



PROJECT No.: TCS/00512/09

**DSD CONTRACT NO. DC/2009/13
CONSTRUCTION OF SEWAGE TREATMENT WORKS AT
YUNG SHUE WAN AND SOK KWU WAN**

**SOK KWU WAN PORTION AREA
Quarterly Environmental Monitoring and Audit
(EM&A) Summary Report No.Q3 (February to
April 2011)**

PREPARED FOR
**LEADER CIVIL ENGINEERING CORPORATION
LIMITED**

Quality Index Date	Reference No.	Prepared By	Certified By
1 June 2011	TCS00512/09/600/R0243v2	 Nicola Hon Environmental Consultant	 T.W. Tam Environmental Team Leader

Version	Date	Description
1	30 May 2011	First submission
2	1 June 2011	Amended against IEC's comments on 31 May 2011

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Your reference:

Our reference: 05117/6/16/376228

Date: 1 June 2011

BY FAX ONLY

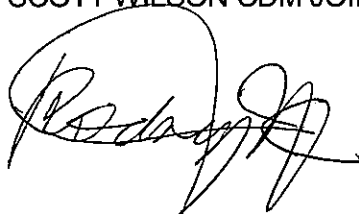
Attention: Mr. C K Au

Dear Sirs,

Contract No. DC/2009/13
Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan
Sok Kwu Wan Portion Area
Quarterly EM&A Summary Report No.Q3 (February 2011 to April 2011)

We refer to the Environmental Permit (EP-281/2007/A) and the email from the Environmental Team, Action-United Environmental Services and Consulting (AUES) with the revised report for the captioned project, dated 1 June 2011. We do not have further comment and have verified the captioned report.

Yours faithfully
SCOTT WILSON CDM JOINT VENTURE



Rodney Ip

ICWR/STKW/ecwc

cc Leader Civil Engineering (Attn: Mr Vincent Chan)
AUES (Attn: Mr T.W. Tam)
ER/LAMMA (Attn: Mr Neil Wong)
CDM (Attn: Mr Mark Sin)

EXECUTIVE SUMMARY

ES.01 This is the 3rd Quarterly EM&A summary report for Sok Kwu Wan under the Project, which covering the construction period from **1 February to 30 April 2011**.

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02 Environmental monitoring activities under the EM&A program in this Reporting Period are summarized in the following table.

Issues	Environmental Monitoring Parameters / Inspection	Occasions
Air Quality	1-hour TSP	135
	24-hour TSP	48
Construction Noise	Leq (30min) Daytime	60
Water Quality	Marine Water Sampling	0
Inspection / Audit	ET Regular Environmental Site Inspection	13

ES.03 According to the EM&A Manual of Sok Kwu Wan, water quality monitoring should be carried out during the marine work. Since construction of marine outfall has not yet commenced, no impact water quality monitoring was undertaken in this Reporting Period.

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES.04 In this Reporting Period, no exceedance in air quality and construction noise monitoring was recorded. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Environmental Issues	Monitoring Parameters	Action Level	Limit Level	Event & Action	
				Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	-	-
	24-hour TSP	0	0	-	-
Construction Noise	Leq _{30min} Daytime	0	0	-	-

ENVIRONMENTAL COMPLAINT

ES.05 No environmental complaint was recorded or received in this Reporting Period. The statistics of environmental complaint are summarized in the following table.

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
27 Jul 2010 – 31 Jan 2011	0	0	NA
1 Feb – Apr 2011	0	0	NA

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.06 No environmental summons or successful prosecutions were recorded in this Reporting Period. The statistics of environmental complaint are summarized in the following tables.

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
27 Jul 2010 – 31 Jan 2011	0	0	NA
1 Feb – Apr 2011	0	0	NA

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
27 Jul 2010 – 31 Jan 2011	0	0	NA
1 Feb – Apr 2011	0	0	NA

REPORTING CHANGE

ES.07 There are no reporting changes in this Reporting Period.

SITE INSPECTION BY EXTERNAL PARTIES

ES.08 No site inspection was undertaken by external parties i.e. EPD or AFCD within the Reporting Period.

FUTURE KEY ISSUES

ES.09 As wet season is approaching, muddy water and other water quality pollutants via site surface water runoff into the sea body within Fish culture zone at Picnic Bay and the Secondary recreation contact subzone at Mo Tat Wan is the key issue of the Project. Mitigation measures for water quality should be properly maintained to prevent any muddy or sandy runoff from the loose soil surface overflow on the site boundary.

ES.10 Moreover, special attention should be also paid on the dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road. Mitigation measures implemented for control the surface runoff including wheel wash facilities, covering of the loose soil surface or stockpile with tarpaulin sheet, etc., should fully implement.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.01 The Leader Civil Engineering Corporation Limited (Leader) has been awarded the *Contract DC/2009/13 - Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwn Wan* (the Project) by the Drainage Services Department (DSD) on 4 May 2010. The Project is part of an overall plan approved under a statutory EIA for Outlying Islands Sewerage Stage 1 Phase 2 Package J – Sok Kwu Wan Sewage Collection and Treatment (Register No. AEIAR-075/2003) and Disposal Facilities and Outlying Islands Sewerage Stage 1 Phase 1 Package C – Yung Shue Wan Sewage Treatment Works and Outfall (Register No. EIA-124/BC). The Environmental Permit No. EP-281/2007 and EP-282/2007 for the Project have been obtained by the DSD on 29 June 2007 for the relevant works. After July 2009, EP-281/2007/A stead EP-281/2007 is EP for Sok Kwu Wan relevant Works.
- 1.02 The Project involves construction of sewage treatment works at Sok Kwn Wan and Yung She Wan with a capacity of 1,430m³/day and 2,850m³/day respectively to provide secondary treatment, construction of 2 pumping stations at Sok Kwu Wan and 1 pumping station at Yung Shue Wan, construction of submarine outfall from the coastline and lying of underground sewerage pipeline. The site layout plan for the captioned work under the Project is showing in *Appendix A*.
- 1.03 According to the Particular Specification (PS) and *Appendix 25* of the Project, Leader should establish an Environmental Team to implement the environmental monitoring and auditing works to fulfill the requirements as stipulated in the Environmental Monitoring and Audit (EM&A) Manuals.
- 1.04 Action-United Environmental Services and Consulting (AUES) has been commissioned by Leader as the ET to implement the relevant EM&A program. Organization chart of the Environmental Team for the Project is shown in *Appendix B*. For ease of reporting, the proposed EM&A programme for baseline and impact monitoring is spilt to following two stand-alone parts:
- (a) Proposed EM&A Programme for Baseline and Impact Monitoring – Sok Kwu Wan (under EP No. 281/2007/A varied on 23 September 2009)
 - (b) Proposed EM&A Programme for Baseline and Impact Monitoring – Yung Shue Wan (under EP No. 282/2007)
- 1.05 This is the 3rd Quarterly EM&A Summary report for Sok Kwu Wan Portion Area presenting the monitoring results and inspection findings for the reporting period from **1 February to 30 April 2011**.

1.2 REPORT STRUCTURE

The Quarterly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-

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, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS
SECTION 5	CONCLUSION

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

2.01 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in *Appendix B*.

2.2 CONSTRUCTION PROGRESS

2.02 The master and three month rolling construction programs are enclosed in *Appendix C* and the major construction activities undertaken in this quarter are listed below:-

1 to 28 February 2011

- Footpath Diversion adjacent to SKW Sewage Treatment Works
- Construction for pumping station no.1 & 2

1 to 31 March 2011

- Footpath Diversion adjacent to SKW Sewage Treatment Works
- Construction for pumping station no.1 & 2

1 to 30 April 2011

- Footpath Diversion adjacent to SKW Sewage Treatment Works
- Construction for pumping station no.1 & 2
- Construction of the rising main
- Rock slope cutting works

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.03 Summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in this Reporting Month is presented in *Table 2-1*.

Table 2-1 Status of Environmental Licenses and Permits

Item	Description	License/Permit Status
1	Air pollution Control (Construction Dust)	Notified EPD on 19 May 2010 Ref.: 317486
2	Chemical Waste Producer Registration	Issued on 8/6/2010 WPN 5213-912-L2720-01
3	Water Pollution Control Ordinance	Approved on 29/9/2010 Valid to: 30/09/2015 Licence no.: WT00007567-2010
4	Billing Account for Disposal of Construction Waste	Issued on 26 May 2010 A/C No: 7010815
5	Construction Noise Permit	Permit no. GW-RS044-11 Valid from: 7 Feb 2011 Until: 6 Aug 2011

3 SUMMARY OF MONITORING REQUIREMENTS

3.1 ENVIRONMENTAL ASPECT

- 3.01 The EM&A baseline monitoring program cover the following environmental issues:
- Air quality;
 - Construction noise; and
 - Marine Water quality;
- 3.02 The ET implements the EM&A programme in accordance with the aforementioned requirements. Detailed air quality, construction noise and water quality of the EM&A program are presented in the following sub-sections.
- 3.03 A summary of the Air, Noise and Marine Water monitoring parameters is presented in **Table 3-1**:

Table 3-1 Summary of the Air and Noise monitoring parameters of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP Monitoring by Real-Time Portable Dust Meter; and • 24-hour TSP Monitoring by High Volume Air Sampler.
Noise	<ul style="list-style-type: none"> • Leq (30min) during normal working hours; and • Leq (15min) during Restricted Hours.
Marine Water Quality	<p><i>In-situ Measurements</i></p> <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Salinity (ppt); • Water depth (m); and • Temperature (°C). <p><i>Laboratory Analysis</i></p> <ul style="list-style-type: none"> • Suspended Solids (mg/L)

3.2 MONITORING LOCATIONS

Air Quality

- 3.04 Three air monitoring stations: AM1, AM2 and AM3 were designated in the *EM&A Manual Section 2.5*. The detailed air monitoring stations is described in **Table 3-2** and graphical is shown in **Appendix D**.

Table 3-2 Location of Air Quality Monitoring Station

Sensitive Receiver	Location
AM1	Squatter house in Chung Mei Village
AM2	Squatter house in Chung Mei Village
AM3	Football court

Construction Noise

- 3.05 According to *EM&A Manual Section 3.4* stipulations, there were four noise sensitive receivers (NM1-NM4) designated for the construction noise monitoring. NM1, NM2 and NM4 of the three designated monitoring stations were identified and are monitored by the current DSD contract DC/2007/18. However, the premises monitoring station NM3 was rejected by the owner of 1B Sok Kwu Wan and an alternative noise monitoring station RNM3 replacement was proposed by the contract DC/2007/18 ET and accepted by the IEC and EPD before the baseline monitoring commencement in April 2008. The location RNM3 is located at Sok Kwu Wan Sitting-out area which just 3m width footpath away from the original location house 1B. The detailed construction noise monitoring stations to also under the Project is described in **Table 3-3** and graphical is shown in **Appendix D**.

Table 3-3 Location of Construction Noise Monitoring Station

Sensitive Receiver	Location
NM1	1, Chung Mei Village
NM2	20, Sok Kwu Wan
RNM3	Sok Kwu Wan Sitting-out Area
NM4	2-storey village house at Ta Shui Wan

Water Quality

- 3.06 Three control stations (C1-C3) and three impact stations (W1-W3) were recommended in the *EM&A Manual Section 4.5*. Impact stations W1-W3 identified at the sensitive receivers (FCZ and secondary contact recreation subzone) to monitor the impacts from the construction of the submarine outfall as well as the effluent discharge from the proposed STW on water quality. Three control stations: C1, C2 & C3 were specified at locations representative of the project site in its undisturbed condition and located at upstream and downstream of the works area. Detailed and co-ordination of marine water quality monitoring stations is described in **Table 3-4** and the graphical is shown in **Appendix D** and would be performed for EM&A programme.

Table 3-4 Location of Marine Water Quality Monitoring Station

Station	Description	Co-ordination	
		Easting	Northing
W1	Secondary recreation contact subzone at Mo Tat Wan	832 968	807 732
W2	Fish culture zone at Picnic Bay	832 607	807 985
W3	Fish culture zone at Picnic Bay	832 045	807 893
C1 (flood)	Control Station	833 703	808 172
C2	Control Station	831 467	807 747
C3 (ebb)	Control Station	832 220	808 862

3.3 MONITORING FREQUENCY AND PERIOD

- 3.07 The Impact monitoring carried out in the EM&A programme is basically in accordance with the requirements in *EM&A Manual Sections 2.7, 3.6, 4.7 and 4.8*. The monitoring requirements are listed as follows:

Air Quality Monitoring

Parameters: 1-hour TSP and 24-hour TSP.

Frequency: Once in every six days for 24-hour TSP and three times in every six days for 1-hour TSP.

Duration: Throughout the construction period.

Noise Monitoring

Parameters: Leq (30min) & Leq (5min), L10 and L90.

Leq (15min) & Leq (5min), L10 and L90 during the construction undertaken during Restricted Hours (19:00 to 07:00 hours next of normal working day and full day of public holiday and Sunday)

Frequency: Once per week during 0700-1900 hours on normal weekdays. Restricted Hour monitoring should depend on conditions stipulated in Construction Noise Permit.

Duration: Throughout the construction period.

Marine Water Quality Monitoring

Parameters: Duplicate in-situ measurements: water depth, temperature, Dissolved Oxygen, pH, turbidity and salinity;

HOKLAS-accredited laboratory analysis: Suspended Solids

- Frequency: Three days a week, at mid ebb and mid flood tides. The interval between 2 sets of monitoring will be more than 36 hours.
- Sampling Depth
- (i.) Three depths: 1m below water surface, 1m above sea bottom and at mid-depth when the water depth exceeds 6m.
 - (ii.) If the water depth is between 3m and 6m, two depths: 1m below water surface and 1m above sea bottom.
 - (iii.) If the water depth is less than 3m, 1 sample at mid-depth is taken
- Duration: During the course of marine works

Post-Construction Monitoring – Marine Water

- 3.08 Upon the marine works (dredging and HDD pipe installation) completion, 4 weeks of post-construction monitoring would be undertaken in accordance with the *Section 4.8 of EM&A Manual*. The requirements of post-construction monitoring such as the parameter, frequency, location and sampling depth is same as the impact monitoring.

3.4 MONITORING EQUIPMENT

Air Quality Monitoring

- 3.09 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to approve. The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

Noise Monitoring

- 3.10 Sound level meter in compliance with the *International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1)* specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m s⁻¹.

Water Quality Monitoring

- 3.11 ***Dissolved Oxygen and Temperature Measuring Equipment*** – The instrument should be a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring as included a DO level in the range of 0 – 20mg L⁻¹ and 0 – 200% saturation; and a temperature of 0 – 45 degree Celsius.
- 3.12 ***pH Meter*** – The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1 pH in arrange of 0 to 14.
- 3.13 ***Turbidity (NTU) Measuring Equipment*** – The instrument should be a portable and weatherproof turbidity measuring instrument using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.
- 3.14 ***Water Sampling Equipment*** – A water sampler should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.
- 3.15 ***Water Depth Detector*** – A portable, battery-operated echo sounder should be used for the

determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat.

- 3.16 **Salinity Measuring Equipment** – A portable salinometer capable of measuring salinity in the range of 0 - 40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.
- 3.17 **Sample Containers and Storage** – Water samples for SS should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen).
- 3.18 **Monitoring Position Equipment** - A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for maritime (RTCM) Type 16 error message ‘screen pop-up’ facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office), or other equipment instrument of similar accuracy, should be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.
- 3.19 **Suspended Solids Analysis** – Analysis of suspended solids shall be carried out in a HOKLAS or other international accredited laboratory.

3.5 EQUIPMENT CALIBRATION

- 3.20 Calibration of the HVS is performed upon installation in accordance with the manufacturer’s instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5025A). The calibration data are properly documented and the records are maintained by ET for future reference.
- 3.21 The 1-hour TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment was checked before and after each monitoring event. In-house calibration with the High Volume Sampler (HVS) in same condition was undertaken in yearly basis.
- 3.22 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.
- 3.23 The Water Quality Monitoring equipments such as Dissolved Oxygen meter, pH Meter, Turbidity Measuring Instrument and Salinometer, are calibrated by HOKLAS accredited laboratory of three month intervals.
- 3.24 All updated calibration certificates of the monitoring equipment used for the impact monitoring program in the relevant Monthly EM&A Report.

3.6 METEOROLOGICAL INFORMATION

- 3.25 The meteorological information during the construction phase is obtained from the Wong Chuk Hang Station of the Hong Kong Observatory (HKO) which near the Project site. The meteorological information in this Reporting Period is presented in Appendix F.

3.7 DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.26 The impact monitoring data are handled by the ET’s systematic data recording and management, which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.
- 3.27 The monitoring data recorded in the equipment e.g. 1-hour TSP meter, noise meter and Multi-parameter Water Quality Monitoring System, are downloaded directly from the equipments at the end of each monitoring day. The downloaded monitoring data are input into

a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

3.8 DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

3.28 According to the Sok Kwu Wan Environmental Monitoring and Audit Manual, the air quality, construction noise were set up, namely Action and Limit levels are listed in *Tables 3-5* and *3-6* as below.

Table 3-5 Action and Limit Levels for Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour	24-hour	1-hour	24-hour
AM1	343	173	500	260
AM2	331	175	500	260
AM3	353	191	500	260

Table 3-6 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level
	0700-1900 hours on normal weekdays	
NM1 NM2 RNM3 NM4	When one or more documented complaints are received	75 dB(A) of Leq(30min) during normal hours from 0700 to 1900 hours on normal weekdays, reduced to 70 dB(A) of Leq(30min) for schools and 65 dB(A) during school examination periods

3.29 Due to water quality baseline monitoring still not yet finalized, the Action/Limit Levels will be provided in due course.

4 IMPACT MONITORING RESULTS

4.01 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 Reporting Period, the graphical plots of the trends of monitored parameter over the past four months are presented in *Appendix E*.

4.1 RESULTS OF AIR QUALITY MONITORING

4.02 Results of air quality monitoring at the identified locations during the Reporting Period are summarized in *Tables 4-1*. In this quarter period, a total of **135** events of 1-hour TSP and **48** successful events of 24-hour TSP measurements were conducted at designated Location AM1, AM2 and AM3. 24-hour and 1-hour TSP results fluctuated well below the Action Level during the Reporting Period. No Notification of Exceedance (NOE) of 24-hour and 1-hour TSP air quality criteria or corrective action was therefore required.

