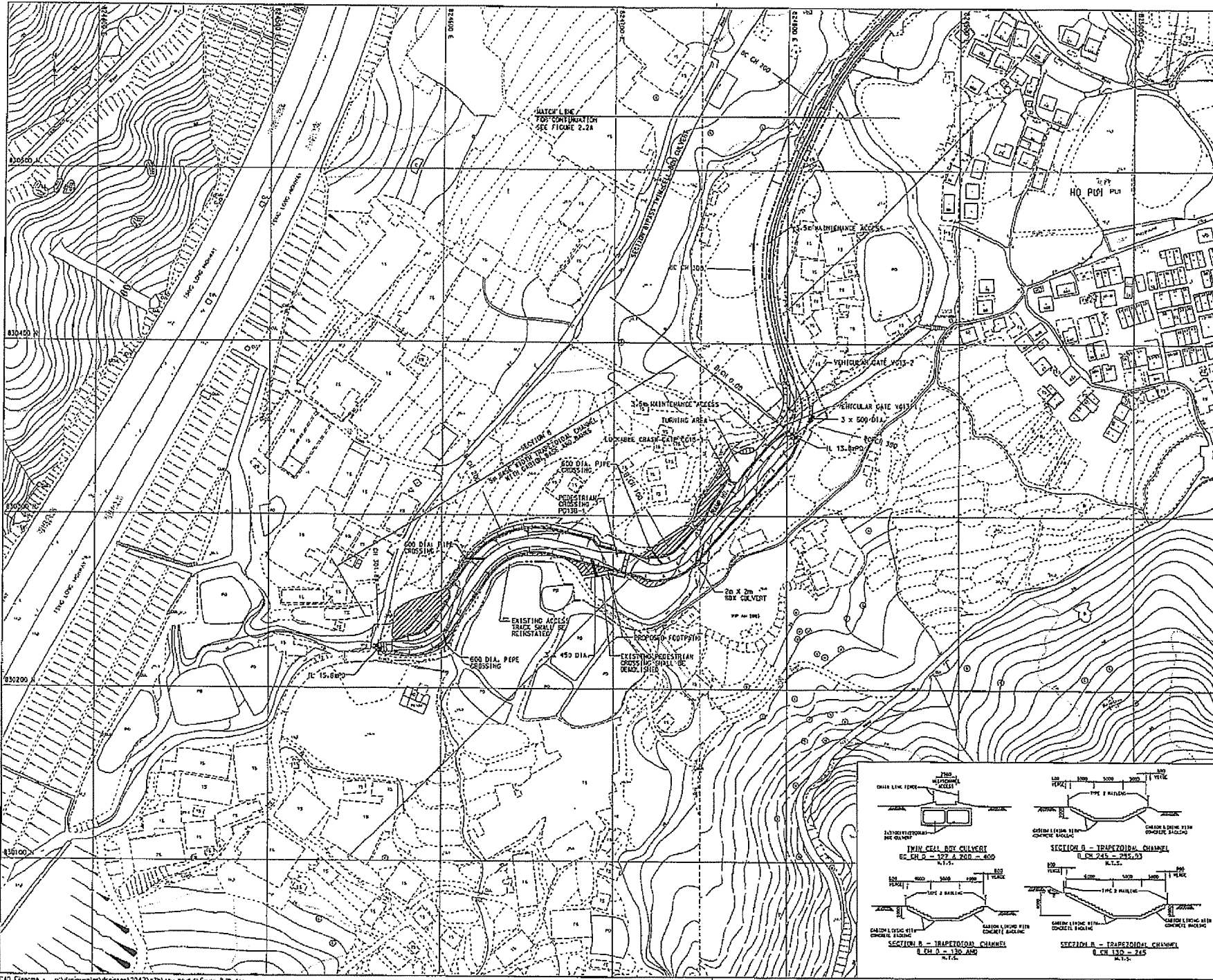
In viewing that the major construction activities of the Project are substantially completed, the Contractor is reminded to maintain the housekeeping of the site in good standard.

The Contractor is reminded that all environmental issues identified in the EM&A Manual as recommended in the EIA and summarized in Mitigation Measure Implementation Schedule shall be implemented properly until the monitoring programme end.

END OF TEXT

## **Appendix A**

### **Location Plan of the Project and Environmental Monitoring Locations**



- © COPYRIGHT BY BLACK & VEATCH HONG KONG LIMITED and Government of HONG KONG
- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
  2. GRID LINES ARE HONG KONG METRIC GRID 1960.
  3. TYPE 2 RAILING WITH DEBRIS TRAP BAR AND BENCH MARK PILES SHALL BE PROVIDED AT BOTH SIDES OF THE CHANNEL BANKS.

- LEGEND:
- SITE BOUNDARY
  - PROPOSED CHANNEL
  - PROPOSED SLOPE
  - ▨ AREA TO BE FILLED TO ADJACENT GROUND LEVEL
  - 1:1 SLOPE
  - PROPOSED RETAINING WALL

C	05/05	AMENDMENT TO	BY-PASS CULVERT	K.I.L.
B	10/05	MINOR AMENDMENT TO	CHANNEL LAYOUT	K.I.L.
A	05/05	MINOR AMENDMENTS TO	SITE BOUNDARY	K.I.L.

REVISION	DATE	DESCRIPTION	BY	CHECKED	DATE
1	04/04		AK	AK	04/04
2	04/04		AK	AK	04/04

AGREEMENT NO. CE 62/93

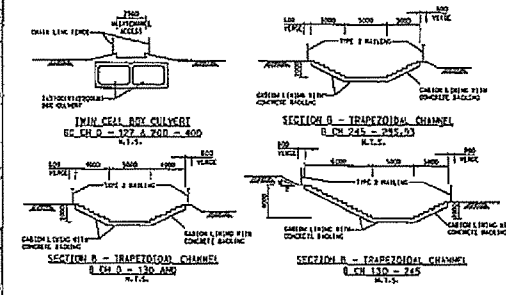
Contract Title:

YUEN LONG, KAM TIN, NGAU TAM MEI AND TIN SHUI WAI DRAINAGE IMPROVEMENT, STAGE 1, PHASE 2B - KAM TIN

MA ON KONG CHANNEL KT13 PROPOSED LAYOUT PLAN (SHEET 2 OF 2)

FIGURE 1.3b

Scale: 1:2000 A1, 1:2000 A3



P&ID Date: 16 APR 2006



Copyright by Black & Veatch Hong Kong Limited and  
Corporation of BESAR

NOTES:  
1. GRID LINES ARE HONG KONG METRIC GRID 1980.

- LEGEND:
- MA ON KONG AND HO PUT ECRETIES
  - PROPOSED COMPENSATORY TREE PLANTING
  - CONSERVATION AREA DENOED ON OUTLINE ZONING PLAN
  - WDRAS BOLDARY OF CHANNEL X13
  - ECOLOGY MONITORING AREAS

Revision	Date	Description			Initial
		Designed	Checked	Drawn	
Initial		MC	KIL	YLL	KIL
Date	09/05	09/05	09/05	09/05	09/05

Approved

AGREEMENT NO. CE 67/98

Contract title  
YUEN LONG, KAM TIN,  
NGAU TAM MEI AND TIN SHUI WAI  
DRAINAGE IMPROVEMENT, STAGE 1,  
PHASE 2B - KAM TIN