Table 4-1 Summary of 1-hour and 24-hour TSP result

Station	1-hour TSP ($\mu\text{g}/\text{m}^3$)			24-hour TSP ($\mu\text{g}/\text{m}^3$)		
	Max	Min	Mean	Max	Min	Mean
AM1	191	56	118	152	27	68
Record Date	5-Mar-11	28-Feb-11	45 events	18-Apr-11	27-Apr-11	16 events
AM2	195	48	116	170	40	96
Record Date	1-Feb-11	28-Feb-11	45 events	2-Feb-11	14-Feb-11	16 events
AM3	170	53	118	180	26	95
Record Date	10-Feb-11	8-Apr-11	45 events	26-Mar-11	8-Feb-11	16 events

4.2 RESULTS OF CONSTRUCTION NOISE MONITORING

4.03 Summary of construction noise monitoring at the identified locations during the Reporting Period are summarized in *Table 4-2* below. In this reporting quarter, a total of **15** 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 4-2 Summary of Construction Noise Monitoring Results

Station	Leq(30min) (dB(A))	
	Max	Min
NM1	74.8	51.5
Record Date	10-Feb-11	19-Apr-11
NM2	75.0	53.4
Record Date	2-Apr-11	29-Mar-11
RNM3	74.6	54.7
Record Date	10-Feb-11	29-Mar-11
NM4	74.2	49.1
Record Date	8-Apr-11	16-Feb-11

4.3 RESULTS OF MARINE WATER QUALITY OF MONITORING

4.04 Due to marine water quality baseline monitoring still not yet completed, no marine works was commenced in the Project at Sok Kwu Wan. No impact water quality monitoring was undertaken in this Reporting Period and no results are presented in this section.

4.4 ECOLOGICAL MONITORING

- 4.05 According to Clause 3.7 and Figure 4 in the Environmental Permit No. EP-281/2007/A, a total of 12 numbers *Celtis Timorensis* (uncommon species) in Chung Mei at Sok Kwu Wan, are identified to require labeling, fencing and protection. Out of these, four numbers located in the Pumping Station No.1 area are required to be transplanted in advance of pumping station construction and the transplantation proposal has been submitted to EPD previously.
- 4.06 In the reporting quarter, regular inspections were carried out on **11, 25 February, 19 March, 4 and 19 April 2011** by the landscaping sub-Contractor (Melofield Nursery and Landscape Contractor Limited) after the transplantation. The copies of the inspection reports are attached in relevant Monthly EM&A Report (**February, March and April 2011**).

5 WASTE MANAGEMENT

5.01 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

5.1 RECORDS OF WASTE QUANTITIES

5.02 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.

5.03 The quantities of waste for disposal in this Reporting Period are summarized in *Table 5-1* and *5-2* and the Monthly Summary Waste Flow Table is shown in *Appendix G*. Whenever possible, materials were reused on-site as far as practicable.

Table 5-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity			Disposal Location
	Feb 11	Mar 11	Apr 11	
C&D Materials (Inert) ('000m ³)	0.043	0.106	0.025	Sok Kwu Wan Transfer Facility
Reused in the Contract (Inert) ('000m ³)	0	0.255	0.090	-
Reused in other Projects (Inert) ('000m ³)	0	1.175	1.159	-
Disposal as Public Fill (Inert) ('000m ³)	0	0	0	Sok Kwu Wan Transfer Facility

Table 5-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity			Disposal Location
	Feb 11	Mar 11	Apr 11	
Recycled Metal (kg)	0	0	0	-
Recycled Paper / Cardboard Packing (kg)	0	0	0	-
Recycled Plastic (kg)	0	0	0	-
Chemical Wastes (kg)	0	0	0	-
General Refuses (tonne)	0.35	0.36	5.160	Sok Kwu Wan Transfer Facility

5.04 There was no site effluent discharged but the estimated volume of surface runoff was less than 50m³ in this reporting quarter.

6 SITE INSPECTION

- 6.01 According to the Final Report Environmental Monitoring and Audit Manual [2095/13.3], the environmental site inspection should be formulated by ET Leader. Regular environmental site inspections had been carried out by the ET to confirm the environmental performance. In this Reporting Period, site inspection was carried out on **1, 9, 14, 22 February, 1, 8, 15, 22, 29 March, 6, 14, 19 and 26 April 2011**. Besides, routine joint-site visit by IEC, RE, Leader and ET was carried out on **22 February, 8 March and 14 April 2011**.
- 6.02 Observations for the site inspections and monthly audit within this Reporting Month are summarized in *Table 6-1*.

Table 6-1 Site Observations

Date	Findings / Deficiencies	Follow-Up Status
1 February 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
9 February 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
14 February 2011	<ul style="list-style-type: none"> The transplanted tree should be kept away from the construction wastes or other tools nearby. 	The observation has been followed on 22 February 2011.
22 February 2011	<ul style="list-style-type: none"> The outlet of the sedimentation tank should be further improved to reduce SS content. 	The observation has been followed on 1 March 2011.
1 March 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
8 March 2011	<ul style="list-style-type: none"> The sediment inside the sedimentation tank should be removed to restore the tank de-silting capacity. The cement bag was disposed on the site. The Contractor should remove it to prevent any runoff to the ground. 	The observations have been followed on 15 March 2011.
15 March 2011	<ul style="list-style-type: none"> Muddy water discharging was observed, the Contractor should improve de-silting facility to minimize SS content. (PS2) 	The observation has been followed on 22 March 2011.
22 March 2011	<ul style="list-style-type: none"> Turbid water was discharged from sedimentation tank. The Contractor should improve de-silting system to minimize SS content. (PS1) 	The water quality was improved on 25 March 2011.
29 March 2011	<ul style="list-style-type: none"> Turbid water was discharged from sedimentation tank. The Contractor should improve de-silting system to minimize SS content. (PS1) 	More de-silting facilities were further applied and water quality was improved on 29 March 2011.
6 April 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A
14 April 2011	<ul style="list-style-type: none"> House-keeping on the site has to be improved. (Portion G). The general refuse should be removed. (Portion G) Regular water spraying was reminded to apply on dry haul road. (Portion G) 	The observations have been followed on 14, 18 and 19 April 2011.
19 April 2011	<ul style="list-style-type: none"> The power generator without drip tray was observed. 	The observation has been followed on 26 April 2011.
26 April 2011	<ul style="list-style-type: none"> No environmental issue was observed during the site inspection. 	N.A

7 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

7.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

7.01 No environmental complaint, summons and prosecution was received in this Reporting Period. The statistical summary table of environmental complaint is presented in [Tables 7-1, 7-2](#) and [7-3](#).

Table 7-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
27 Jul 2010 – 31 Jan 2011	0	0	NA
1 Feb – Apr 2011	0	0	NA

Table 7-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
27 Jul 2010 – 31 Jan 2011	0	0	NA
1 Feb – Apr 2011	0	0	NA

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
27 Jul 2010 – 31 Jan 2011	0	0	NA
1 Feb – Apr 2011	0	0	NA

8 IMPLEMENTATION STATUS OF MITIGATION MEASURES

- 8.01 The environmental mitigation measures that recommended in the Sok Kwu Wan Environmental Monitoring and Audit Manual covered the issues of dust, noise, water and waste and they are summarized as following:

Dust Mitigation Measure

- 8.02 Installation of 2m high solid fences around the construction site of Pumping Station P2 is recommended. Implementation of the requirements stipulated in the Air Pollution Control (Construction Dust) Regulation and the following good site practices are recommended to control dust emission from the site:
- Stockpiles of imported material kept on site should be contained within hoardings, dampened and / or covered during dry and windy weather;
 - Material stockpiled alongside trenches should be covered with tarpaulins whenever works are close to village houses;
 - Water sprays should be used during the delivery and handling of cement, sands, aggregates and the like.
 - Any vehicle used for moving sands, aggregates and construction waste shall have properly fitting side and tail boards. Materials should not be loaded to a level higher than the side and tail boards, and should be covered by a clean tarpaulin.

Noise Mitigation Measure

- 8.03 As detailed in the EIA report, concreting work of the Pumping Station P1a and sewer alignment construction activities would likely cause adverse noise impacts on some of the noise sensitive receivers. Appropriate mitigation measures have therefore been recommended. The mitigation measures recommended in the EIA report are summarised below:
- Use of quiet equipment for the construction activities of the Pumping Stations and sewer alignment;
 - Use of temporary noise barrier around the site boundary of Pumping Station P1a;
 - Use of kick ripper (saw and lift) method to replace the breaker for pavement removal during sewer alignment construction;
 - Restriction on the number of plant during sewer alignment construction;
 - Use of noise screening structures in the form of acoustic shed or movable barrier wherever practicable and feasible in areas with sufficient clearance and headroom during the construction of sewer alignment;
 - Adoption of manual working method wherever practicable and feasible in areas where the worksites of the proposed sewer alignment are located less than 20m from the residential noise sensitive receivers and less than 30m from the temple and the public library; and
 - Implementation of the following good site practices:
 - Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program.
 - Mobile plant, if any, should be sited as far away from NSRs as possible.
 - Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.
 - Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.
 - Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Water Quality Mitigation Measure

- 8.04 No-dig method using Horizontal Directional Drilling (HDD) would be used for the installation of outfall pipe of about 480 m from shore to minimize the potential water quality impacts arising from the dredging works required for the submarine outfall construction. For the remaining outfall pipe of about 240m and the diffuser section, open trench dredging would still be required.

- 8.05 During the dredging works, the Contractor should be responsible for the design and implementation of the following mitigation measures.
- Dredging should be undertaken using closed grab dredgers with a total production rate of 55m³/hr;
 - Deployment of 2-layer silt curtains with first layer enclosing the grab and the second layer at around 50, from the dredging area while dredging works are in progress;
 - all vessels should be sized such that adequate clearance (i.e. minimum clearance of 0.6m) is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;
 - all pipe leakages should be repaired promptly and plant shall not be operated with leaking pipes;
 - excess material should be cleaned from the decks and exposed fittings of barges before the vessel is moved;
 - adequate freeboard (i.e. minimum of 200mm) should be maintained on barges to ensure that decks are not washed by wave action;
 - all barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material; and
 - loading of barges and hoppers should be controlled to prevent splashing of dredged material to the surrounding water, and barges and hoppers should not be filled to a level which would cause the overflow of materials or sediment laden water during loading or transportation; and
 - the decks of all vessels should be kept tidy and free of oil or other substances that might be accidentally or otherwise washed overboard.

Construction Run-off and Drainage

- 8.06 The Contractor should observe and comply with the Water Pollution Control Ordinance and the subsidiary regulations. The Contractor should follow the practices, and be responsible for the design, construction, operation and maintenance of all the mitigation measures as specified in ProPECC PN 1/94 “Construction Site Drainage”. The design of the mitigation measures should be submitted by the Contractor to the Engineer for approval. These mitigation measures should include the following practices to minimise site surface runoff and the chance of erosion, and also to retain and reduce any suspended solids prior to discharge:
- Provision of perimeter channels to intercept storm-runoff from outside the site. These should be constructed in advance of site formation works and earthworks.
 - Works programmes should be designed to minimize works areas at any one time, thus minimising exposed soil areas and reducing the potential for increased siltation and runoff.
 - Sand/silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove the sand/silt particles from run-off. These facilities should be properly and regularly maintained. These facilities shall be carefully planned to ensure that they would be installed at appropriate locations to capture all surface water generated on site.
 - Careful programming of the works to minimise soil excavation works during rainy seasons.
 - Exposed soil surface should be protected by paving or hydroseeding as soon as possible to reduce the potential of soil erosion.
 - Trench excavation should be avoided in the wet season, and if necessary, these should be excavated and backfilled in short sections.
 - Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric.

General Construction Activities

- 8.07 Debris and rubbish generated on-site should be collected, handled and disposed of properly to avoid entering the nearby coastal waters and stormwater drains. All fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. Open drainage channels and culverts near the works areas should be covered to block the entrance of large debris and refuse.

Wastewater Arising from Workforce

- 8.08 Portable toilets shall be provided by the Contractors, where necessary, to handle sewage from the workforce. The Contractor shall also be responsible for waste disposal and maintenance practices

Sediment Contamination Mitigation Measure

- 8.09 The basic requirements and procedures for dredged mud disposal are specified under the WBTC No. 34/2002. The management of the dredging, use and disposal of marine mud is monitored by the MFC, while the licensing of marine dumping is the responsibility of the Director of Environmental Protection (DEP).
- 8.10 The uncontaminated dredged sediment will be loaded onto barges and transported to the designated marine disposal site. Appropriate dredging methods have been incorporated into the recommended water quality mitigation measures including the use of closed-grab dredgers and silt curtains. Category L sediment would be suitable for disposal at a gazetted open sea disposal ground.
- 8.11 During transportation and disposal of the dredged marine sediments, the following measures should be taken to minimize potential impacts on water quality:
- Bottom opening of barges should be fitted with tight fitting seals to prevent leakage of material. Excess material should be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.
 - Monitoring of the barge loading should be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels should be equipped with automatic self-monitoring devices as specified by the DEP.

Construction Waste Mitigation Measure

Good Site Practices and Waste Reduction Measures

- 8.12 It is not anticipated that adverse waste management related impacts would arise, provided that good site practices are strictly followed. Recommendations for good site practices for the construction waste arising include:
- Nomination of an approved person, such as a site manager, to be responsible for the implementation of good site practices, arranging for collection and effective disposal to an appropriate facility, of all wastes generated at the site.
 - Training of site personnel in proper waste management and chemical handling procedures.
 - Appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.
 - Provision of sufficient waste disposal points and regular collection for disposal.
 - Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Facility.
 - Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.
 - Maintain records of the quantities of wastes generated, recycled and disposed.
- 8.13 In order to monitor the disposal of C&D waste at landfills and to control fly tipping, a trip-ticket system should be included as one of the contractual requirements and implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. An Independent Environmental Checker should be responsible for auditing the results of the system.
- 8.14 Good management and control can prevent the generation of significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction

include:

- segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- to encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the work force;
- any unused chemicals or those with remaining functional capacity should be recycled;
- use of reusable non-timber formwork to reduce the amount of C&D material;
- prior to disposal of C&D waste, it is recommended that wood, steel and other metals should be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill;
- proper storage and site practices to minimise the potential for damage or contamination of construction materials; and
- plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.

General Site Wastes

- 8.15 A collection area should be provided where waste can be stored prior to removal from site. An enclosed and covered area is preferred for the collection of the waste to reduce 'wind blow' of light material.

Chemical Wastes

- 8.16 After use, chemical waste (eg. cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Any unused chemicals or those with remaining functional capacity should be recycled. Spent chemicals should be properly stored on site within suitably designed containers, and should be collected by an approved operator for disposal at the Chemical Waste Treatment Facility or other licenced facility in accordance with the Waste Disposal (Chemical Waste) (General) Regulation under the Waste Disposal Ordinance.
- 8.17 Any service shop and minor maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakages and spillage should only be undertaken with the areas appropriately equipped to control these discharges.

Construction and Demolition Material

- 8.18 The C&D material should be separated on-site into three categories: (i) public fill, the inert portion of the C&D material (e.g. concrete and rubble), which should be re-used on-site or disposed of at a public filling area; (ii) C&D waste for re-use and/or recycling, the non-inert portion of the C&D material, (e.g. steel and other metals, wood, glass and plastic); (iii) C&D waste which cannot be re-used and/or recycled. The waste producers are responsible for its disposal at strategic landfills.
- 8.19 In order to minimise the impact resulting from collection and transportation of material for off-site disposal, it was recommended that inert material should be re-used on-site where possible. Prior to disposal of C&D material, it was also recommended that steel and other metals should be separated for re-use and/or recycling where practicable to minimise the quantity of waste to be disposed of to landfill.

Ecology Mitigation Measure

Terrestrial Ecology

- 8.20 The uncommon tree species should be labelled and probably fenced to avoid direct or indirect disturbance during construction. Works areas should avoid woodland habitats, in particular where these trees are located.

- 8.21 Construction and maintenance of site runoff control measures would be required at all work sites during construction. These should include barriers to direct runoff to sand/silt removal facilities (sand/silt/traps and/or sediment basins); minimisation of earthworks during rainy season (May to September); and coverage of sand/fill piles and exposed earth during storms.
- 8.22 Special attention should be paid during the breeding season of Romer's Tree Frog (March to September) to ensure their habitat landward to Pumping Station P2 site is well protected from site runoff. Barriers should be deployed completely along the landward side of the pumping station site boundary to prevent any site runoff from entering the tree frog habitat. Intactness of the barriers should be frequently inspected.

Intertidal and Subtidal Ecology

- 8.23 Construction and maintenance of site runoff control measures would be required at all work sites during construction. These should include barriers to direct runoff to sand/silt removal facilities (sand/silt/traps and/or sediment basins); use of silt curtains along coastline; minimisation of earthworks during rainy season (May to September); and coverage of sand/fill piles and exposed earth during storms.
- 8.24 To reduce impacts of sediment resuspension upon nearby habitats and organisms during dredging, all dredging should be done using a closed-grab dredger, and silt curtains should be deployed around the dredger during all dredging activity

Fisheries Mitigation Measure

- 8.25 Closed grab dredger, deployment of silt curtains around the immediate dredging area and low dredging rate have been recommended in Water Quality of the EIA report in order to minimise sediment release into the water column.

Landscape & Visual Mitigation Measure

- 8.26 Mitigation measures recommended in the EIA Report for landscape and visual impacts during the construction stage are summarised below.
- Screening of site construction works by use of hoarding that is appropriate to its site context;
 - Retaining existing trees and minimising damage to vegetation where possible by close co-ordination and on site alignment adjusted of rising main and gravity sewer pipelines. Tree protective measures should be implemented to ensure trees identified as to be retained are satisfactorily protected during the construction phase;
 - Careful and efficient transplanting of affected trees (1 no.) to temporary or final transplant location (the proposed tree to be transported is a semi-mature *Macaranga tanarius* and is located at the proposed Pumping Station P2 location);
 - Short excavation and immediate backfilling of sections upon completion of works to reduce active site area;
 - Conservation of top-soil for reuse.
 - Night-time light source from marine fleets should be directed away from the residential units
- 8.27 Leader had been implementing the required environmental mitigation measures according to the Sok Kwu Wan Environmental Monitoring and Audit Manual subject to the site condition. Environmental mitigation measures generally implemented by Leader in this Reporting Month are summarized in [Table 8-1](#).

Table 8-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Drainage channels were provided to convey run-off into the treatment facilities; and • Drainage systems were regularly and adequately maintained.
Air Quality	<ul style="list-style-type: none"> • Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet; • Public roads around the site entrance/exit had been kept clean and free from dust; and • Tarpaulin covering of any dusty materials on a vehicle leaving the site.
Noise	<ul style="list-style-type: none"> • Good site practices to limit noise emissions at the sources; • Use of quiet plant and working methods; • Use of site hoarding or other mass materials as noise barrier to screen noise at ground level of NSRs; and • To minimize plant number use at the worksite.
Waste and Chemical Management	<ul style="list-style-type: none"> • Excavated material should be reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible; • Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner; • The Contractor should adopt a trip ticket system for the disposal of C&D materials to any designed public filling facility and/or landfill; and • Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.
General	<ul style="list-style-type: none"> • The site was generally kept tidy and clean.

9 CONCLUSIONS AND RECOMMENTATIONS

9.1 CONCLUSIONS

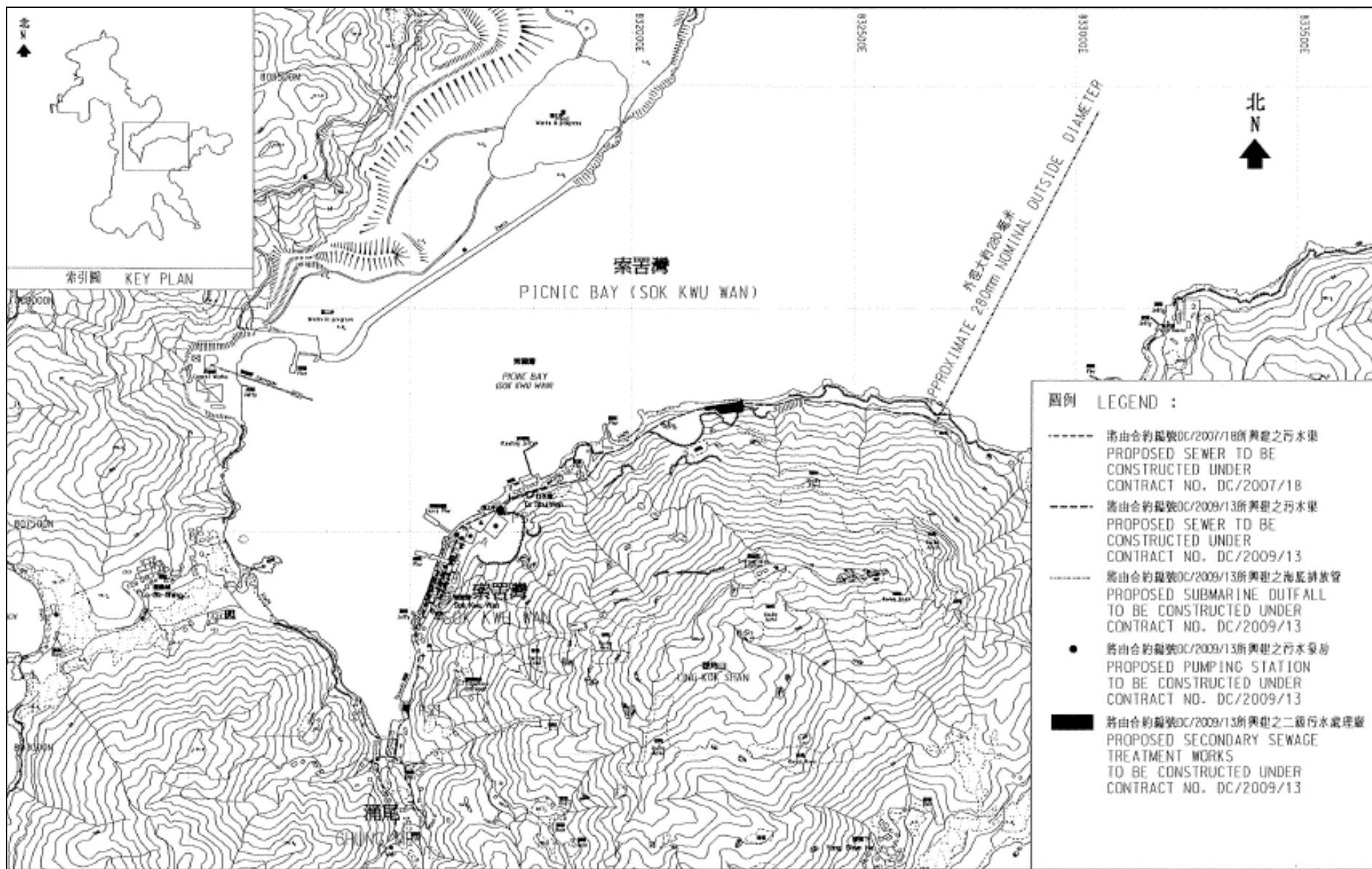
- 9.01 This is the 3rd Quarterly EM&A summary report for Sok Kwu Wan under the Project covering the construction period from **1 February to 30 April 2011**.
- 9.02 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in this reporting quarter. No NOE or the associated corrective actions were therefore issued.
- 9.03 In this reporting quarter, no 1-hour TSP or 24-hr TSP monitoring results was found to be triggered the Action or Limit Level in this Reporting Period.
- 9.04 No documented complaint, notification of summons or successful prosecution was received.
- 9.05 **13** events of site inspection were carried out by ET in this Reporting Quarter and no non-compliance was observed during the inspection. In general, all the observation has been rectified during the next week site inspection. The environmental performance of the Project was therefore considered as satisfactory.
- 9.06 No site inspection was undertaken by external parties i.e. EPD or AFCD within the Reporting Period.

9.2 RECOMMENDATIONS

- 9.07 As wet season is approaching, muddy water and other water quality pollutants via site surface water runoff into the sea body within Fish culture zone at Picnic Bay and the Secondary recreation contact subzone at Mo Tat Wan is the key issue of the Project. Mitigation measures for water quality should be properly maintained to prevent any muddy or sandy runoff from the loose soil surface overflow on the site boundary.
- 9.08 Moreover, special attention should be also paid on the dust mitigation measures to avoid fugitive dust emissions from loose soil surface or haul road. Mitigation measures implemented for control the surface runoff including wheel wash facilities, covering of the loose soil surface or stockpile with tarpaulin sheet, etc., should fully implement.

Appendix A

Site Layout Plan – Sok Kwu Wan Portion Area



Appendix B

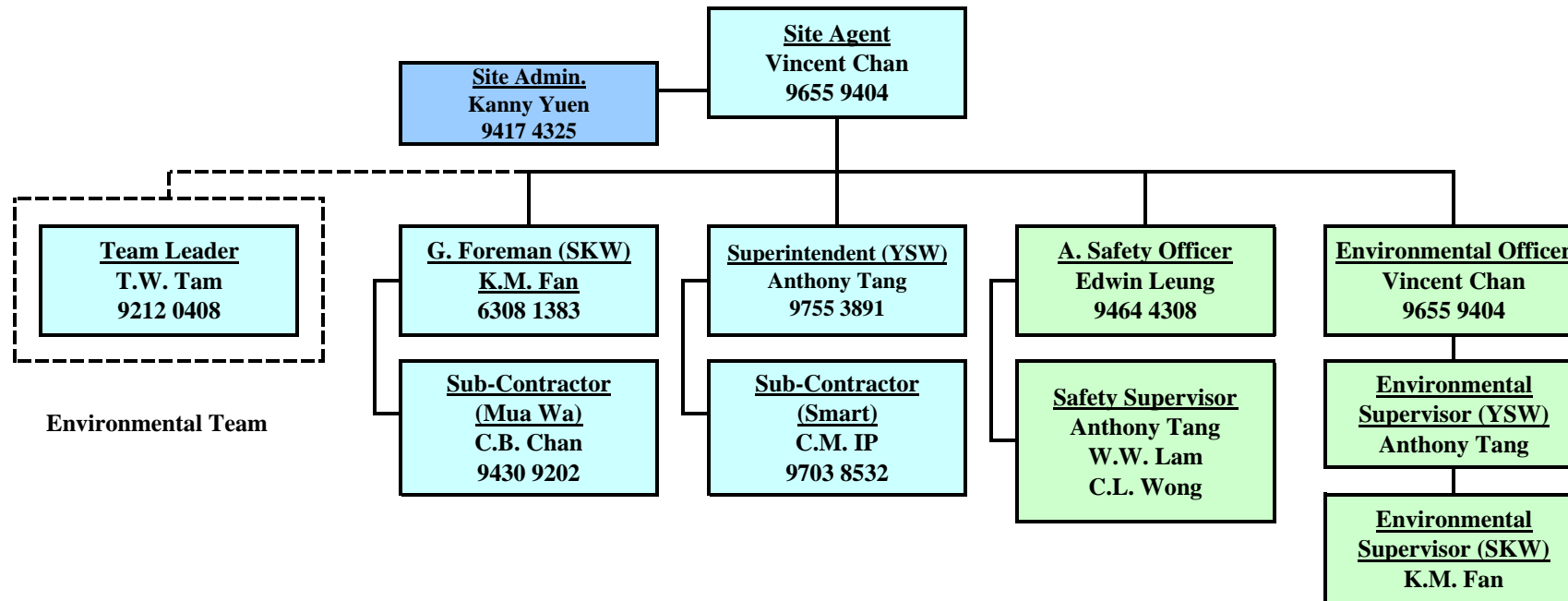
Organization Structure and Contact Details of Relevant Parties

Leader Civil Engineering Corporation LTD

Contract No. DC/2009/13

Construction of sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan

Organization Structure for Environmental Management (EMP Rev. 1.00)



Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
DSD	Employer	Mr. AU Chi Kwong	-	-
SCJV	Engineer's Representative	Mr. Neil Wong	2982 0240	2982 4129
SCJV	Resident Engineer	Mr. Alfred Cheung	2982 0240	2982 4129
Scott Wilson	Independent Environmental Checker	Mr. Rodney Ip	2410 3750	2428 9922
Leader	Project Manager	Mr. Wilfred So	2982 1750	2982 1163
Leader	Site Agent/ Environmental Officer	Mr. Vincent Chan	2982 1750	2982 1163
Leader	Section Engineer	Mr. Burgess Yip	2982 1750	2982 1163
Leader	Safety Officer	Mr. Edwin Leung	2982 1750	2982 1163
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Assistance Environmental Consultant	Mr. Ray Cheung	2959 6059	2959 6079
AUES	Team Supervisor	Mr. Ben Tam	2959 6059	2959 6079

Legend:

DSD (Employer) – Drainage Services Department

CDM (Engineer) – Scott Wilson CDM Joint Venture

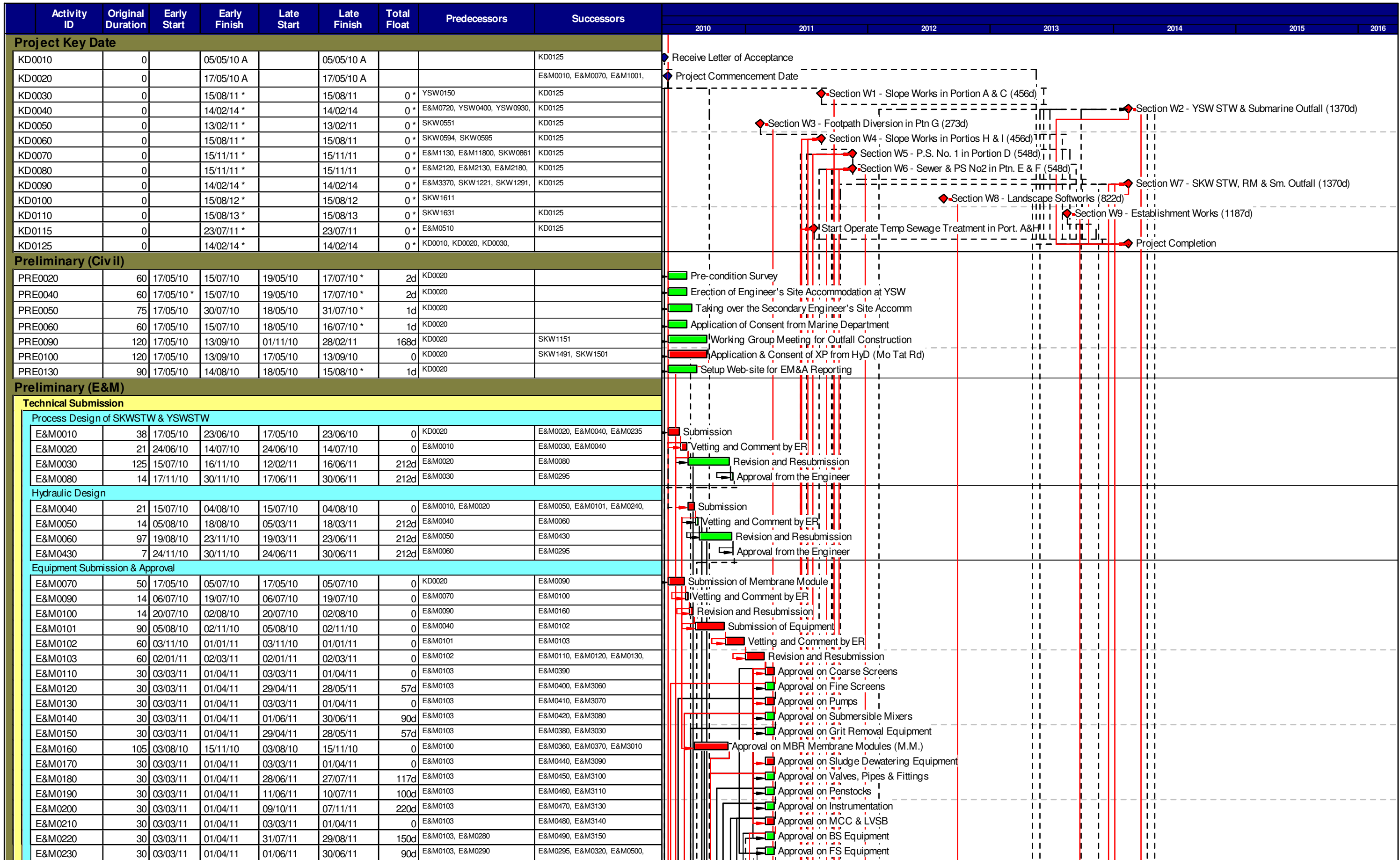
Leader (Main Contractor) – Leader Civil Engineering Corporation Limited

Scott Wilson (IEC) – Scott Wilson Limited

AUES (ET) – Action-United Environmental Services & Consulting

Appendix C

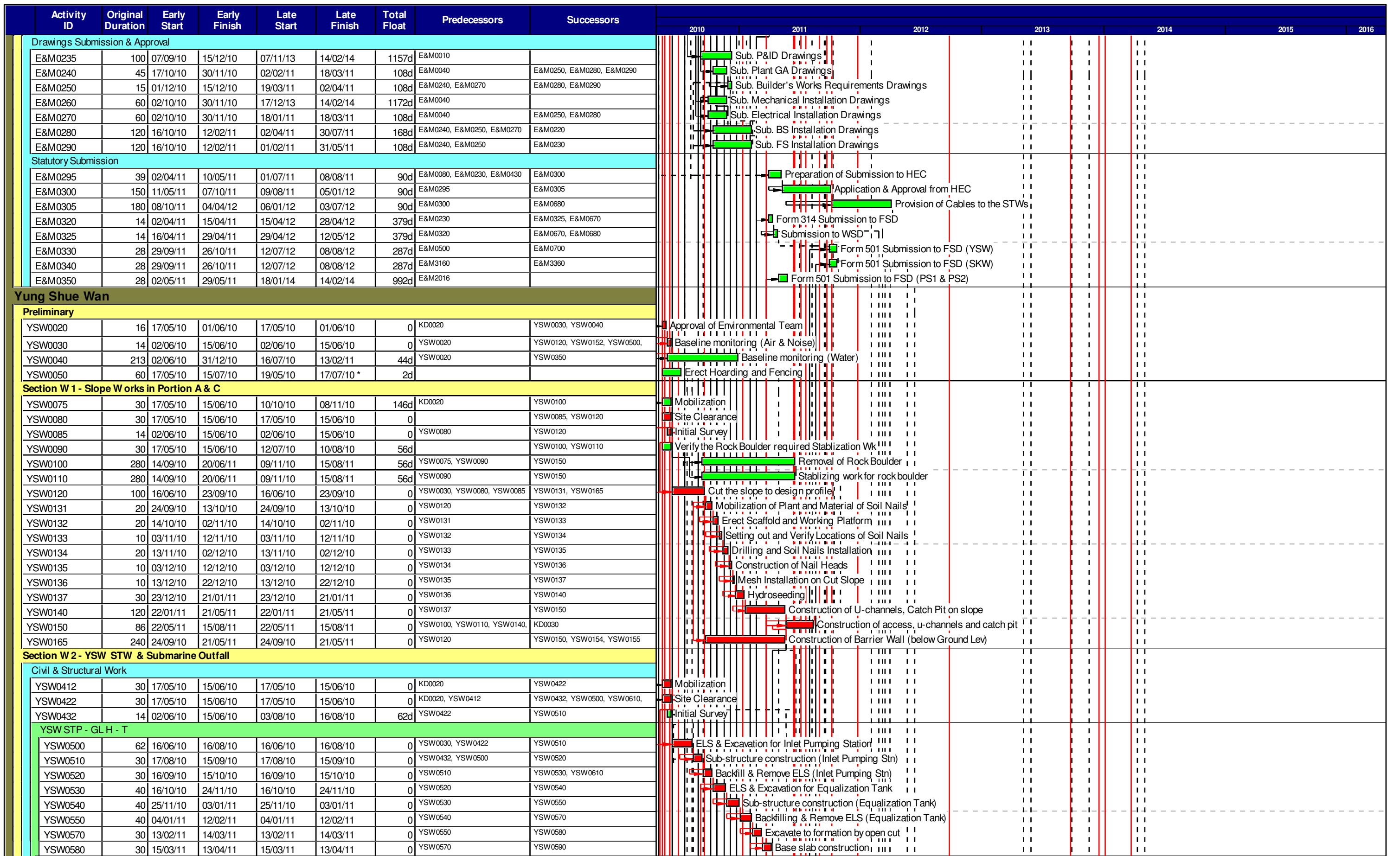
Master and Three Months Rolling Construction Programs



Start date	05/05/10		Early bar
Finish date	14/02/14		Progress bar
Data date	17/05/10		Critical bar
Run date	06/01/11		Summary bar
Page number	1A		Progress point
			Critical point
			Summary point
			Start milestone point
			Finish milestone point

Leader Civil Engineering Corp. Ltd.
Contract No. DC/2009/13
Construction of Sewage Treatment Works at YSW & SKW
Works Programme (Rev. 2)

Date	Revision	Checked	Approved
17/05/10	Revision 0	StL	VC
31/07/10	Revision 1	StL	VC
30/12/10	Revision 2	StL	VC



Start date	05/05/10		Early bar
Finish date	14/02/14		Progress bar
Data date	17/05/10		Critical bar
Run date	06/01/11		Summary bar
Page number	2A		Progress point
			Critical point
			Summary point
			Start milestone point
			Finish milestone point