Drawing title  
ECOLOGY MONITORING AREAS  
RECOMMENDED FOR  
CONSTRUCTION PHASE AND  
OPERATION PHASE

Drawing no.	Scale
Figure 6.1	1:2000 A1 1:4000 A3

香港特別行政區政府渠務署  
THE GOVERNMENT OF THE  
HONG KONG  
SPECIAL ADMINISTRATIVE REGION  
DRAINAGE SERVICES DEPARTMENT

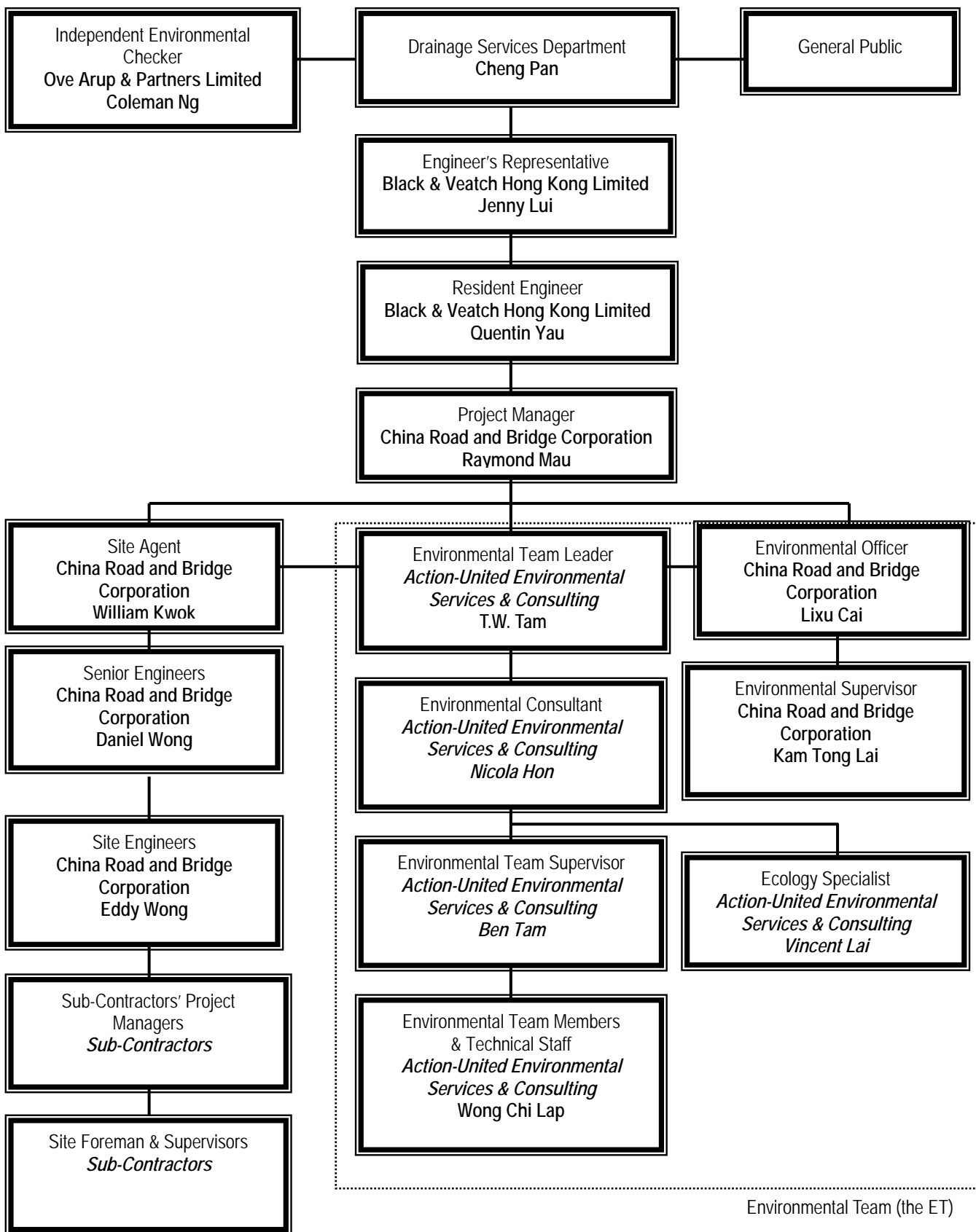
BLACK & VEATCH HONG KONG LIMITED  
黑政工程顧問有限公司

Plot Date: 25 APR 2006  
CAD Filename: p:\d\dr\water\dr\map\12047\c20\env\plan\1\fig1-5.dwg



**Appendix B**

**Environmental Management Organization and  
Contacts of Key Personnel**



Environmental Management Organization

**Contact Details of Key Personnel**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
DSD	Employer	Mr. Cheng Pan	2594-7264	2827-8526
B&V	Engineer's Representative	Ms. Jenny Lui	2478-9161	2478-9369
B&V	Resident Engineer	Mr. Quentin Yau	2478-9161	2478-9369
OAP	Independent Environmental Checker	Mr. Coleman Ng	2268-3097	2268-3950
CRBC	Project Director	Mr. Wang Yanhua	2283-1688	2283-1689
CRBC	Project Manager	Mr. Raymond Mau	9048-3669	2283-1689
CRBC	Site Agent	Mr. William Kwok	9779-8871	2283-1689
CRBC	Senior Engineer	Mr. Daniel Wong	9858-3176	2283-1689
CRBC	Environmental Officer	Mr. Lixu Cai	6474-6975	2283-1689
CRBC	Environmental / Construction Supervisor (Yuen Long site)	Mr. Kam Tong Lai	9401-6296	2283-1689
CRBC	Safety Officer	Mr. Eddy Wong	9374-8954	2283-1689
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Miss Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Ben Tam	2959-6059	2959-6079
AUES	Ecologist	Mr. Vincent Lai	2959-6059	2959-6079

**Legend:**

- DSD (Employer) – Drainage Services Department  
 B&V (Engineer) – Black & Veatch Hong Kong Limited  
 CRBC (Main Contractor) – China Road and Bridge Corporation  
 OAP (IEC) – Ove Arup & Partners Ltd  
 AUES (ET) – Action-United Environmental Services & Consulting

## **Appendix C**

### **Construction Program**

Three Months Rolling Programme - July 2011 to September 2011

ID	Task Name	Duration	Start	Finish	July					August				September					
					26/6	3/7	10/7	17/7	24/7	31/7	7/8	14/8	21/8	28/8	4/9	11/9	18/9	25/9	
1	Section II (Channel KT13)	77 days	Sat 2/7/11	Fri 30/9/11															
2	Regular Tree Survey & Protection	77 days	Sat 2/7/11	Fri 30/9/11															
3	Section A	77 days	Sat 2/7/11	Fri 30/9/11															
4	Remedial Works	77 days	Sat 2/7/11	Fri 30/9/11															
5	Section of Box Culvert BC13-1	77 days	Sat 2/7/11	Fri 30/9/11															
6	Remedial Works	77 days	Sat 2/7/11	Fri 30/9/11															
7	Section B	77 days	Sat 2/7/11	Fri 30/9/11															
8	Remedial Works	77 days	Sat 2/7/11	Fri 30/9/11															
9																			
10	Section V	77 days	Sat 2/7/11	Fri 30/9/11															
11	Preservation and Protection of Tree for Section II	77 days	Sat 2/7/11	Fri 30/9/11															
12																			
13	Others	77 days	Sat 2/7/11	Fri 30/9/11															
14	Installation of Retro-reflective Identification Tags in Manholes at Tseng Tau Chung Tsuen	77 days	Sat 2/7/11	Fri 30/9/11															
15	Rehabilitation Works for Existing Sewerage at Leung Tin Tsuen	77 days	Sat 2/7/11	Fri 30/9/11															

Task Split Progress Milestone Summary

## **Appendix D**

### **Mitigation Measure Implementation Schedule**

**Appendix A**  
**Mitigation Measures Implementation Schedule**

Ecological Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
4.9.2	To avoid potential impacts to the egret and the associated habitats, the proposed layout and gabion structures shown in Figures 2.2A, 2.2B and 2.4 of the EIA shall be adopted. The bypass culvert design shall ensure that continuous flow of the existing unmodified stream is maintained. Reprovide the stream section affected by the bypass culvert with gabion banks and natural substrates as stream bed materials.	Minimize loss of egret, stream and conservation area, and the associated ecological habitats	Design Stage Refer to Figures 2.2A, 2.2B and 2.4 for locations	Detailed Design Engineer	✓	✓		Environmental Impact Assessment Ordinance (EIAO)
4.9.7	Chain link fence to be provided along the site boundary near the CA zone and Ho Pui Egret (Figure 4.13). Prohibit the disturbance of vegetation outside the site boundary. Signage to be provided at conspicuous location to warn workers from entering and disturbing the sensitive areas.	Minimize the disturbance and access to the CA zone and Ho Pui Egret during construction	Construction Stage at locations shown in Figure 4.13 of the EIA before commencement of bypass culvert construction	Construction Contractor		✓		EIAO
4.9.8	Compensatory planting of about 148 heavy standard size trees (in 2:1 ratio) for the approximately 74 trees to be felled.	Compensatory planting of trees that inevitably need to be felled	Construction Stage at locations shown in Figures 4.13, LP-001 and LP-002 of the EIA before commencement of operation stage	Construction Contractor		✓		EIAO
4.9.9 & Table 4.35	Planting an area (855 m <sup>2</sup> ) of appropriate tree and bamboo species as shown in Figure 4.13:  <i>Bambusa eutuldoides</i> 40% of total species <i>Cinnamomum camphora</i> 15% of total species <i>Celtis tetranda</i> 15% of total species <i>Ficus tetranda</i> 15% of total species <i>Ficus microcarpa</i> 15% of total species	Replace lost vegetation and conservation area by enhancing a stream side area to become suitable habitats for egrets	Construction Stage at locations shown in Figure 4.13 of the EIA before commencement of operation stage	Construction Contractor		✓		EIAO

Ecological Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
4.9.2 (ii)	Potentially adverse impacts arising from the maintenance of the channelized sections will be minimized by restricting routine channel maintenance to annual silt removal by hand or light machinery during the dry season (October to March). The management of woody / emergent vegetation will be limited to manual cutting, to be carried out only when unchecked growth of such vegetation is very likely to impede channel flow.	Minimize impacts arising from the maintenance of KT13	KT13 during Operation Stage	DSD (or DSD's maintenance contractor)			✓	EIAO



Noise Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
5.5.22	<p><u>Level 1 Mitigation Measure</u></p> <p>Plant to be used in the construction phase are listed in Appendix F1 of the EIA. Quiet and silenced plant should be used (Appendix F2).</p> <p>No nighttime works will be carried out.</p>	Prevent noise impact at sensitive receivers	To be implemented at the works sites during the Construction Phase.	Construction Contractor		✓		EIAO
5.5.23 5.5.24	<p><u>Level 2 Mitigation Measure</u></p> <p>Temporary noise barrier of minimum height 3m should be erected along the site boundary of the construction work which is closest to the NSRs. These barrier shall be gap free apart from the necessary entrances/exits. The overall length for which noise barriers are required is shown in Figure 5.3. These barriers shall be constructed in such a way that no construction works and PME are visible from the low rise noise sensitive receivers they protect. A minimum surface density of 10 kg/m<sup>2</sup> is required. Where the affected sensitive receivers are very close to the construction works so that they cannot be adequately screened by the proposed temporary noise barrier as described on Figure 5.3, the Contractor is required to fully or partially modify the design of the temporary noise barriers, such as adding cantilevered portion or the use of mobile barrier, to screen the construction works away from the line of sight of the affected sensitive receivers.</p>	Prevent noise impact at sensitive receivers	To be implemented at the works sites during the Construction Phase (see Figure 5.3).	Construction Contractor		✓		EIAO

Air Quality Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
6.5.12	<p>Dust Mitigation Measures</p> <p>The Contractor shall prevent dust nuisance arising from the construction activities. The Contractor is required to follow all the requirements for dust control stipulated in the Air Pollution Control (Construction Dust) Regulation. Dust suppression measures should be installed as part of proper construction practice, and these should be incorporated in the Contract Specification and implemented to minimize dust nuisance to within acceptable levels. The following are examples of the dust suppression measures:</p> <ul style="list-style-type: none"> <li>(i) The Contractor shall frequently clean and water the site to minimize fugitive dust emissions.</li> <li>(ii) Effective water sprays shall be used during the delivery and handling of aggregate, and other similar materials, when dust is likely to be created and to dampen all stored materials during dry and windy weather.</li> <li>(iii) Watering of exposed surfaces shall be exercised as often as possible depending on the circumstances.</li> <li>(iv) Areas within the site where there is a regular movement of vehicles must be regularly watered as often as necessary for effective suppression of dust or as often as directed by the Engineer.</li> <li>(v) Where dusty material are being discharged to vehicle from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust fans shall be provided for this enclosure and vented to a suitable fabric filter system.</li> </ul>	Prevent dust / odour nuisance	To be implemented at the works sites during the Construction Phase.	Construction Contractor		✓		Air Pollution Control Ordinance [Air Pollution Control (Construction Dust) Regulation]

Air Quality Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
6.5.12 (cont'd)	<p>(vi) The Contractor shall restrict all motorised vehicles within the site, excluding those on public roads, to a maximum speed of 15 km per hour and confine haulage and delivery vehicles to designated roadways inside the site.</p> <p>(vii) Wheel washing facilities shall be installed 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 facility. Such wheel washing facilities shall be usable prior to any earthworks excavating activity on the site. The Contractor shall also provide a hard-surfaced road between any washing facility and the public road.</p> <p>(viii) All vehicle exhausts should be directly vertically upwards or directed away from the ground.</p> <p>(ix) Any materials dropped on paved roads will need to be cleaned up immediately to prevent dust nuisance.</p> <p><i>Odour Mitigation Measures</i></p> <p>(x) Any odourous excavated material should be placed away from sensitive receivers. The material shall be removed within 1 day.</p> <p>(xi) Any odourous material stockpiled should be of the shortest duration. Also, all stockpiled materials must be stored in covered skips. Any leachate from these storage skips shall be collected in covered tanks or buckets and removed from site with toilet waste by licensed collectors for discharging to government sewer.</p>							

Air Quality Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
6.5.4	No on-site concrete batching plant shall be erected.	Prevent dust nuisance	To be implemented at the works sites during the construction phase			✓		Air Pollution Control Construction Dust Regulation
6.5.13	During the Operation Phase, excavated sediment deposits should be regularly removed from the channel to maintain adequate water flow as well as to remove odourous materials. Potentially odourous materials should be stockpiled for the minimum time possible and away from ASRs. The material should be stored in covered impermeable skips and removed from site within 1 day.	Prevent odor nuisance during operation phase	To be implemented along KT13 during the Operation Phase.	DSD's Maintenance Contractor			✓	

Water Quality Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
7.5.5 - 7.5.7	<p>Temporary earth bunds and sand barriers should be used to direct stormwater run-off to temporary settlement area. The settlement area should be within the channel itself. A cofferdam should be formed to keep the working area dry. The channel will be dug out to a depth of around 1 – 2m for a length of approximately 12m, to form a sedimentation area. The volume will be approximately 50m<sup>3</sup> (with a channel width of 3.5m).</p> <p>Sediment flowing downstream should settle in this settlement pond, while run-off from the surface should be channel through a local site drainage system into the settlement area. The settlement area should be maintained and the deposited materials should be removed regularly, at the onset of and after each rainstorm to ensure proper functioning at all times. No sediment removal shall be allowed in rainy weather.</p> <p>Open stockpiles susceptible to erosion should be covered with tarpaulin or similar fabric, especially during the wet season (Apr-Sep) or when heavy rainstorm is predicted.</p>	Prevent additional pollution load being added to stream due to KT13 works (site formation)	To be implemented at the works sites during the Construction Phase.	Construction Contractor		✓		Water Pollution Control Ordinance ProPECC Note (PN 1/94)
7.5.8 - 7.5.10	<p>The Contractor should provide temporary drainage diversion during construction to ensure continuous water flow to the unmodified portion of the stream. The use of containment structure such as temporary earth bunds, sand bags, sheetpile barriers or similar techniques is recommended to facilitate a dry or at least confined excavation within watercourses.</p> <p>Excavated sediment from streams and channel is likely to be wet and contaminated. The material should be stored in covered impermeable skips and disposed on the same day, or within 1 day, to avoid both odour and inadvertent release of contaminants to nearby water bodies.</p>	Prevent additional pollution load being added to stream due to KT13 works (stream diversion and dredging)	To be implemented at the works sites during the Construction Phase.	Construction Contractor		✓		Water Pollution Control Ordinance ProPECC Note (PN 1/94)

Water Quality Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
7.5.11 - 7.5.12	<p>Runoff should be carefully channelled to prevent concrete-contaminated water from entering watercourses. Adjustment of pH can be achieved by adding a suitable neutralising reagent to wastewater prior to discharge. Re-use of the supernatant from the sediment pits for washing out of concrete lorries should be practised.</p> <p>Any exceedance of acceptable range of pH levels in the nearby water bodies caused by inadvertent release of site runoff containing concrete should be monitored and rectified under the EM&amp;A programme for this Project.</p>	Prevent additional pollution load being added to stream due to KT13 works (concreting work)	To be implemented at the works sites during the Construction Phase.	Construction Contractor		✓		Water Pollution Control Ordinance ProPECC Note (PN 1/94)
7.5.13	<p>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. The storage site should be located away from existing water courses. Hard standing compounds should drain via an oil interceptor. To prevent spillage of fuels or other chemicals to water courses, all fuel tanks and storage areas should be sited on sealed areas, within a bund of a capacity equal to 110% of the storage capacity of the largest tank. Disposal of the waste oil should be done by a licensed collector. Oil interceptors should 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. Good housekeeping practices should be implemented to minimise careless spillage and to keep the storage and 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>	Prevent additional pollution load being added to stream due to KT13 works (site workshop or depot)	To be implemented at the works sites during the Construction Phase.	Construction Contractor		✓		Water Pollution Control Ordinance ProPECC Note (PN 1/94)

Water Quality Impact Mitigation								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
7.5.14 - 7.5.15	<p>Sewage arising from the additional population of workers on site should be collected in a suitable storage facility, such as portable chemical toilets. An adequate number of portable toilets should be provided for the construction workforce. The portable toilets should be maintained in a state that will not deter the workers from using them. The collected wastewater from sewage facilities and also from eating areas or washing facilities must be disposed of properly, in accordance with the WPCO requirements. Wastewater collected should be discharged into foul sewers and collected by licensed collectors.</p> <p>Either chemical toilets or other types of sewage treatment facilities without local discharge of wastewater shall be used to handle the foul water effluent arising from the project sites.</p>	Prevent additional pollution load being added to stream due to KT13 works (wastewater from workers)	To be implemented at the works sites during the Construction Phase.	Construction Contractor		✓		Water Pollution Control Ordinance ProPECC Note (PN 1/94)