Leader Civil Engineering Corp. Ltd.
Contract No. DC/2009/13
Construction of Sewage Treatment Works at YSW & SKW
Works Programme (Rev. 2)

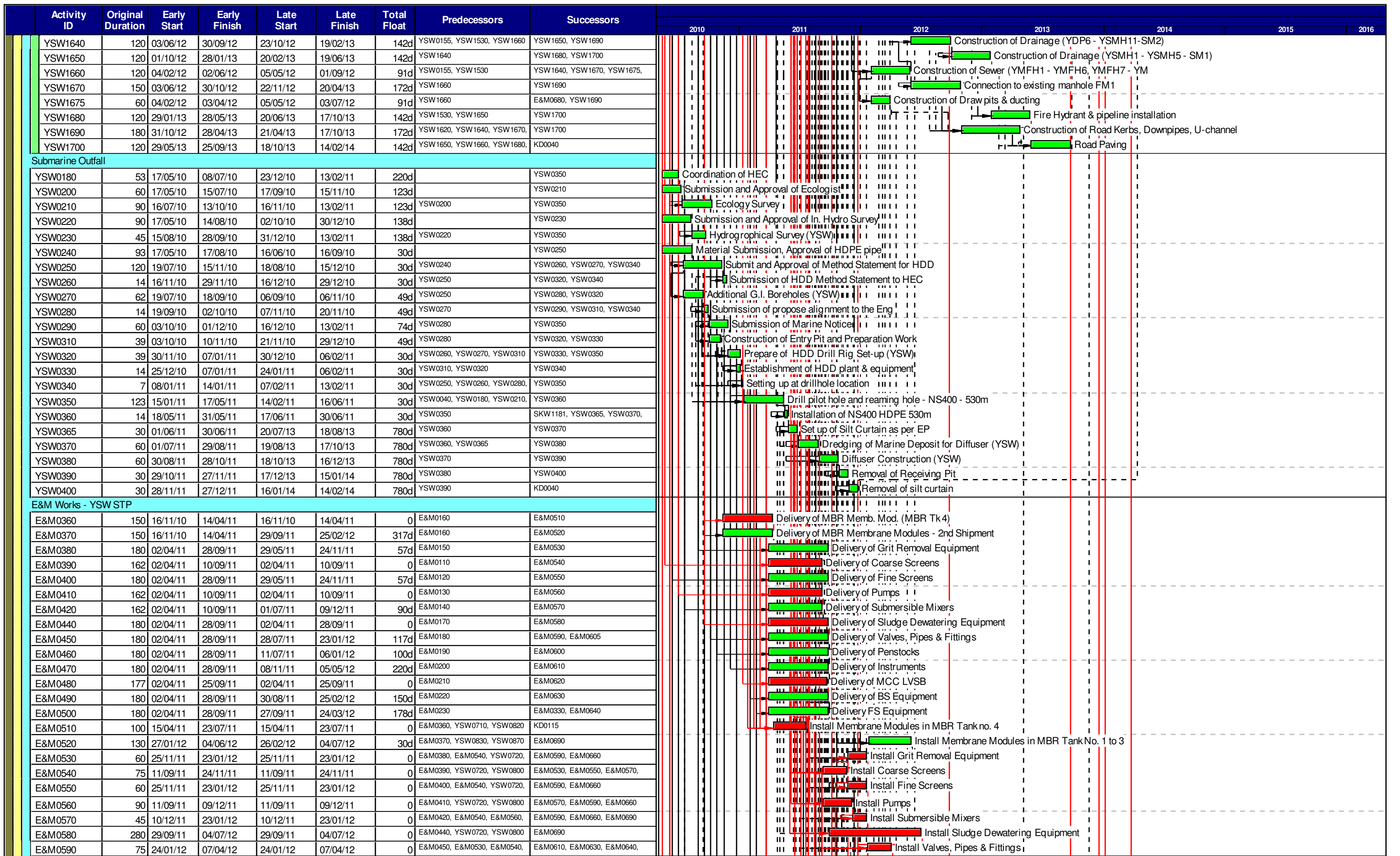
Date	Revision	Checked	Approved
17/05/10	Revision 0	StL	VC
31/07/10	Revision 1	StL	VC
30/12/10	Revision 2	StL	VC

Activity ID	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Predecessors	Successors	2010	2011	2012	2013	2014	2015	2016
YSW0590	55	14/04/11	07/06/11	14/04/11	07/06/11	0	YSW0580	YSW0600							
YSW0600	55	08/06/11	01/08/11	08/06/11	01/08/11	0	YSW0590	YSW0720, YSW0800							
YSW0720	40	02/08/11	10/09/11	02/08/11	10/09/11	0	YSW0600	E&M0530, E&M0540, E&M0550,							
YSW0800	40	02/08/11	10/09/11	02/08/11	10/09/11	0	YSW0600	E&M0530, E&M0540, E&M0550,							
YSW STP - GLT - X															
YSW0610	50	16/10/10	04/12/10	16/10/10	04/12/10	0	YSW0030, YSW0422, YSW0520	YSW0620							
YSW0620	60	05/12/10	02/02/11	05/12/10	02/02/11	0	YSW0610	YSW0630							
YSW0630	95	03/02/11	08/05/11	03/02/11	08/05/11	0	YSW0620	YSW0640							
YSW0640	91	09/05/11	07/08/11	09/05/11	07/08/11	0	YSW0630	YSW0810, YSW0840							
YSW0810	100	18/06/11	25/09/11	18/06/11	25/09/11	0	YSW0640	E&M0610, E&M0620, E&M0630,							
YSW STP - GLF - H & DN Tanks															
YSW0650	72	16/06/10	26/08/10	16/06/10	26/08/10	0	YSW0030, YSW0422	YSW0660							
YSW0660	44	27/08/10	09/10/10	27/08/10	09/10/10	0	YSW0650	YSW0670							
YSW0670	32	10/10/10	10/11/10	10/10/10	10/11/10	0	YSW0660	YSW0680							
YSW0680	30	11/11/10	10/12/10	11/11/10	10/12/10	0	YSW0670	YSW0690							
YSW0690	60	11/12/10	08/02/11	11/12/10	08/02/11	0	YSW0680	YSW0700, YSW0820							
YSW0700	35	09/02/11	15/03/11	09/02/11	15/03/11	0	YSW0690	YSW0710							
YSW0710	30	16/03/11	14/04/11	16/03/11	14/04/11	0	YSW0700	E&M0510, E&M0630, E&M0640							
YSW0820	65	09/02/11	14/04/11	09/02/11	14/04/11	0	YSW0690	E&M0510, E&M0630, E&M0640							
YSW STP - GLA - F															
YSW0730	0	01/06/11		01/07/11		30d	YSW0360	YSW0740							
YSW0740	22	01/06/11	22/06/11	01/07/11	22/07/11	30d	YSW0730	YSW0750							
YSW0750	22	23/06/11	14/07/11	23/07/11	13/08/11	30d	YSW0740	YSW0760							
YSW0760	24	15/07/11	07/08/11	14/08/11	06/09/11	30d	YSW0750	YSW0770, YSW1470							
YSW0770	22	08/08/11	29/08/11	07/09/11	28/09/11	30d	YSW0760	YSW0780							
YSW0780	21	30/08/11	19/09/11	29/09/11	19/10/11	30d	YSW0770	YSW0790							
YSW0790	30	20/09/11	19/10/11	20/10/11	18/11/11	30d	YSW0780	YSW0795, YSW0870							
YSW0795	30	20/10/11	18/11/11	19/11/11	18/12/11	30d	YSW0790	YSW0830							
YSW0830	30	19/11/11	18/12/11	19/12/11	17/01/12	30d	YSW0795	E&M0520, E&M0605, E&M0630,							
YSW0870	60	20/10/11	18/12/11	28/12/11	25/02/12	69d	YSW0790	E&M0520, E&M0605, E&M0630,							
Fire Hose Reel / Sprinkler Pump Rm															
YSW0840	30	08/08/11	06/09/11	01/09/11	30/09/11	24d	YSW0030, YSW0422, YSW0640	YSW0860							
YSW0860	30	07/09/11	06/10/11	01/10/11	30/10/11	24d	YSW0840	YSW0880							
YSW0880	30	07/10/11	05/11/11	31/10/11	29/11/11	24d	YSW0860	YSW0890							
YSW0890	30	06/11/11	05/12/11	30/11/11	29/12/11	24d	YSW0880	YSW0900, YSW0930							
YSW0900	35	06/12/11	09/01/12	30/12/11	02/02/12	24d	YSW0890	YSW0910, YSW0925							
YSW0910	21	10/01/12	30/01/12	03/02/12	23/02/12	24d	YSW0900	YSW0915, YSW0925							
YSW0915	30	31/01/12	29/02/12	24/02/12	24/03/12	24d	YSW0910	YSW0925							
YSW0925	30	31/01/12	29/02/12	24/02/12	24/03/12	24d	YSW0900, YSW0910, YSW0915	E&M0640							
YSW0930	60	06/12/11	03/02/12	06/05/12	04/07/12	152d	YSW0890	E&M0690, KD0040							
Emergency Storage Tank															
YSW1470	30	08/08/11	06/09/11	07/11/11	06/12/11	91d	YSW0030, YSW0760	YSW1480							
YSW1480	40	07/09/11	16/10/11	07/12/11	15/01/12	91d	YSW1470	YSW1490							
YSW1490	30	17/10/11	15/11/11	16/01/12	14/02/12	91d	YSW1480	YSW1500							
YSW1500	40	16/11/11	25/12/11	15/02/12	25/03/12	91d	YSW1490	YSW1530, YSW1536, YSW1540							
YSW1530	40	26/12/11	03/02/12	26/03/12	04/05/12	91d	YSW1500	E&M0690, YSW1620, YSW1640,							
YSW1536	40	26/12/11	03/02/12	26/05/12	04/07/12	152d	YSW1500	YSW1538							
YSW1538	30	05/01/12	03/02/12	05/06/12	04/07/12	152d	YSW1536	E&M0690							
YSW1540	40	26/12/11	03/02/12	26/05/12	04/07/12	152d	YSW1500	E&M0690							
Road, Drain, Cable Draw Pits & Ducting															
YSW0152	92	16/06/10	15/09/10	26/09/13	26/12/13	1198d	YSW0030	YSW0153							
YSW0153	50	16/09/10	04/11/10	27/12/13	14/02/14	1198d	YSW0152								
YSW0154	90	22/05/11	19/08/11	08/10/11	05/01/12	139d	YSW0165	YSW0155							
YSW0155	120	20/08/11	17/12/11	06/01/12	04/05/12	139d	YSW0154, YSW0165	YSW1640, YSW1660							
YSW1620	240	04/02/12	30/09/12	24/08/12	20/04/13	202d	YSW1530	KD0040, YSW1625, YSW1690							
YSW1625	240	01/10/12	28/05/13	20/06/13	14/02/14	262d	YSW1620	KD0040							

Start date	05/05/10	Early bar
Finish date	14/02/14	Progress bar
Data date	17/05/10	Critical bar
Run date	06/01/11	Summary bar
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		Start milestone point
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Start date	05/05/10		Early bar
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Data date	17/05/10		Critical bar
Run date	06/01/11		Summary bar
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Activity ID	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Predecessors	Successors	2010	2011	2012	2013	2014	2015	2016
E&M0600	180	29/09/11	26/03/12	07/01/12	04/07/12	100d	E&M0460, YSW0720, YSW0800	E&M0690			Install Penstocks (Batch 1, GL H - T)				
E&M0605	120	27/01/12	25/05/12	07/03/12	04/07/12	40d	E&M0450, YSW0830, YSW0870	E&M0690			Install Penstocks (Batch 2, GL A - F)				
E&M0610	60	08/04/12	06/06/12	06/05/12	04/07/12	28d	E&M0470, E&M0590, YSW0720,	E&M0690			Install Instruments				
E&M0620	120	26/09/11	23/01/12	26/09/11	23/01/12	0	E&M0480, YSW0810	E&M0660, E&M0680			Install SAT, MCC & LVSB				
E&M0630	130	26/02/12	04/07/12	26/02/12	04/07/12	0	E&M0490, E&M0590, YSW0710,	E&M0690			Install BS Equipment				
E&M0640	102	01/03/12	10/06/12	25/03/12	04/07/12	24d	E&M0500, E&M0590, YSW0710,	E&M0690			Install FS Equipment				
E&M0650	88	08/04/12	04/07/12	08/04/12	04/07/12	0	E&M0590	E&M0690			Hydraulic Tests of Pipeworks				
E&M0660	110	24/01/12	12/05/12	24/01/12	12/05/12	0	E&M0530, E&M0540, E&M0550,	E&M0670			Cabling Works				
E&M0670	52	13/05/12	03/07/12	13/05/12	03/07/12	0	E&M0320, E&M0325, E&M0660	E&M0680			Insulation Tests of Cables and Cable Termination				
E&M0680	1	04/07/12	04/07/12	04/07/12	04/07/12	0	E&M0305, E&M0325, E&M0620,	E&M0690			Energization				
E&M0690	35	05/07/12	08/08/12	05/07/12	08/08/12	0	E&M0520, E&M0570, E&M0580,	E&M0700			Functional and Performance Tests of Equipment				
E&M0700	505	09/08/12	26/12/13	09/08/12	26/12/13	0	E&M0330, E&M0690	E&M0710			Commissioning Test - Phase I				
E&M0710	50	27/12/13	14/02/14	27/12/13	14/02/14	0	E&M0700	E&M0720			Commissioning Test - Phase II				
E&M0720	0		14/02/14*		14/02/14	0*	E&M0710	KD0040			Completion of Section W2				

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Preliminary

SKW0250	16	17/05/10	01/06/10	17/05/10	01/06/10	0	KD0020	SKW0260	Approval of Environmental Team
SKW0260	14	02/06/10	15/06/10	02/06/10	15/06/10	0	SKW0250	SKW0242, SKW0592, SKW0681,	Baseline monitoring (Air & Noise)

Section W 3 - Footpath Diversion in Portion G

Civil & Geotechnical Works									
SKW0240	21	17/05/10	06/06/10	17/05/10	06/06/10	0		SKW0241	Site Clearance
SKW0241	9	07/06/10	15/06/10	07/06/10	15/06/10	0	SKW0240	SKW0242	Initial Survey
SKW0242	57	16/06/10	11/08/10	16/06/10	11/08/10	0	SKW0241, SKW0260	SKW0251	Excavation to formation for Bay 1 to 5
SKW0251	21	12/08/10	01/09/10	12/08/10	01/09/10	0	SKW0242	SKW0301	Drill & Install Dowel Bar for Bay 1 & 3
SKW0301	14	02/09/10	15/09/10	02/09/10	15/09/10	0	SKW0251	SKW0311	Erect Formwork mesh & weephole for Bay 1 & 3
SKW0311	14	16/09/10	29/09/10	16/09/10	29/09/10	0	SKW0301	SKW0321	Concreting for Bay 1 & 3
SKW0321	7	30/09/10	06/10/10	30/09/10	06/10/10	0	SKW0311	SKW0331	Drilling & install Dowel Bar for Bay 2 & 5
SKW0331	7	07/10/10	13/10/10	07/10/10	13/10/10	0	SKW0321	SKW0341	Erect Formwork mesh & weephole for Bay 2 & 5
SKW0341	7	14/10/10	20/10/10	14/10/10	20/10/10	0	SKW0331	SKW0351	Concreting for Bay 2 & 5
SKW0351	21	21/10/10	10/11/10	21/10/10	10/11/10	0	SKW0341	SKW0361	Excavation to formation for Bay 6 to 9
SKW0361	6	11/11/10	16/11/10	11/11/10	16/11/10	0	SKW0351	SKW0371	Drill & install dowel Bar for Bay 4 & 7
SKW0371	7	17/11/10	23/11/10	17/11/10	23/11/10	0	SKW0361	SKW0381	Erect formwork mesh & weephole for Bay 4 & 7
SKW0381	7	24/11/10	30/11/10	24/11/10	30/11/10	0	SKW0371	SKW0391	Concreting for Bay 4 & 7
SKW0391	3	01/12/10	03/12/10	01/12/10	03/12/10	0	SKW0381	SKW0401	Drill & install dowel Bar for Bay 6 & 9
SKW0401	7	04/12/10	10/12/10	04/12/10	10/12/10	0	SKW0391	SKW0411	Erect formwork mesh & weephole for Bay 6 & 9
SKW0411	7	11/12/10	17/12/10	11/12/10	17/12/10	0	SKW0401	SKW0421	Concreting for Bay 6 & 9
SKW0421	1	18/12/10	18/12/10	18/12/10	18/12/10	0	SKW0411	SKW0431	Drill & install dowel Bar for Bay 8
SKW0431	4	19/12/10	22/12/10	19/12/10	22/12/10	0	SKW0421	SKW0441	Erect formwork mesh & weephole for Bay 8
SKW0441	4	23/12/10	26/12/10	23/12/10	26/12/10	0	SKW0431	SKW0461	Concreting for Bay 8
SKW0461	3	27/12/10	29/12/10	27/12/10	29/12/10	0	SKW0441	SKW0471	Excavation for no fine concrete Bay (1-9)
SKW0471	7	30/12/10	05/01/11	30/12/10	05/01/11	0	SKW0461	SKW0481	Concreting for no-fine concrete
SKW0481	14	06/01/11	19/01/11	06/01/11	19/01/11	0	SKW0471	SKW0491	Installation of Wall tie & stone facing
SKW0491	7	06/01/11	12/01/11	06/01/11	12/01/11	0	SKW0481	SKW0501	Construction of Gabion Wall
SKW0501	3	06/01/11	08/01/11	06/01/11	08/01/11	0	SKW0491	SKW0511	Place Geotextile
SKW0511	7	09/01/11	15/01/11	09/01/11	15/01/11	0	SKW0501	SKW0521	Backfill behind the retaining wall to approx. +4
SKW0521	14	16/01/11	29/01/11	16/01/11	29/01/11	0	SKW0511	SKW0531	Watermain Laying and Diversion
SKW0531	7	30/01/11	05/02/11	30/01/11	05/02/11	0	SKW0521	SKW0541	Concreting for Pavement
SKW0541	7	06/02/11	12/02/11	06/02/11	12/02/11	0	SKW0531	SKW0551	Installation of Flower Pot
SKW0551	1	13/02/11	13/02/11	13/02/11	13/02/11	0	SKW0541	KD0050, SKW1261, SKW1311	Permanent Footpath Diversion