Waste Management								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
8.2.5	All construction wastes shall be sorted on site into inert and non-inert components. Non-inert materials (wood, glass and plastics) shall be recycled or reused and disposed to NENT Landfill as a last resort. Inert materials (soil, rubble, sand, rock, brick and concrete) shall be separated and reused on site prior to final disposal at the public filling facility at Tuen Mun Area 38.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		WBTC No. 12/2000  ETWB TCW No. 33/2002 19/2005 31/2004
8.2.7	Any excavated material from the stream shall be removed within 1 day of excavation, taking measures to reduce odour and potential runoff.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		WBTC No. 12/2000  ETWB TCW No. 33/2002 19/2005 31/2004
8.2.13 – 8.2.18 & 8.3.3	The excavated sediments shall be managed in accordance with ETWB TCW No. 34/2002 and WBTC No. 12/2000. The excavated sediment shall be disposed to marine disposal sites allocated by the Marine Fill Committee (MFC) – Pit IVa / Pit IVb of the East Sha Chau facility as capping material for Type 1 disposal and Pit IVc of the East Sha Chau facility for Type 2 disposal. The general allocation conditions as stipulated by the MFC shall be followed.	To properly manage the excavated sediment	Proposed works area during the Construction Phase	Construction Contractor		✓		WBTC No. 12/2000  ETWB TCW No. 34/2002  Dumping at Sea Ordinance
8.2.20	Dry concrete waste shall be sorted out from the other wastes and recycled at Tuen Mun Area 38 to form aggregates for road sub-base.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		WBTC No. 12/2000  ETWB TCW No. 33/2002 19/2005 31/2004
8.2.22 – 8.2.24	Hoarding, shutters, form works and false works made of reusable materials such as steel or plastic / concrete panels shall be used as a preferred alternative to non-reusable materials such as wood and timber, with reference to WBTC No. 19/2001 - Metallic Site Hoarding and Signboards.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		WBTC No. 19/2001



Waste Management								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
8.2.25 – 8.2.29	Where the construction processes produce chemical waste, the contractor must register with EPD as a Chemical Waste Producer. Storage, handling, transport and disposal of chemical waste shall be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published by EPD. All chemical waste shall be collected by a licensed collector for disposal at a licensed chemical waste treatment facility.	Waste reduction, re-use, recycling and proper disposal of chemical waste	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		Waste Disposal Ordinance  Waste Disposal (Chemical Waste) (General Regulation)
8.2.30	Settled sediments from wheel wash facilities should be dried and disposed of in the same way as inert excavated material.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		WBTC No. 12/2000  ETWB TCW No. 33/2002 19/2005 31/2004
8.2.32	A temporary refuse collection station shall be set up by the Contractor. Municipal waste shall be collected regularly and delivered to the North East New Territories (NENT) Landfill.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		Waste Disposal Ordinance  Public Health and Municipal Services Ordinance
8.4.2	Appropriate waste management measures should be incorporated as part of the Environmental Management Plan (EMP) to be prepared and implemented by the Contractor.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		ETWB TCW No. 19/2005
8.4.3	Training of construction staff should be undertaken by the Contractor in order to increase awareness of waste management issues.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		ETWB TCW No. 19/2005
8.3.4 & 8.4.9	The Contractor shall refer and strictly follow the requirements stipulated in the ETWB TCW No. 31/2004 – Trip Ticket System for Disposal of Construction and Demolition Materials.	Waste reduction, re-use, recycling and proper disposal	Throughout the construction sites during the Construction Phase	Construction Contractor		✓		ETWB TCW No. 31/2004

Cultural Heritage								
EIA Ref.	Mitigation Measures	Objectives of Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
Table 9.3	<p>A condition survey will be required before and during the construction phase to ensure the structure of the identified historic grave (KT13-02-02) remains intact.</p> <p>Measures will have to be taken to ensure the structural stability of the identified historic grave (KT13-02-02). Details will be presented in the condition survey.</p>	To ensure the structure of the identified historic grave (KT13-02-02) remains intact during construction phase	Historic grave (KT13-02-02) / Before and during construction of the bypass culvert	Construction Contractor / Qualified archaeologist to conduct condition survey		✓		EIAO

Landscape/Visual Impact Mitigation								
ELA Ref.	Mitigation Measures	Objectives for Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
					Design	Construction	Operation	
Table 10.2	<p><b>CONSTRUCTION PHASE</b></p> <p>CM1 Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where practical.</p> <p>CM2 Temporary access to site should be planned with care and located to minimize disturbance to existing riparian vegetation.</p> <p>CM3 Existing trees to be retained on site should be carefully protected during construction.</p> <p>CM4 Trees unavoidably affected by the works should be transplanted where practical.</p> <p>CM5 Compensatory tree planting should be provided to compensate for felled trees.</p> <p>CM6 Erection of decorative screen hoarding compatible with the surrounding rural setting.</p>	Improves visual quality of project area and proposed works	To be implemented along KT13 works area during the Construction Phase.	Construction Contractor		✓		Works Bureau Technical Circular No. 14/2002
Table 10.3, Figures LP-001 & LP-002	<p><b>OPERATION PHASE</b></p> <p>OM1 Buffer planting of trees and shrubs to screen off and blend in the channel with the adjacent settings</p> <p>OM2 Compensation planting of tree and bamboo species as recommended in Ecological Assessment compensates and reinstates riparian woodland disturbed on top of hydroseeding.</p> <p>OM3 Gabion embankment and substratum for natural colonization of vegetation</p> <p>OM4 Chromatic treatment of vehicular and pedestrian crossing to match adjacent setting.</p> <p>OM5 Aesthetic/ Quality design to re-provision of sitting out area of Ma On Kong.</p> <p>OM6 Approximate 50m stretch of grasscrete lined maintenance access road within CA zone.</p>	Improved visual quality of proposed project	To be implemented along KT13 as shown in Figures LP-001 & LP-002 during Construction Phase / To be completed before commencement of Operation	Construction Contractor		✓		WBTC No. 14/2002 & ETWBTC No. 2/2004

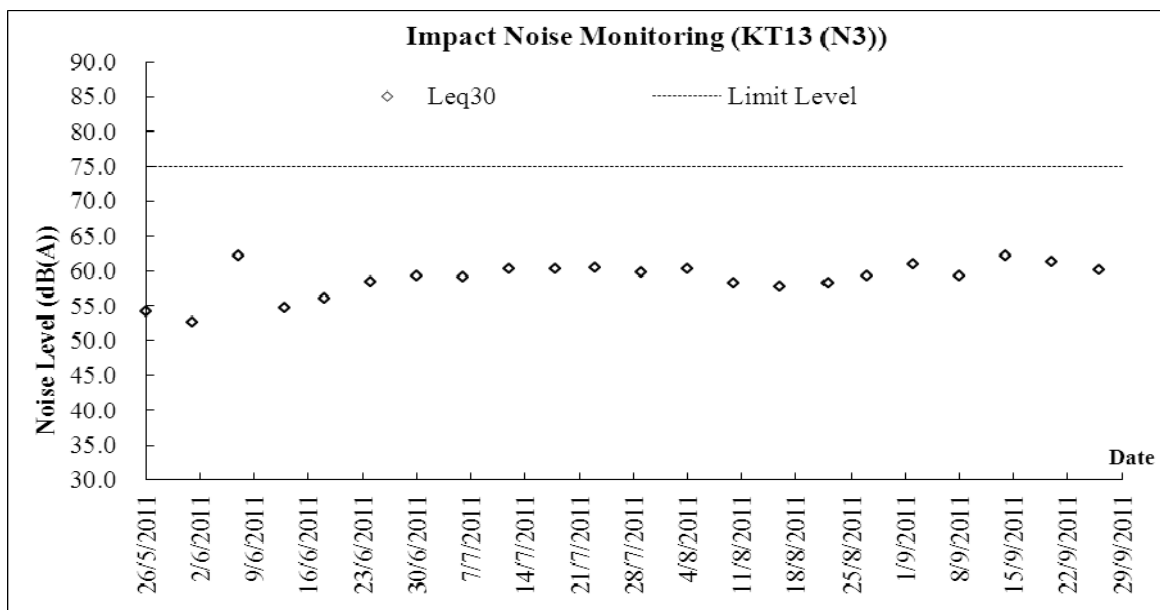
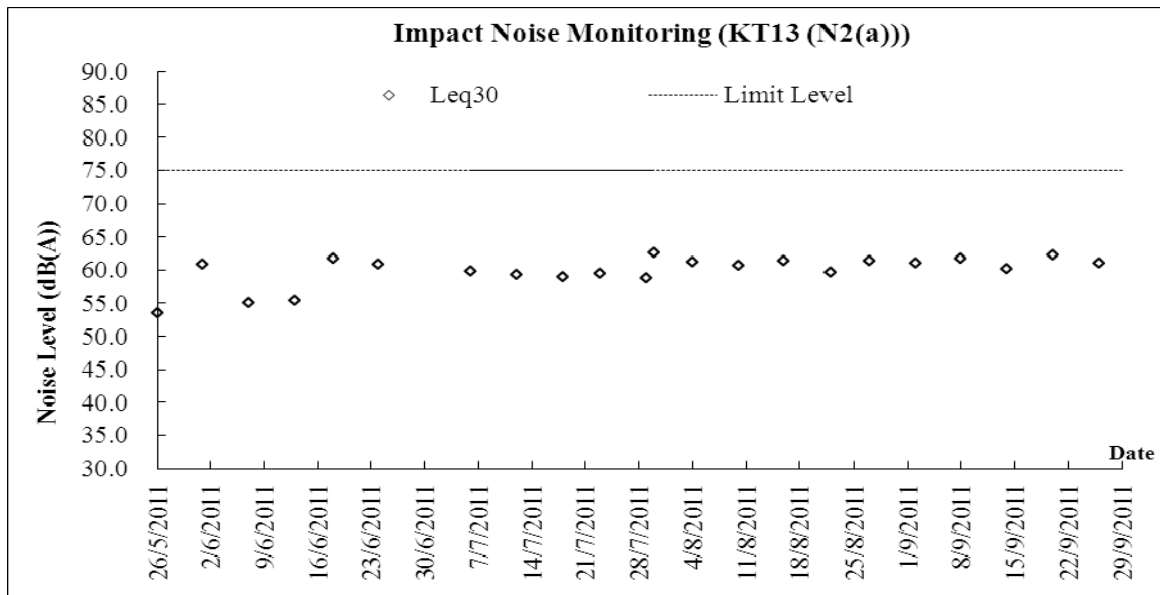
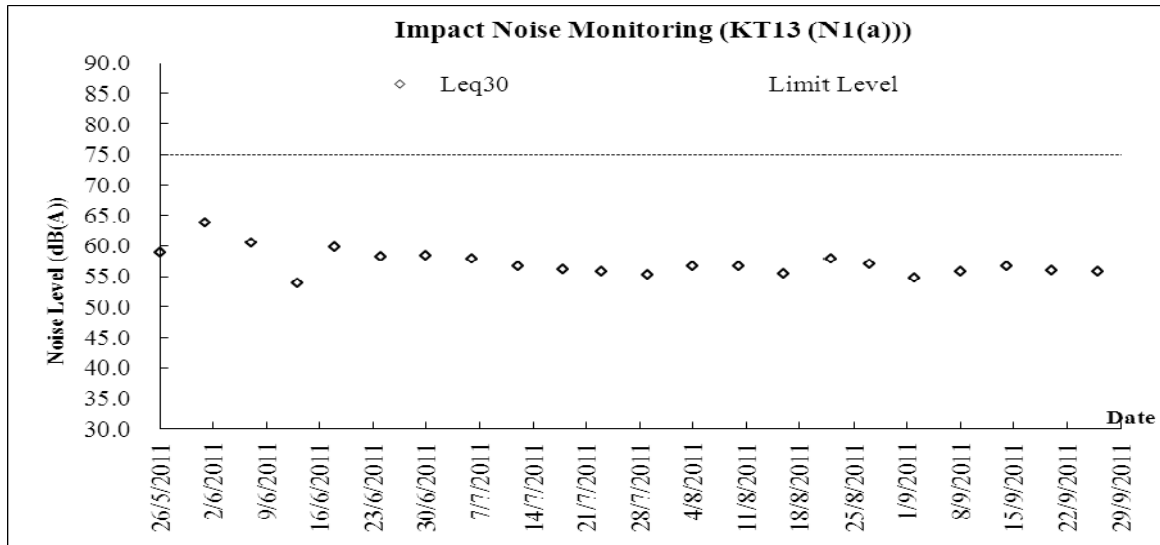
Landscape/Visual Impact Mitigation									
EIA Ref.	Mitigation Measures		Objectives for Proposed Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent(s)	Implementation Stage			Relevant Legislation & Guidelines
						Design	Construction	Operation	
10.8.18 Figures LP-001, LP-002 & 4.13	Compensatory planting of trees and bamboos with requirements as below.		To address both landscape / visual and ecological mitigation needs	To be implemented along KT13 as shown in Figures LP-001 and LP-002 (with reference to Figure 4.13) during Construction Phase / To be completed before commencement of Operation	Construction Contractor		✓		WBTC No. 14/2002 & ETWBTC No. 2/2004
	Size of compensatory tree planting	At least heavy standard size							
	Quantity of compensatory tree planting	2 times of the tree to be felled (approximately 148 nos. of tree to be compensated)							
	Proposed species	<i>Bambusa eutuldoides</i> * <i>Celtis tetrandia</i> <i>Cinnamomum camphora</i> <i>Ficus virens</i> <i>Ficus microcarpa</i>							
Requirements*	To ensure the right species of bamboo is planted, an experience botanist shall be acquired by the Contractor to source the correct bamboo species. In addition, the bamboos should have a minimum stem diameter of 8-10 cm and clump size of 5 shoots per plant.								

## **Appendix E**

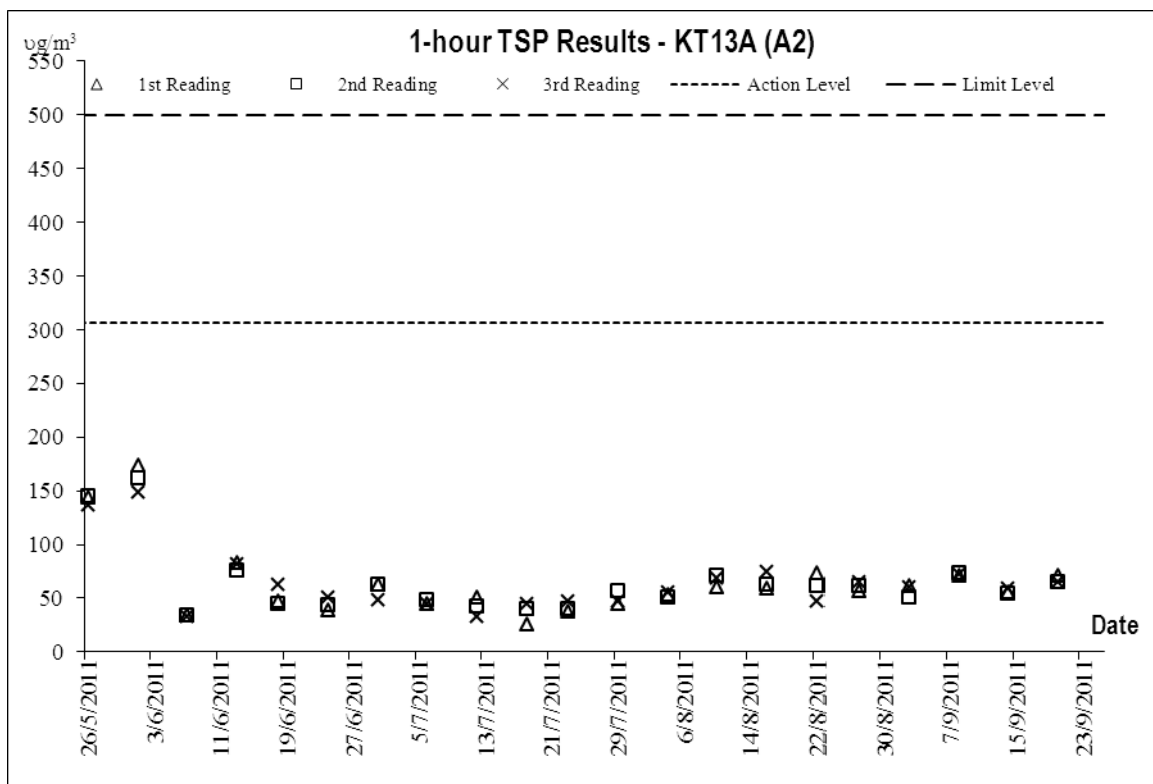
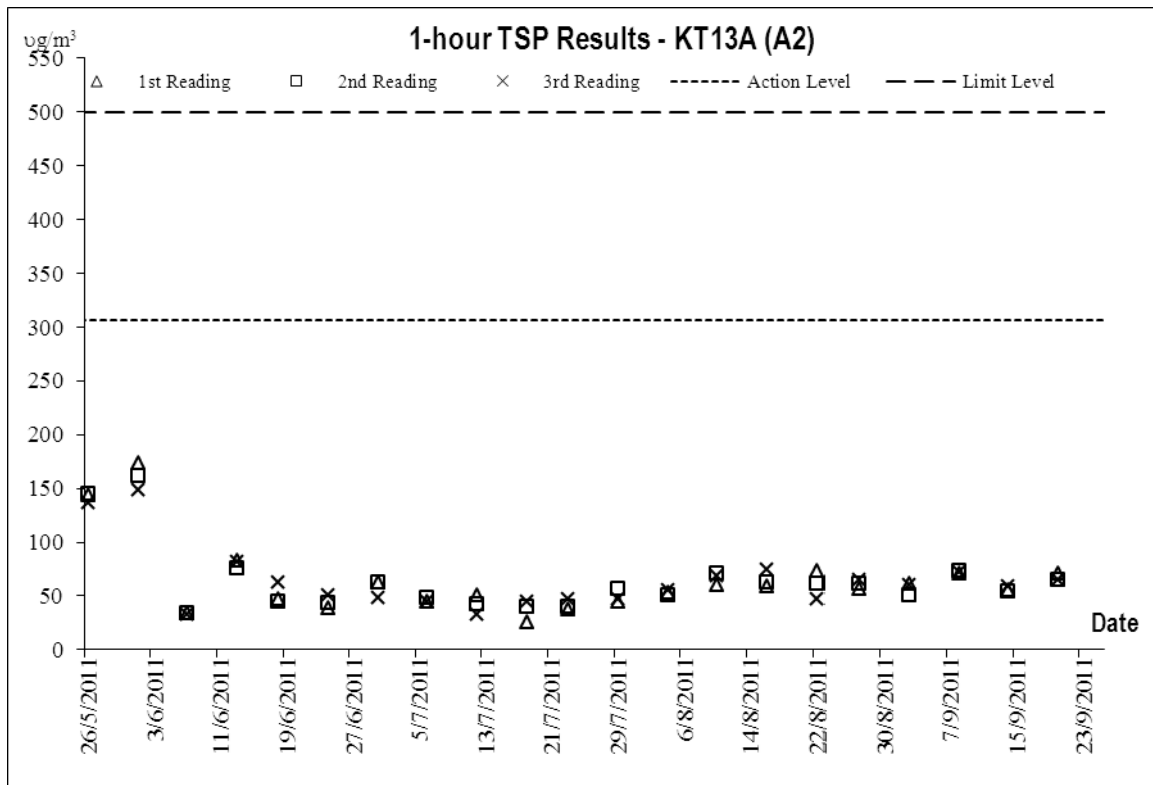
### **Graphic Plots of**