Section W 4 - Slope Works in Portions H & I

Geotechnical Works									
SKW0588	30	15/06/10	14/07/10	15/06/10	14/07/10	0	KD0020	SKW0590	Construct scaffolding access
SKW0590	100	15/07/10	22/10/10	15/07/10	22/10/10	0	SKW0588	SKW0591	Site Clearance for Slope
SKW0591	28	21/09/10	18/10/10	21/09/10	18/10/10	0	SKW0590	SKW0592	Initial Survey for Slope
SKW0592	43	31/08/10	12/10/10	31/08/10	12/10/10	0	SKW0260, SKW0591	SKW05931	Temporary Rockfall fence at ex. Footpath

Start date	05/05/10		Early bar
Finish date	14/02/14		Progress bar
Data date	17/05/10		Critical bar
Run date	06/01/11		Summary bar
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			Critical point
			Summary point
			Start milestone point
			Finish milestone point

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31/07/10	Revision 1	StL	VC
30/12/10	Revision 2	StL	VC

Activity ID	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Predecessors	Successors	Year						
									2010	2011	2012	2013	2014	2015	2016
SKW05931	50	03/09/10	22/10/10	03/09/10	22/10/10	0	SKW0592	SKW05932	Construction of Haul Road (To +21mPD)						
SKW05932	60	23/10/10	21/12/10	23/10/10	21/12/10	0	SKW05931	SKW05933	Construction of Haul Road (To +42mPD)						
SKW05933	30	22/12/10	20/01/11	22/12/10	20/01/11	0	SKW05932	SKW05934	Excavation of Rock Berm (+50mPD to +42.5mPD)						
SKW05934	30	21/01/11	19/02/11	21/01/11	19/02/11	0	SKW05933	SKW05935	Excavation of Rock Berm (+42.5mPD to +35mPD)						
SKW05935	30	20/02/11	21/03/11	20/02/11	21/03/11	0	SKW05934	SKW05936	Excavation of Rock Berm (+35mPD to +27.5mPD)						
SKW05936	30	22/03/11	20/04/11	22/03/11	20/04/11	0	SKW05935	SKW05937	Excavation of Rock Berm (+27.5mPD to +20mPD)						
SKW05937	30	21/04/11	20/05/11	21/04/11	20/05/11	0	SKW05936	SKW05938	Excavation of Rock Berm (+20mPD to +12.5mPD)						
SKW05938	26	21/05/11	15/06/11	21/05/11	15/06/11	0	SKW05937	SKW0594, SKW0595, SKW1311,	Excavation of Rock Berm (+12.5mPD to +5mPD)						
SKW0594	248	11/12/10	15/08/11	11/12/10	15/08/11	0	SKW05938	KD0060	Road & Drains Works						
SKW0595	260	29/11/10	15/08/11	29/11/10	15/08/11	0	SKW05938	KD0060	Rock Meshing & Rockfall Fence						
Section W5 - P.S. No. 1 in Portion D															
Civil & Geotechnical Works															
SKW0651	7	17/05/10	23/05/10	17/05/10	23/05/10	0	KD0020	SKW0652	Site Clearance						
SKW0652	7	24/05/10	30/05/10	24/05/10	30/05/10	0	SKW0651	SKW0661, SKW0681	Initial Survey						
SKW0661	30	31/05/10	29/06/10	31/05/10	29/06/10	0	SKW0652	SKW0681	Transplantation for uncommon vegetation						
SKW0681	49	30/06/10	17/08/10	30/06/10	17/08/10	0	SKW0260, SKW0652, SKW0661	SKW0691	Excavate to lower the working platform to +3mPD						
SKW0691	40	18/08/10	26/09/10	18/08/10	26/09/10	0	SKW0681	SKW0721	ELS to +2.2mPD						
SKW0721	92	17/09/10	17/12/10	17/09/10	17/12/10	0	SKW0691	SKW0741	Excavate to formation						
Structural Works															
SKW0741	15	18/12/10	01/01/11	18/12/10	01/01/11	0	SKW0721	SKW0751	Base Slab (BSD2 & BSD3)						
SKW0751	14	01/01/11	14/01/11	01/01/11	14/01/11	0	SKW0741	SKW0761	Wall & Column (CA1-3,CB1-3,CC1-3, CD1-2) Approx.						
SKW0761	14	14/01/11	27/01/11	14/01/11	27/01/11	0	SKW0751	SKW0771	Base Slab (BSD1) to +3.98						
SKW0771	14	27/01/11	09/02/11	27/01/11	09/02/11	0	SKW0761	SKW0781	Wall & Column (CA1-3,CB1-3,CC1-3, CD1-2) to +6.3						
SKW0781	14	09/02/11	22/02/11	09/02/11	22/02/11	0	SKW0771	SKW0791	Base Slab (GSB1-3,GSC1-5,GSD1-2)						
SKW0791	14	22/02/11	07/03/11	22/02/11	07/03/11	0	SKW0781	SKW0801	Base Slab (GSE1 & GSF1)						
SKW0801	14	07/03/11	20/03/11	07/03/11	20/03/11	0	SKW0791	SKW0811	Wall & Column (CE1-3, CF1-3)						
SKW0811	14	21/03/11	03/04/11	21/03/11	03/04/11	0	SKW0801	SKW0821	Ground Beam (GB1-1,2 GB2-1,2 GB3-1, GBA-1,GBB1-4)						
SKW0821	14	04/04/11	17/04/11	04/04/11	17/04/11	0	SKW0811	SKW0831	Wall & Column (CA1-3,CB1-3,CC1-3, CD1-2) to +10.						
SKW0831	14	18/04/11	01/05/11	18/04/11	01/05/11	0	SKW0821	E&M1101, E&M1102, E&M1103,	Roof Beams & Parapet						
SKW0841	45	18/04/11	01/06/11	18/04/11	01/06/11	0	SKW0831	E&M1101, E&M1102, E&M1103,	ABWF installation						
SKW0861	168	02/05/11	16/10/11	01/06/11	15/11/11	30d	SKW0831, SKW0841	KD0070	300mm U-channel & 675mm Step Channel						
E&M Works (PS1)															
Submission & Delivery															
E&M1001	198	17/05/10	30/11/10	19/05/10	02/12/10	2d	KD0020	E&M1011	Submission of Pumps						
E&M1002	198	17/05/10	30/11/10	19/05/10	02/12/10	2d		E&M1012	Submission of Gen-Set						
E&M1003	198	17/05/10	30/11/10	19/05/10	02/12/10	2d		E&M1013	Submission of DeO System						
E&M1004	180	17/05/10	12/11/10	06/06/10	02/12/10	20d		E&M1014	Submission of LV SB & MCC						
E&M1005	243	17/05/10	14/01/11	03/06/10	31/01/11	17d		E&M1015	Submission of Instrumentation						
E&M1006	243	17/05/10	14/01/11	17/05/10	14/01/11	0		E&M1016	Submission of FS System						
E&M1007	243	17/05/10	14/01/11	17/05/10	14/01/11	0		E&M1017	Submission of BS System						
E&M1011	150	01/12/10	29/04/11	03/12/10	01/05/11	2d	E&M1001	E&M1101	Delivery of Pumps						
E&M1012	150	01/12/10	29/04/11	03/12/10	01/05/11	2d	E&M1002	E&M1102	Delivery of Gen-Set						
E&M1013	150	01/12/10	29/04/11	03/12/10	01/05/11	2d	E&M1003	E&M1103	Delivery of DeO System						
E&M1014	150	13/11/10	11/04/11	03/12/10	01/05/11	20d	E&M1004	E&M1104	Delivery of LV SB & MCC						
E&M1015	90	15/01/11	14/04/11	01/02/11	01/05/11	17d	E&M1005	E&M1105	Delivery of Instrumentation						
E&M1016	107	15/01/11	01/05/11	15/01/11	01/05/11	0	E&M1006	E&M1106	Delivery of FS Equipment						
E&M1017	107	15/01/11	01/05/11	15/01/11	01/05/11	0	E&M1007	E&M1107	Delivery of BS Equipment						
Installation, T&C															
E&M1101	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M1011, SKW0831, SKW0841	E&M1110, E&M1140	Install Pumps						
E&M1102	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M1012, SKW0831, SKW0841	E&M1110, E&M1140	Install Gen Set						
E&M1103	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M1013, SKW0831, SKW0841	E&M1110, E&M1140	Install DeO System						
E&M1104	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M1014, SKW0831, SKW0841	E&M1140	Install LV SB & MCC						
E&M1105	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M1015, SKW0831, SKW0841	E&M1140	Install Instrumentation						
E&M1106	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M1016, SKW0831, SKW0841	E&M1130, E&M1140	Install FS Equipment						
E&M1107	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M1017, SKW0831, SKW0841	E&M1110, E&M1140	Install BS Equipment						
E&M1110	46	26/06/11	10/08/11	24/12/13	07/02/14	912d	E&M1101, E&M1102, E&M1103,	E&M1120	Install Valves, Pipes & Fittings						

Start date	05/05/10		Early bar
Finish date	14/02/14		Progress bar
Data date	17/05/10		Critical bar
Run date	06/01/11		Summary bar
Page number	6A		Progress point
			Critical point
			Summary point
			Start milestone point
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30/12/10	Revision 2	StL	VC

Activity ID	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Predecessors	Successors	2010	2011	2012	2013	2014	2015	2016
E&M1120	7	11/08/11	17/08/11	08/02/14	14/02/14	912d	E&M1110				Hydraulic Test of Pipeworks				
E&M1130	28	26/06/11	23/07/11	19/10/11	15/11/11	115d	E&M1106	KD0070			Form 501 Submission to FSD				
E&M1140	43	26/06/11	07/08/11	26/06/11	07/08/11	0	E&M1101, E&M1102, E&M1103,	E&M1150			Cabling Works				
E&M1150	7	08/08/11	14/08/11	08/08/11	14/08/11	0	E&M1140	E&M1160			Insulation Tests of Cables and Cable Termination				
E&M1160	3	15/08/11	17/08/11	15/08/11	17/08/11	0	E&M1150	E&M1170			Engergization				
E&M1170	30	18/08/11	16/09/11	18/08/11	16/09/11	0	E&M1160	E&M11800			Functional and Performance Tests of Equipment				
E&M11800	60	17/09/11	15/11/11	17/09/11	15/11/11	0	E&M1170	KD0070			Commissioning Test				

Section W 6 - Sewer and PS No.2 in Portions E&H

Civil & Geotechnical Works

SKW0881	7	17/05/10	23/05/10	17/05/10	23/05/10	0	KD0020	SKW0891
SKW0891	7	17/05/10	23/05/10	17/05/10	23/05/10	0	SKW0881	SKW0892
SKW0892	30	24/05/10	22/06/10	24/05/10	22/06/10	0	SKW0891	SKW0901
SKW0901	30	23/06/10	22/07/10	23/06/10	22/07/10	0	SKW0892	SKW0921
SKW0921	14	23/07/10	05/08/10	23/07/10	05/08/10	0	SKW0260, SKW0901	SKW0931, SKW0951
SKW0931	14	06/08/10	19/08/10	06/08/10	19/08/10	0	SKW0921	SKW0951
SKW0951	106	20/08/10	03/12/10	20/08/10	03/12/10	0	SKW0921, SKW0931	SKW0961, SKW0971
SKW0961	257	04/12/10	17/08/11	04/03/11	15/11/11	90d	SKW0951	KD0080
SKW1491	180	14/09/10	12/03/11	14/09/10	12/03/11	0	PRE0100	SKW1511
SKW1511	180	13/03/11	08/09/11	13/03/11	08/09/11	0	SKW1491	SKW1531
SKW1531	34	09/09/11	12/10/11	09/09/11	12/10/11	0	SKW1511	SKW1581
SKW1581	34	13/10/11	15/11/11	13/10/11	15/11/11	0	SKW1531	KD0080

Structural Works

SKW0971	14	04/12/10	17/12/10	04/12/10	17/12/10	0	SKW0951	SKW0981
SKW0981	14	18/12/10	31/12/10	18/12/10	31/12/10	0	SKW0971	SKW0991
SKW0991	14	01/01/11	14/01/11	01/01/11	14/01/11	0	SKW0981	SKW1001
SKW1001	14	15/01/11	28/01/11	15/01/11	28/01/11	0	SKW0991	SKW1011
SKW1011	14	29/01/11	11/02/11	29/01/11	11/02/11	0	SKW1001	SKW1021
SKW1021	20	12/02/11	03/03/11	12/02/11	03/03/11	0	SKW1011	SKW1031
SKW1031	14	04/03/11	17/03/11	04/03/11	17/03/11	0	SKW1021	SKW1041
SKW1041	14	18/03/11	31/03/11	18/03/11	31/03/11	0	SKW1031	SKW1051
SKW1051	14	01/04/11	14/04/11	01/04/11	14/04/11	0	SKW1041	E&M2101, E&M2102, E&M2103,
SKW1061	90	01/04/11	29/06/11	18/04/11	16/07/11	17d	SKW1051	E&M2101, E&M2102, E&M2103,
SKW1081	215	15/04/11	15/11/11	15/04/11	15/11/11	0	SKW1051	KD0080

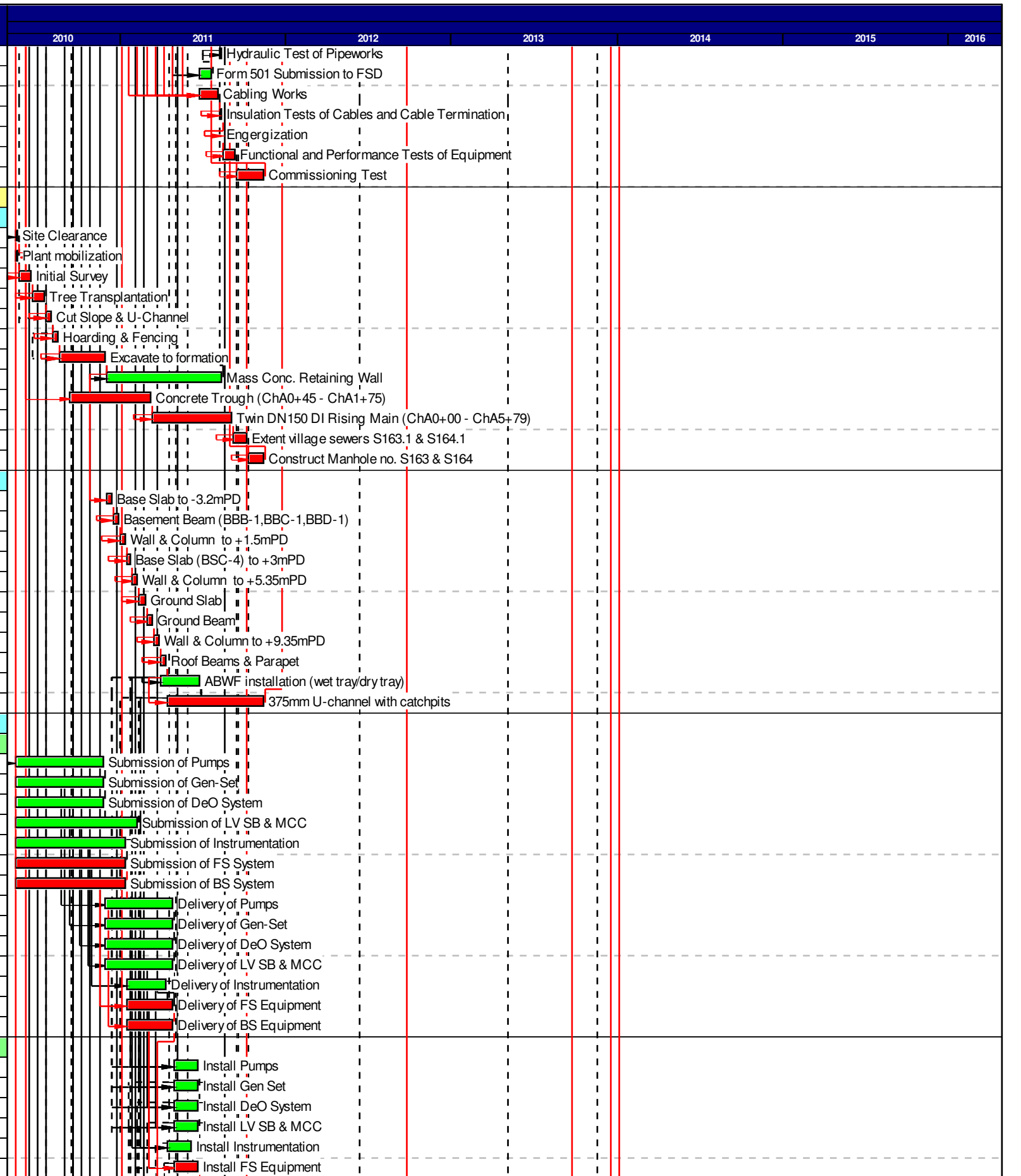
E&M Works (PS2)

Submission & Delivery

E&M2001	198	17/05/10	30/11/10	20/07/10	02/02/11	64d	KD0020	E&M2011
E&M2002	198	17/05/10	30/11/10	20/07/10	02/02/11	64d		E&M2012
E&M2003	198	17/05/10	30/11/10	20/07/10	02/02/11	64d		E&M2013
E&M2004	271	17/05/10	11/02/11	19/05/10	13/02/11	2d		E&M2014
E&M2005	243	17/05/10	14/01/11	03/06/10	31/01/11	17d		E&M2015
E&M2006	243	17/05/10	14/01/11	17/05/10	14/01/11	0		E&M2016
E&M2007	243	17/05/10	14/01/11	17/05/10	14/01/11	0		E&M2017
E&M2011	150	01/12/10	29/04/11	03/02/11	02/07/11	64d	E&M2001	E&M2101
E&M2012	150	01/12/10	29/04/11	03/02/11	02/07/11	64d	E&M2002	E&M2102
E&M2013	150	01/12/10	29/04/11	03/02/11	02/07/11	64d	E&M2003	E&M2103
E&M2014	150	01/12/10	29/04/11	03/12/10	01/05/11	2d	E&M2004	E&M2104
E&M2015	90	15/01/11	14/04/11	01/02/11	01/05/11	17d	E&M2005	E&M2105
E&M2016	107	15/01/11	01/05/11	15/01/11	01/05/11	0	E&M2006	E&M0350, E&M2106
E&M2017	107	15/01/11	01/05/11	15/01/11	01/05/11	0	E&M2007	E&M2107