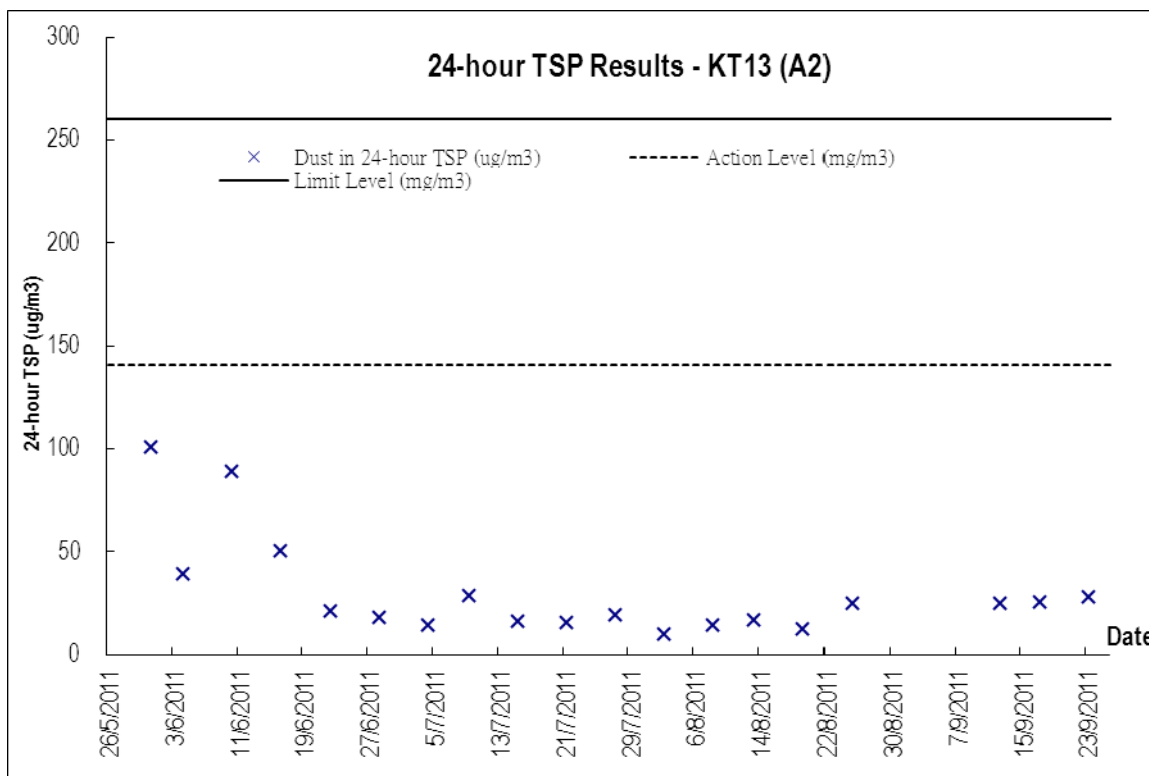
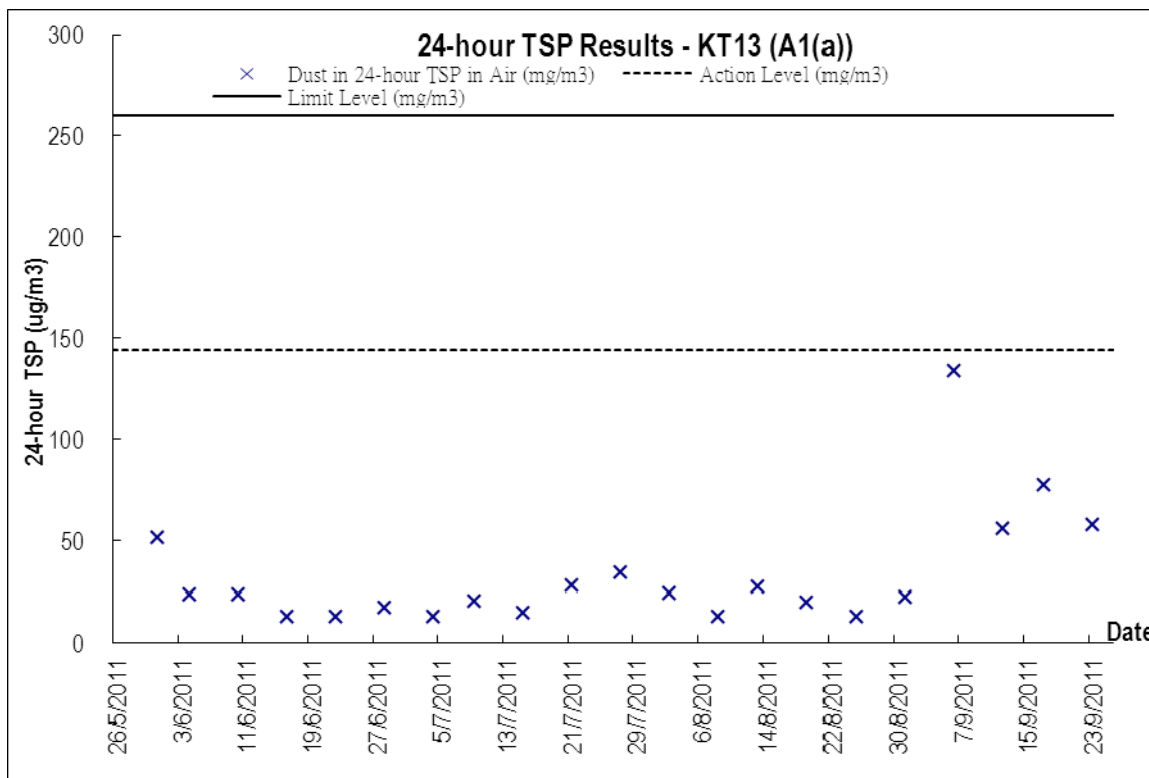
- (a) Air Quality**
- (b) Construction Noise**
- (c) Water Quality**