Installation, T&C

E&M2101	55	30/04/11	23/06/11	03/07/11	26/08/11	64d	E&M2011, SKW1051, SKW1061	E&M2110
E&M2102	55	30/04/11	23/06/11	03/07/11	26/08/11	64d	E&M2012, SKW1051, SKW1061	E&M2110
E&M2103	55	30/04/11	23/06/11	03/07/11	26/08/11	64d	E&M2013, SKW1051, SKW1061	E&M2110
E&M2104	55	30/04/11	23/06/11	02/05/11	25/06/11	2d	E&M2014, SKW1051, SKW1061	E&M2140
E&M2105	55	15/04/11	08/06/11	02/05/11	25/06/11	17d	E&M2015, SKW1051, SKW1061	E&M2140
E&M2106	55	02/05/11	25/06/11	02/05/11	25/06/11	0	E&M2016, SKW1051, SKW1061	E&M2140

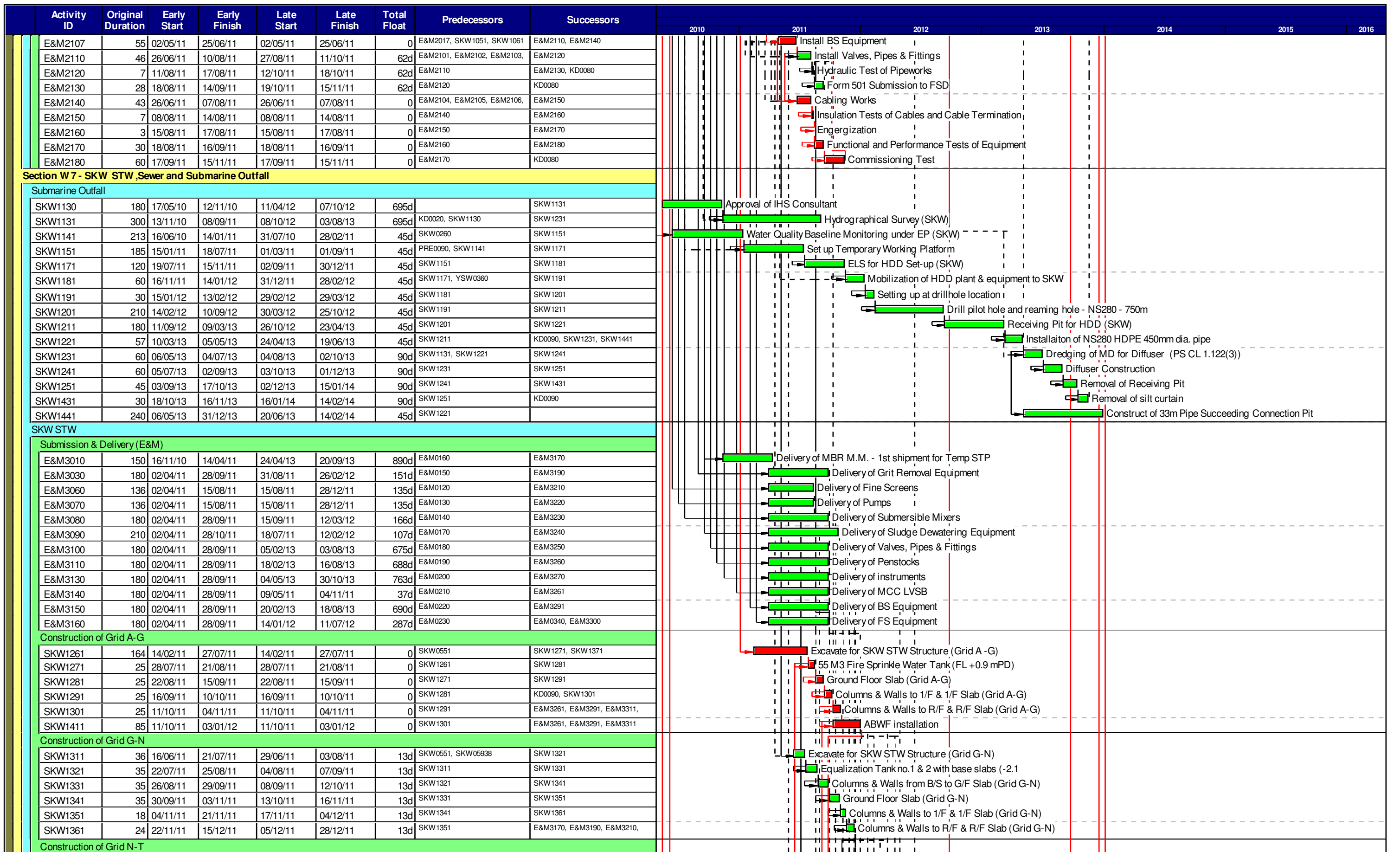


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Run date	06/01/11
Page number	7A
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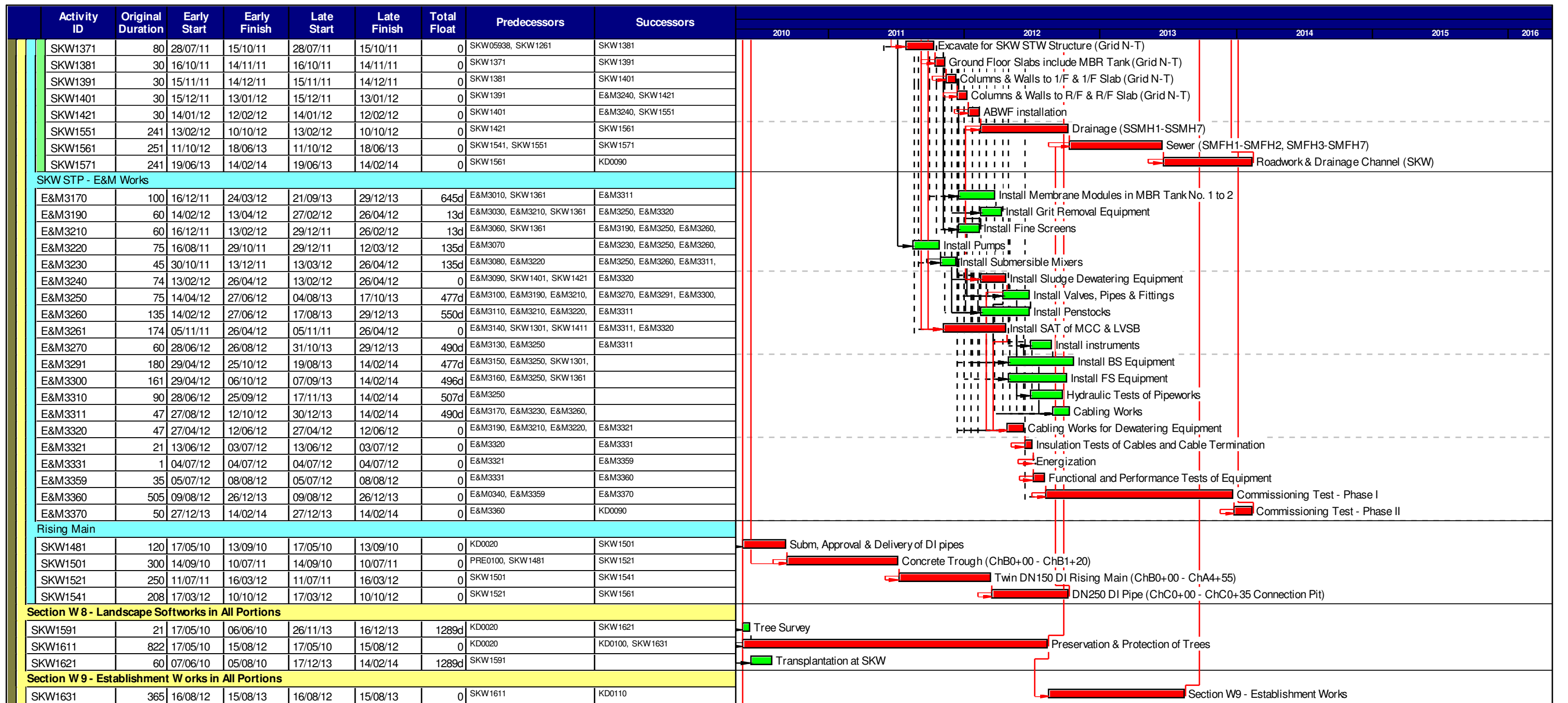
Date	Revision	Checked	Approved
17/05/10	Revision 0	StL	VC
31/07/10	Revision 1	StL	VC
30/12/10	Revision 2	StL	VC



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Data date	17/05/10		Critical bar
Run date	06/01/11		Summary bar
Page number	8A		Progress point
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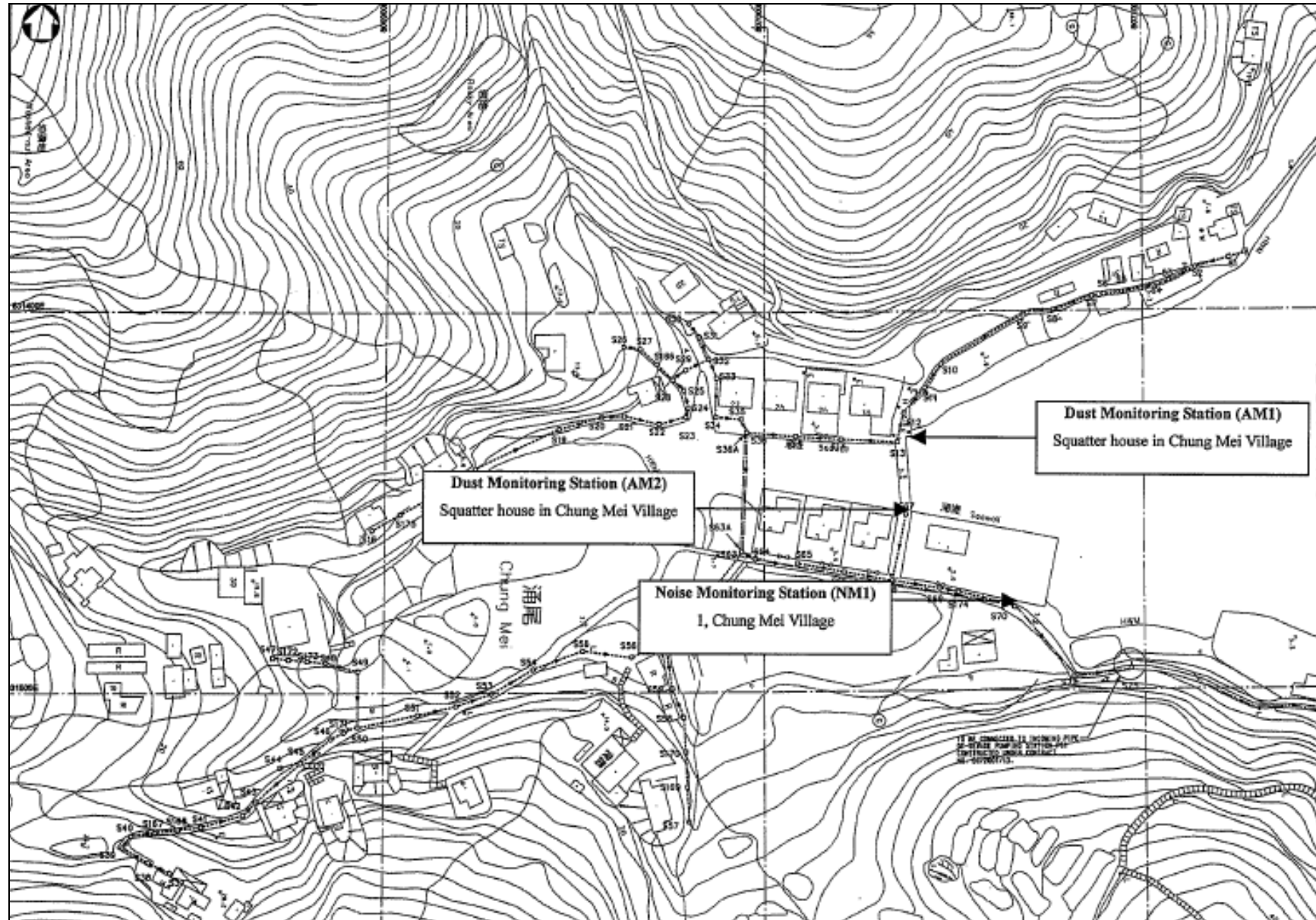
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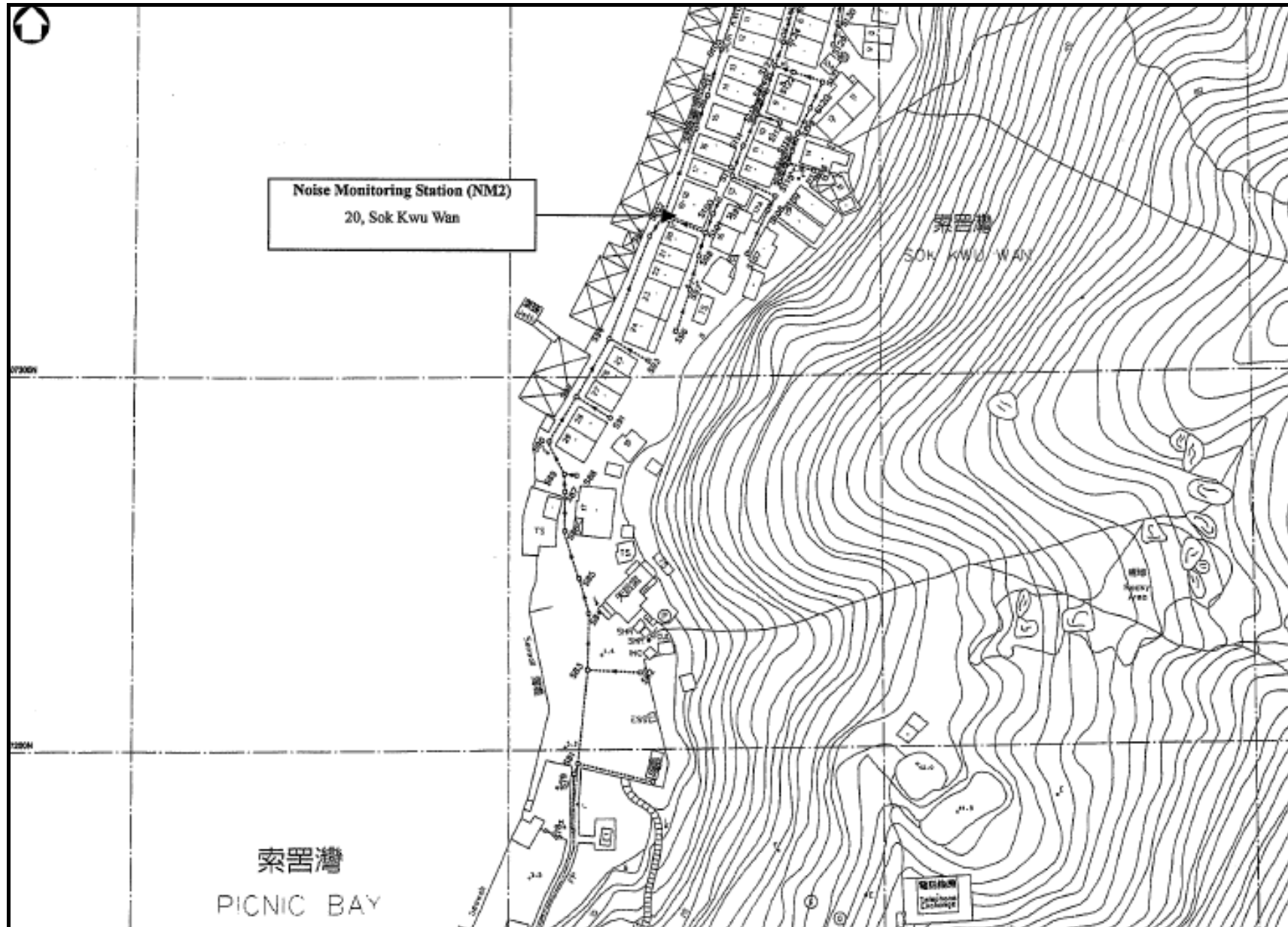
Leader Civil Engineering Corp. Ltd.
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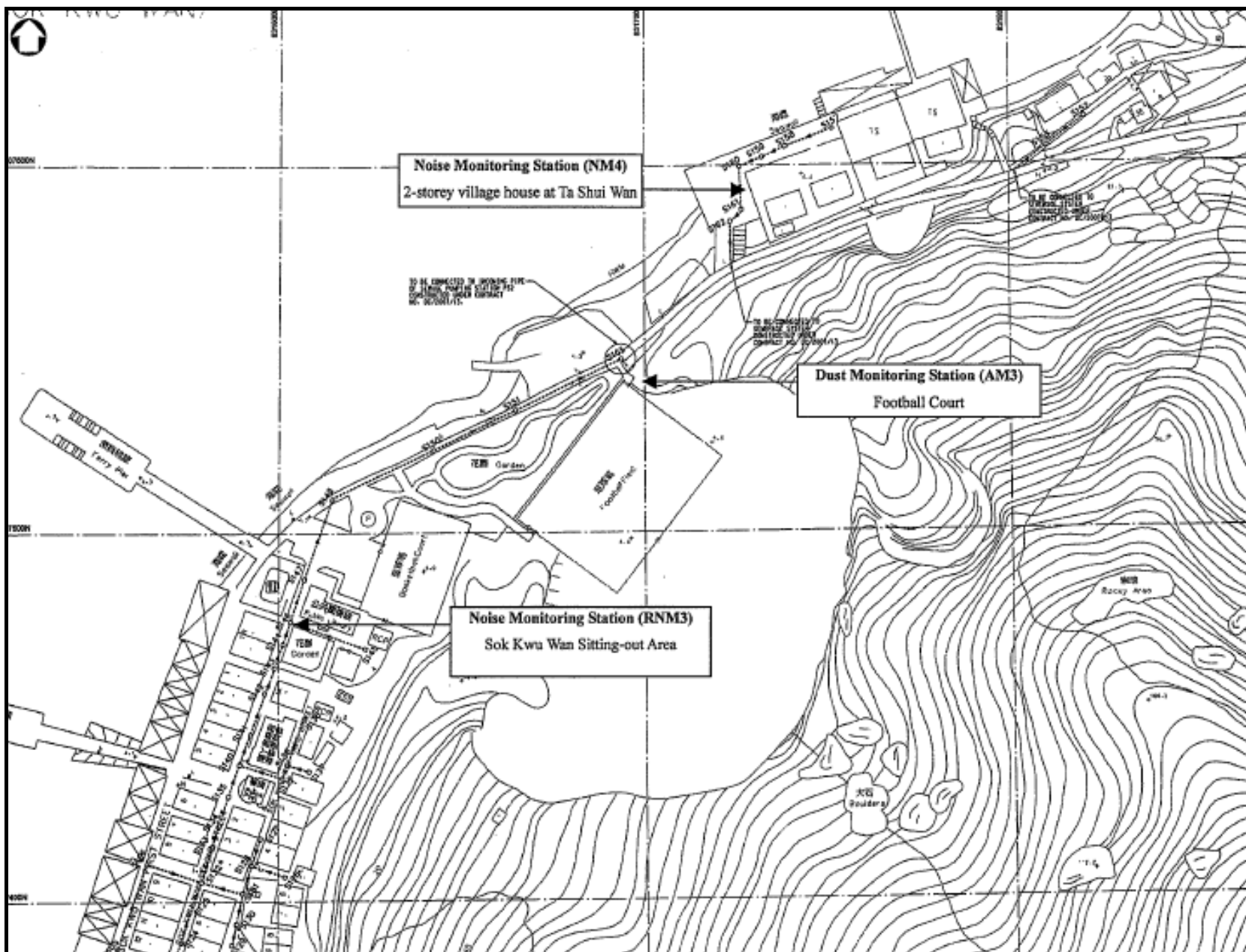
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17/05/10	Revision 0	StL	VC
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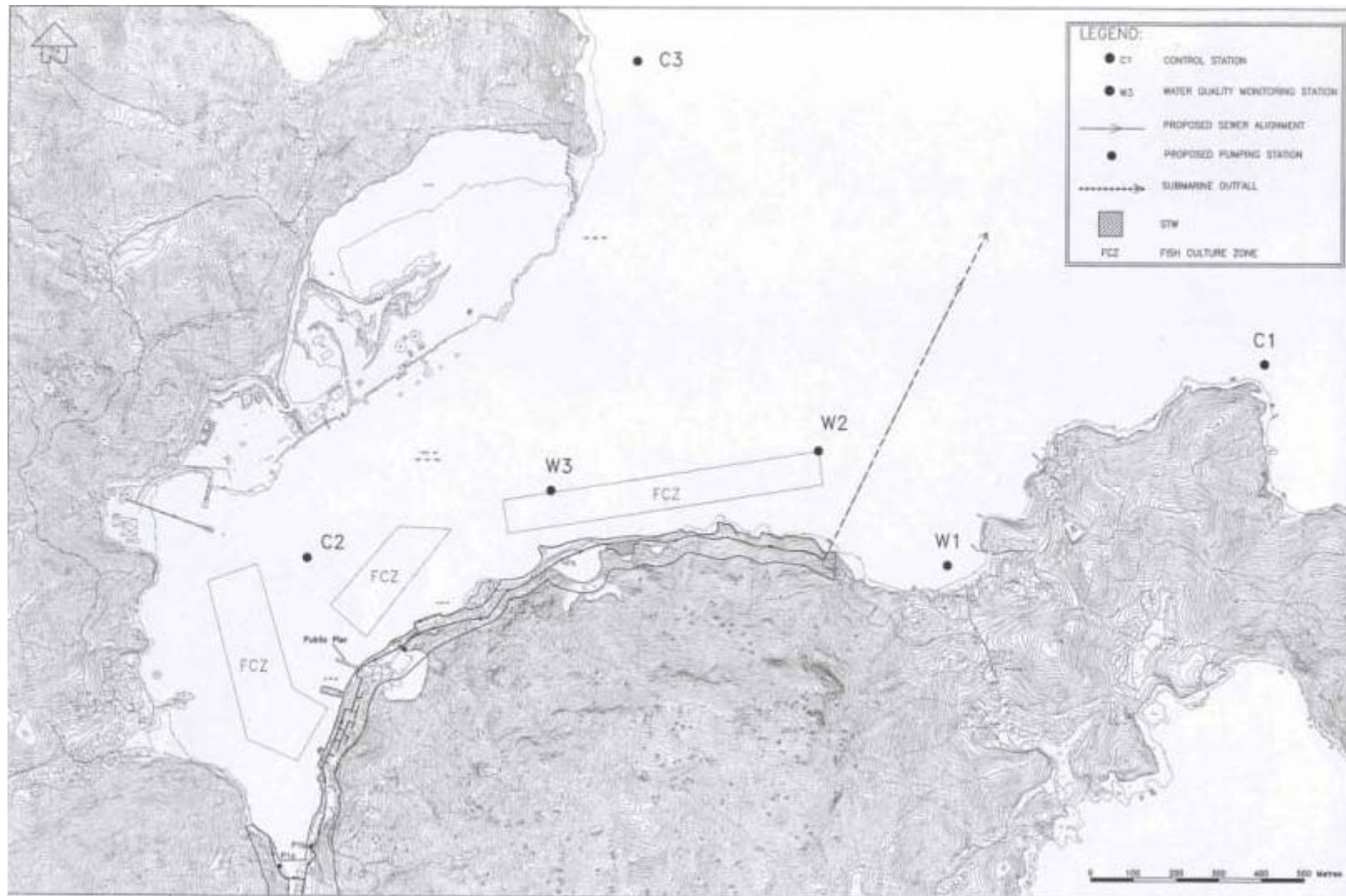
Appendix D

Location of Monitoring Stations (Air Quality / Construction Noise / Water Quality)







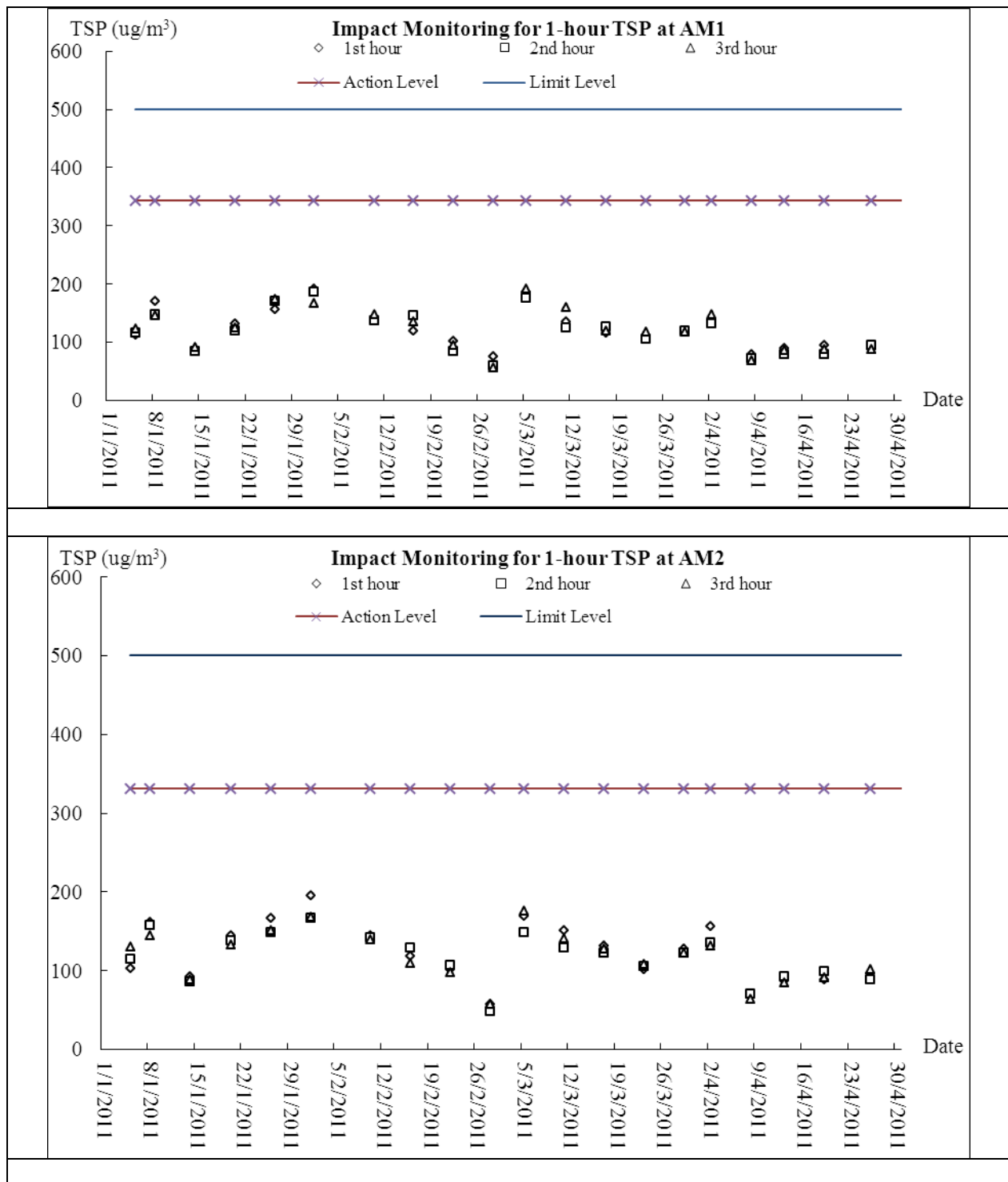


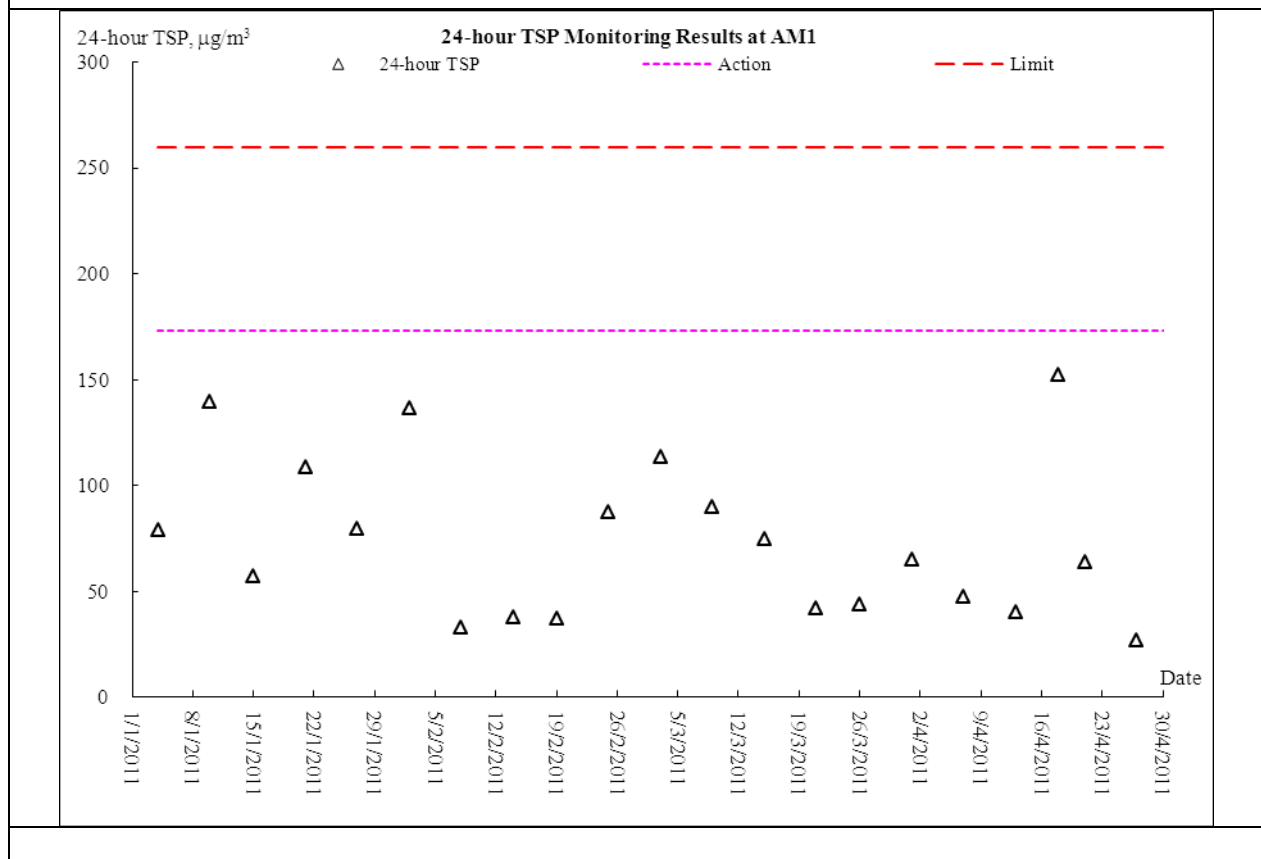
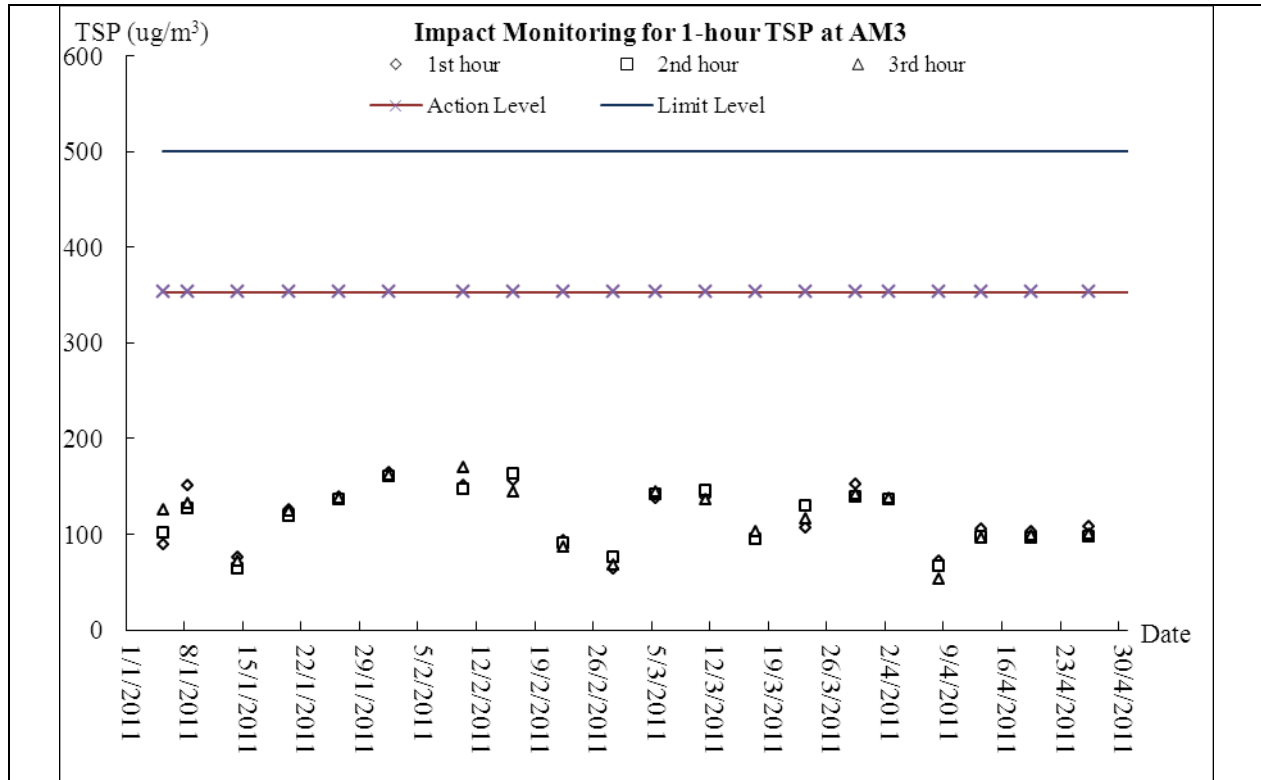
Appendix E

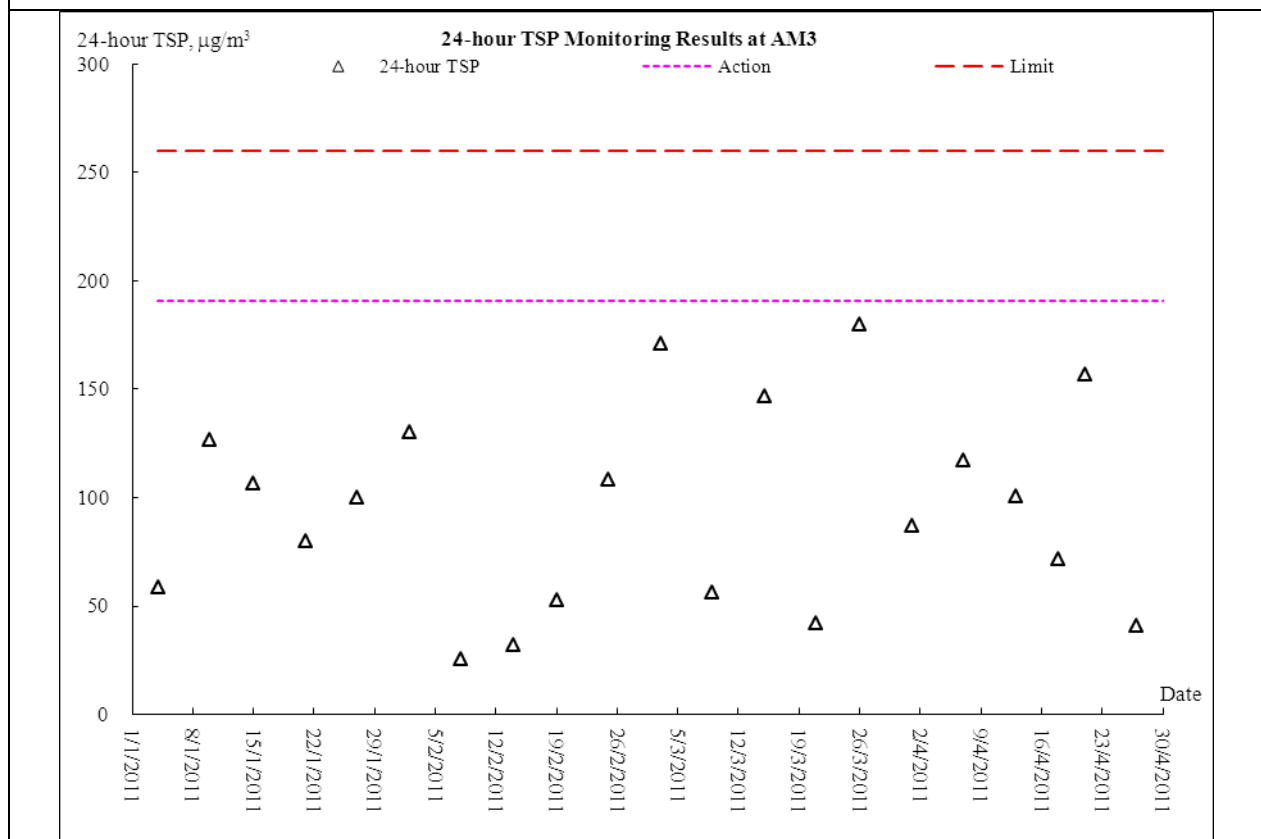
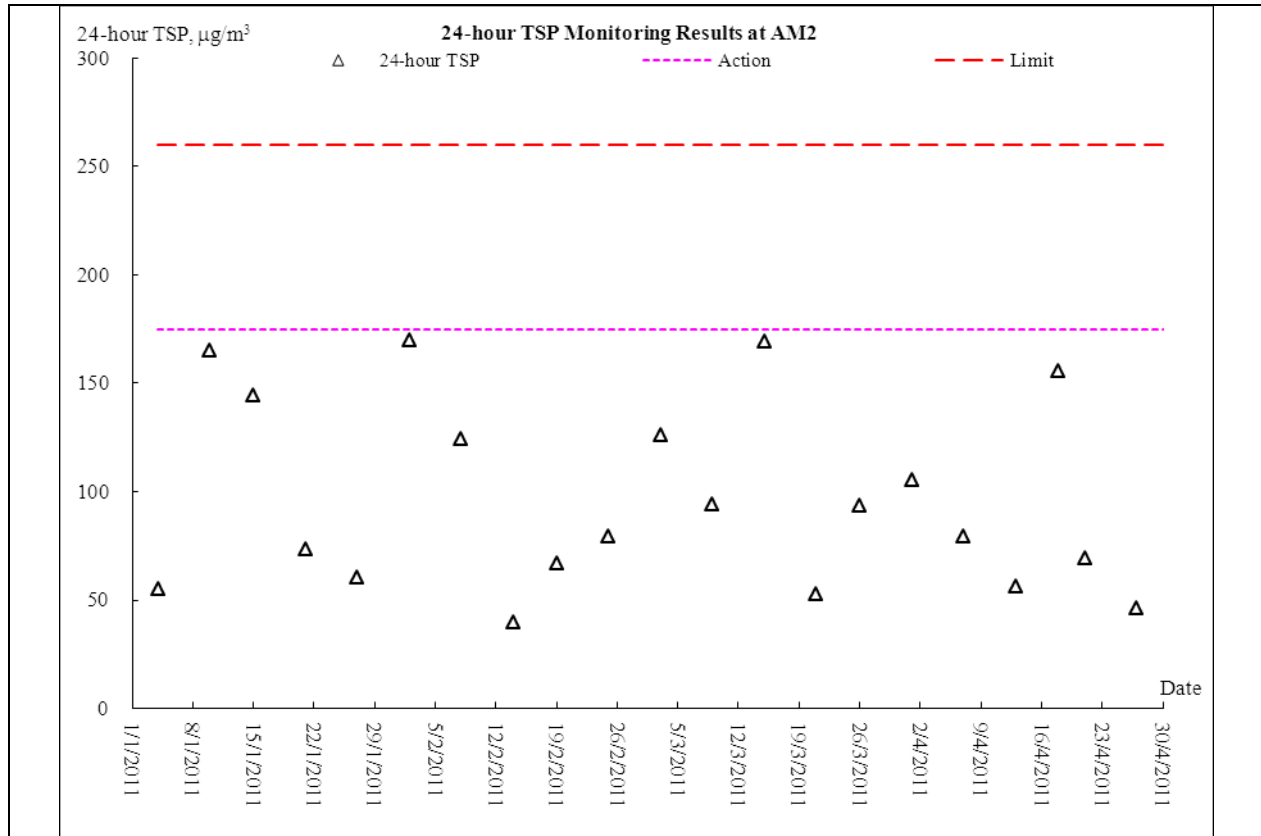
Graphical Plots of Impact Monitoring