### Graphic Plot of Monitoring - Construction Noise



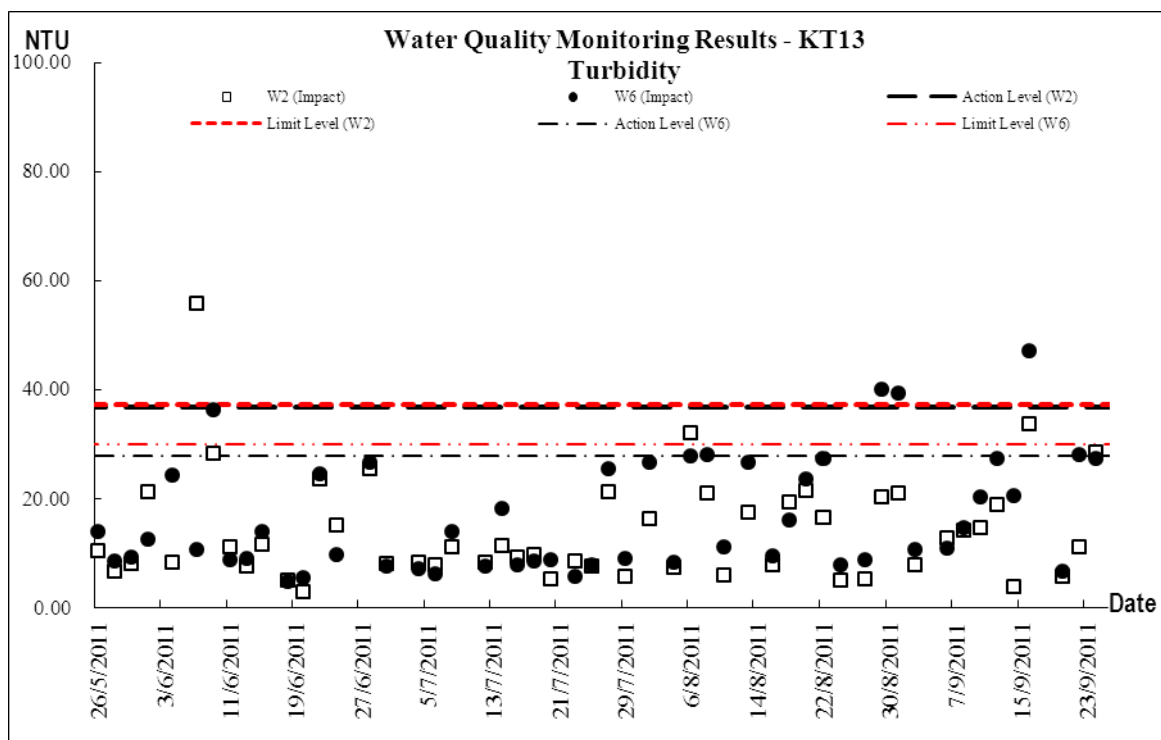
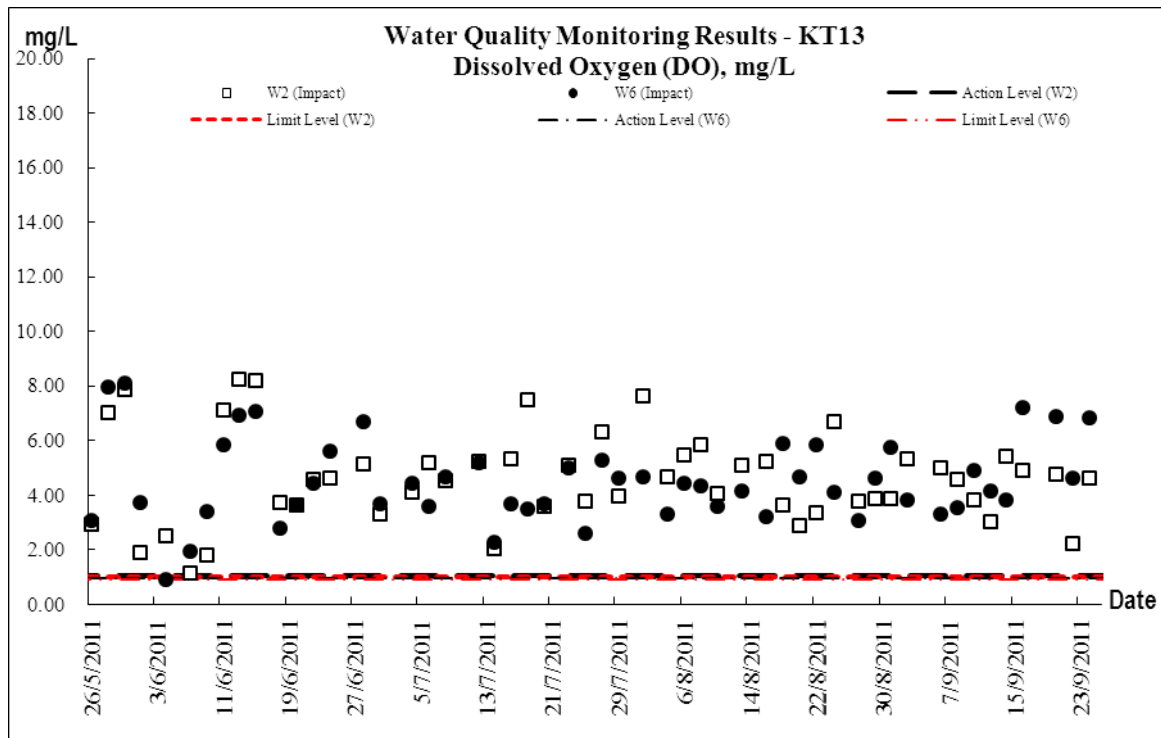
### Graphic Plot of Monitoring – Air Quality

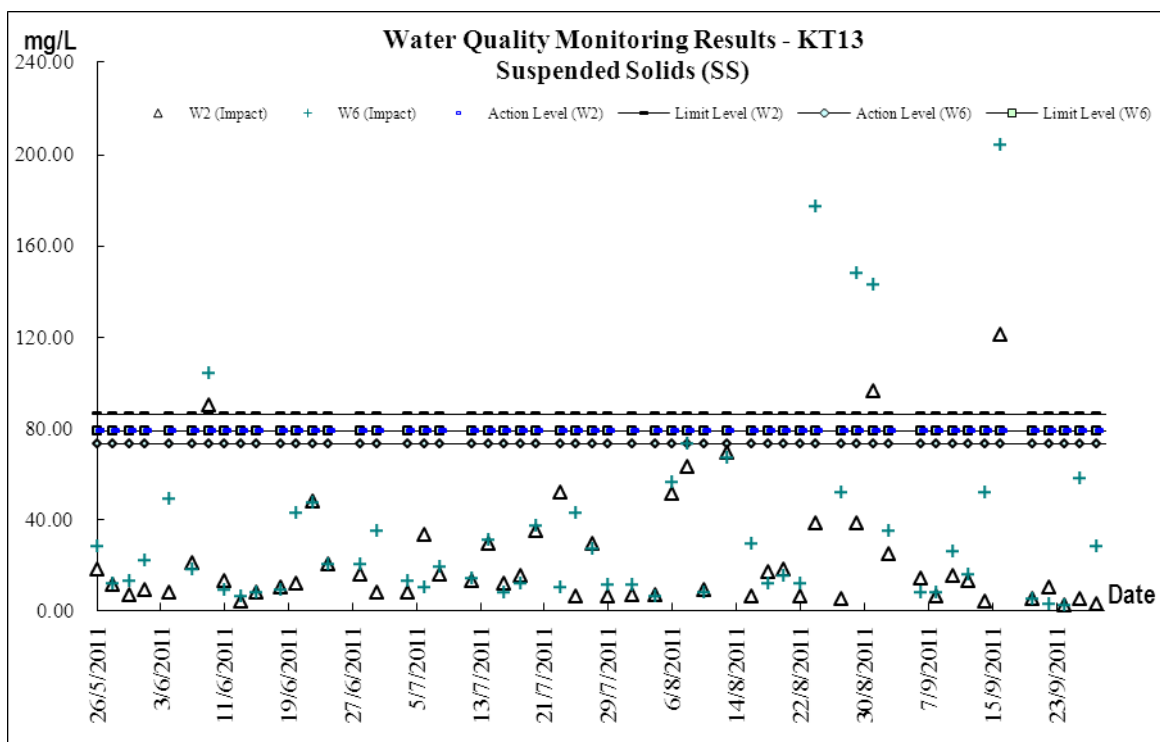
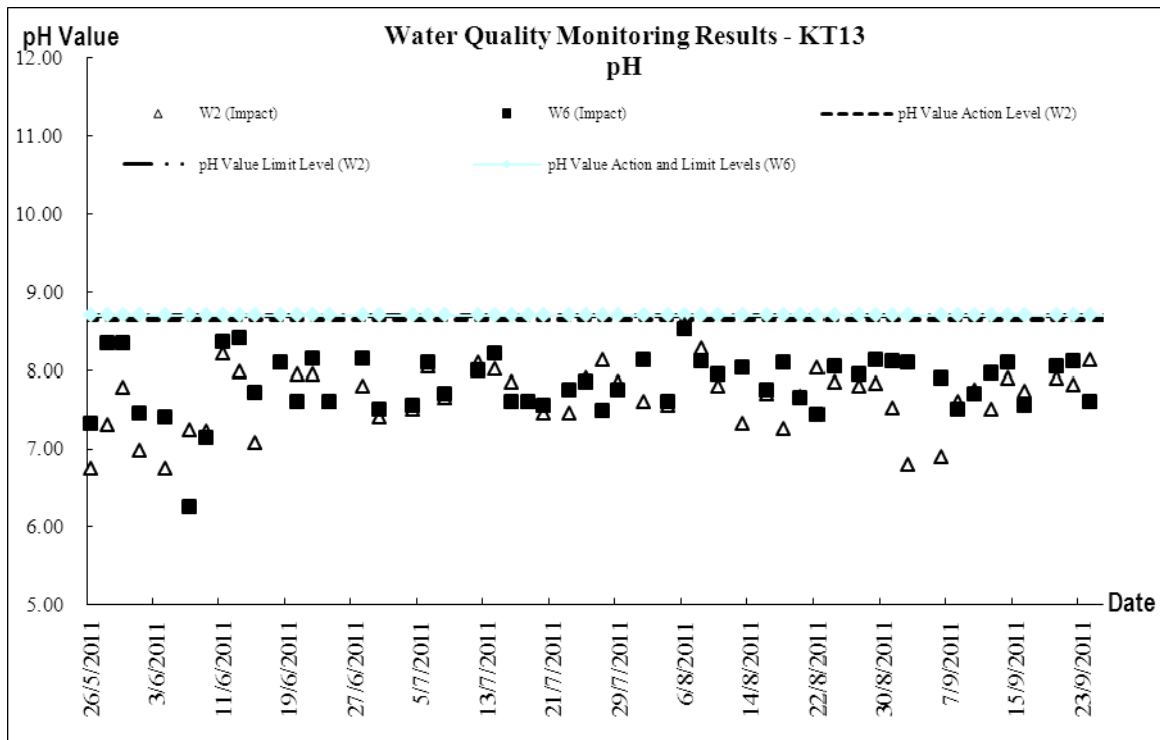


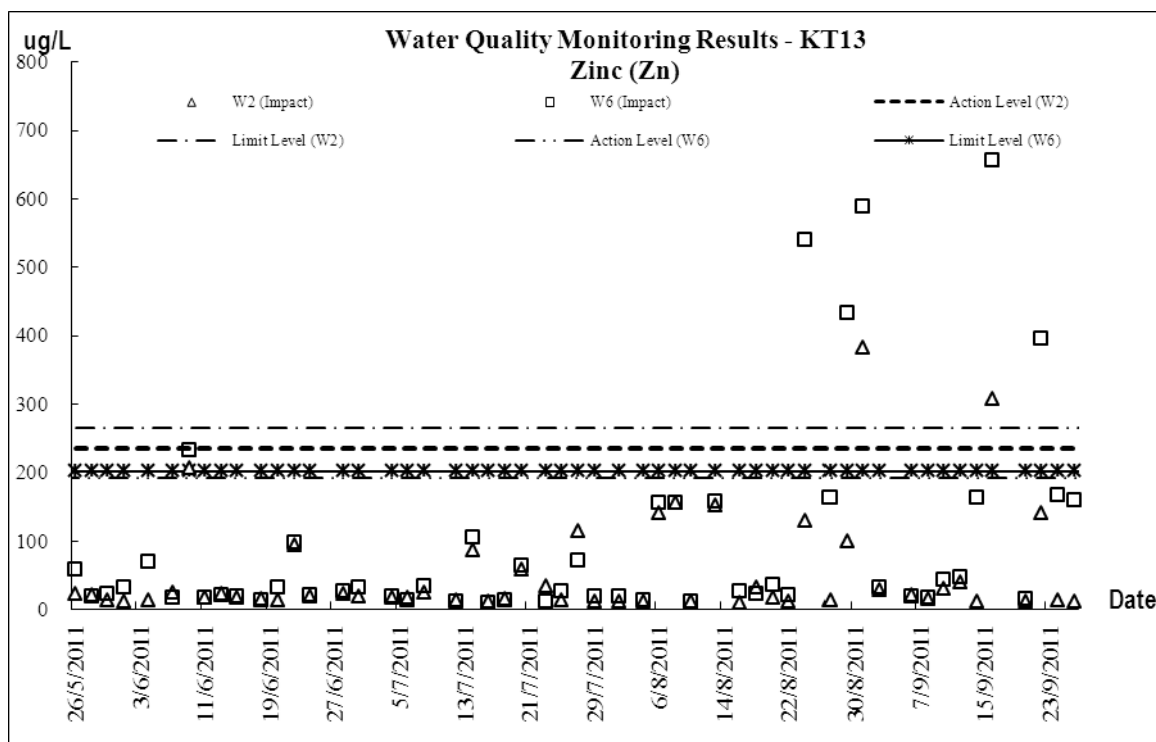
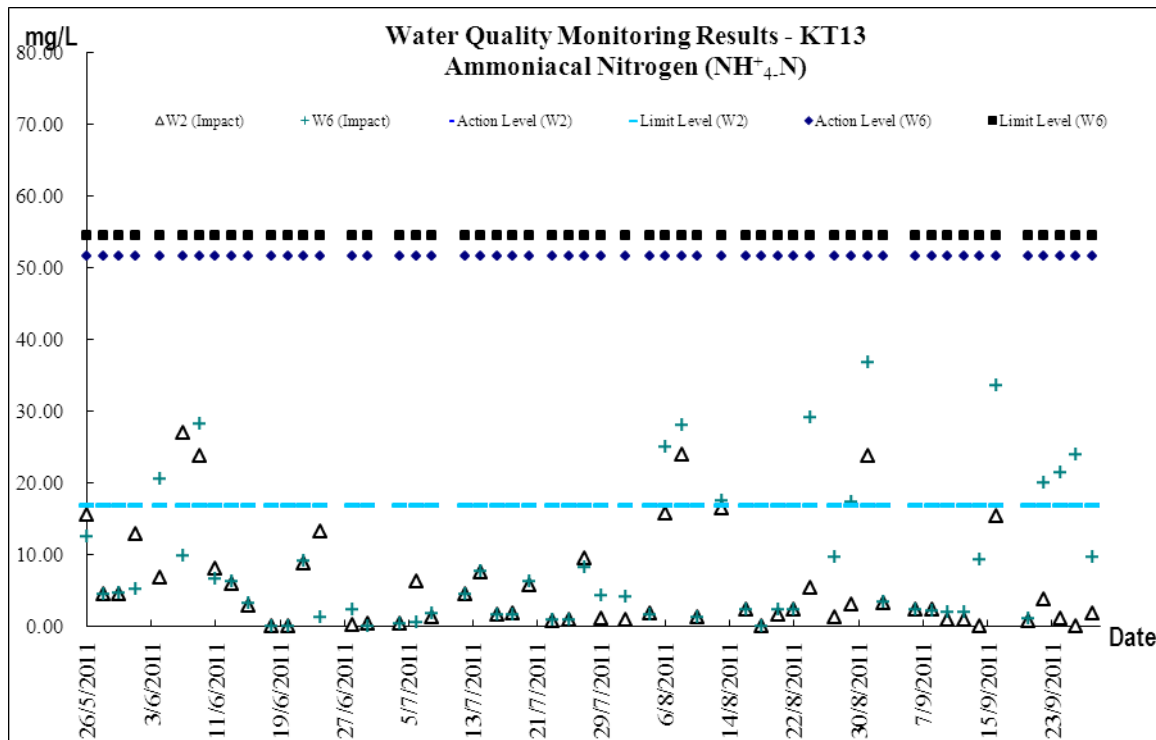




### Graphic Plot of Monitoring –Water Quality







## **Appendix F**

### **Monthly Summary Waste Flow Table**

**Monthly Summary Waste Flow Table**

Date: 30-Sep-11  
Year/Month: Sep-11

<b>Monthly Summary Waste Flow Table for September 2011</b>										
Year	Actual Quantities of Inert C & D Materials Generated Monthly					Estimated Annual Quantities of C & D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete (see note 4)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/ Cardboard packaging	Plastics (see note 3)	Chemical Waste	Others, e.g. General refuse
	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000M <sup>3</sup> )	(in '000KG)	(in '000KG)	(in '000KG)	(in '000KG)	(in '000M <sup>3</sup> )
Jan	2.452	0.001	2.5355	-0.085	0	0	0	0	0	0
Feb	4.167	0.001	1.7215	2.444	0	0	0	0	0	0
Mar	1.894	0.002	2.332	-0.44	0	0	0	0	0	0
Apr	1.123	0.001	1.551	-0.429	0	0	0	0	0	0
May	0.567	0.000	0.5665	0.000	0	0	0	0	0	0
Jun	0.115	0.000	0.297	-0.182	0	0	0	0	0	0
Sub-Total	10.32	0.005	9.004	1.308	0	0	0	0	0	0
Jul	-0.138	0.000	0.2145	-0.352	0	0	0	0	0	0
Aug	0.099	0.000	0.099	0.000	0	0	0	0	0	0
Sep	0.000	0.000	0.000	0.000	0	0	0	0	0	0
Oct	0.000				0	0	0	0	0	0
Nov	0.000				0	0	0	0	0	0
Dec	0.000				0	0	0	0	0	0
Total	10.278	0.005	9.317	0.956	0.000	0.000	0.000	0.000	0.000	0.000

- Notes:
- (1) The performance targets are given in PS Clause 28.10(14)
  - (2) The waste flow table shall include C&D materials that are specified in the Contract to be imported for use at the Site.
  - (3) Plastics refer to plastic bottles/ containers, plastic sheets/ foam form packaging material
  - (4) Broken concrete for recycling into aggregates
  - (5) Negative numbers in "Reused in other Projects" indicate import of materials from other projects.