- 1. Air**
- 2. Noise**
- 3. Marine Water**

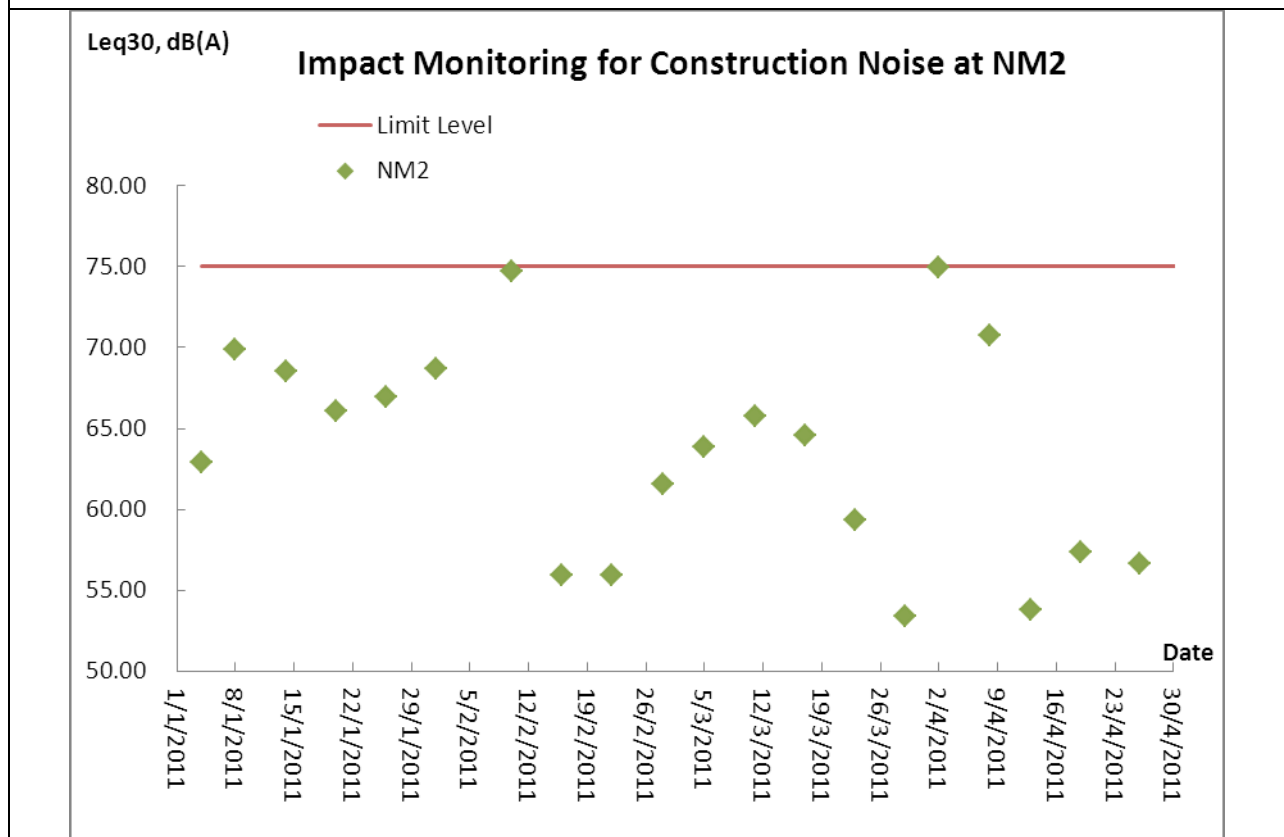
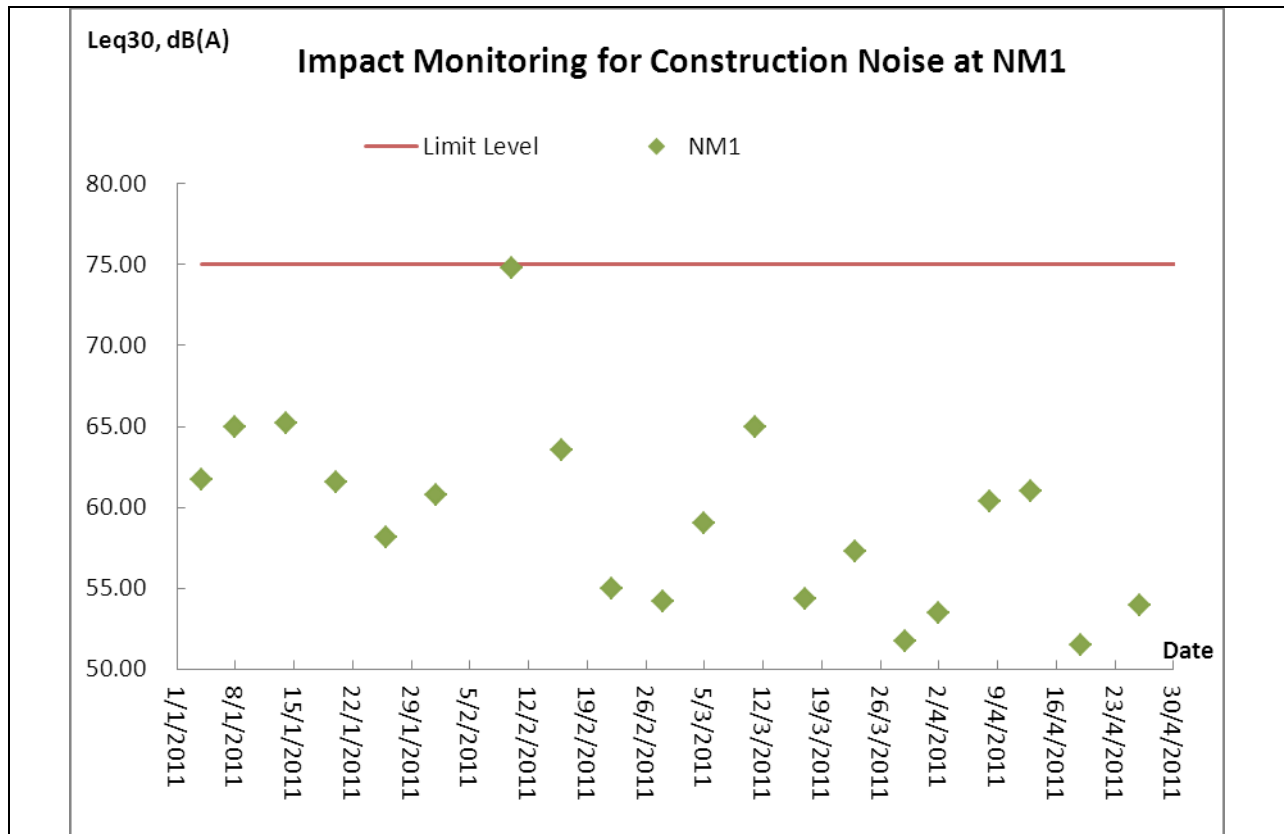
Air Quality

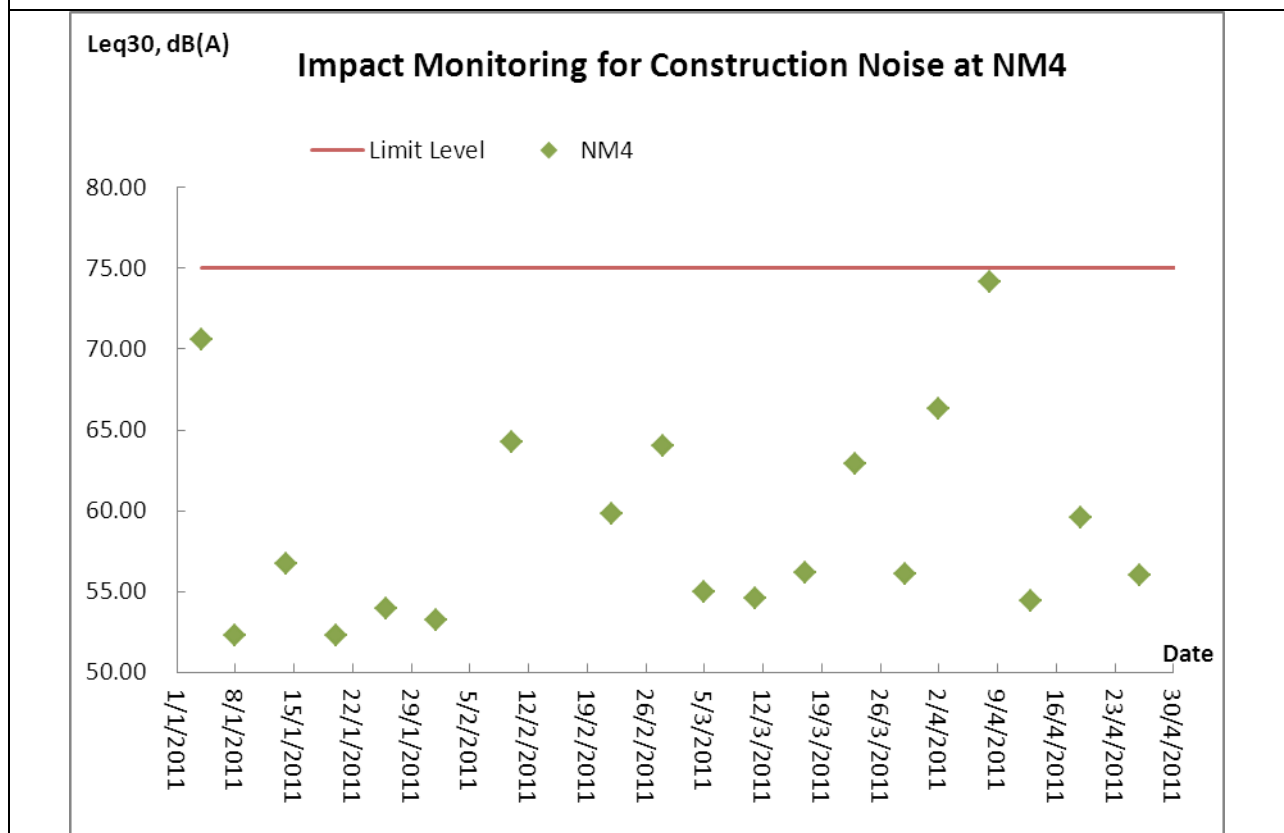
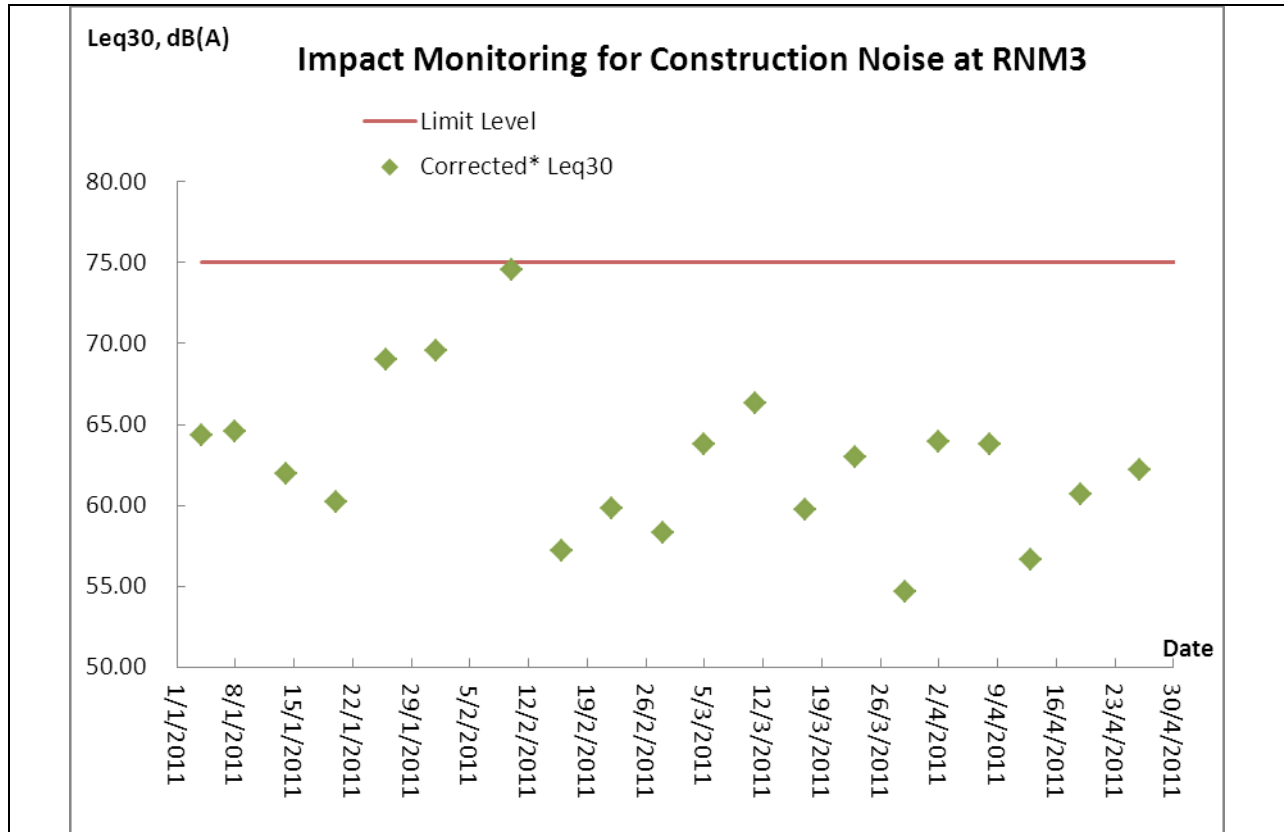






Construction Noise





Appendix F

Meteorological Information

Weather Condition – February 2011

February 2011 was marked by mostly sunny and mild weather interrupted by a cold and cloudy spell with some rain. The month ended up with a mean temperature of 16.2 degrees, just 0.1 degrees below normal. The total bright sunshine duration in the month was 127.7 hours, 33.9 hours above normal. With the abundance sunshine, the monthly mean daily maximum temperature was 19.1 degrees, 0.5 degrees above the normal figure of 18.6 degrees.

February 2011 was also drier than usual. The total rainfall in the month was 23.7 millimetres, only about 45 percent of the normal figure.

Weather Condition – March 2011

Despite some foggy episodes interspersed during the middle of the month, March 2011 was drier than usual. The monthly mean relative humidity was 71 percent, 11 percent below the normal figure of 82 percent and the lowest for March on record. There was only 20.5 millimetres of rainfall recorded in the month, about 29 percent of the normal.

With frequent replenishment of the northeast monsoon, the month was also cooler than usual. The monthly mean temperature was 18.0 degrees, 0.9 degrees below the normal figure of 18.9 degrees.

Weather Condition – April 2011

Due to the stronger than normal northeast monsoon over southern China, April 2011 was sunnier and drier than usual in Hong Kong. The monthly total bright sunshine duration was 191.6 hour, 89.8 hour above normal, while the month's mean relative humidity was 76%, the lowest in April since 1970.

The details meteorological data for each successive day could be referred to the Monthly EM&A Report (February, March and April 2011).

Appendix G

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for April 2011

Month	Actual Quantities of Inert C&D Materials Generated Monthly												Actual Quantities of C&D Wastes Generated Monthly										
	Total Quantity Generated (a) = (c)+(d)+(e)		Hard Rock and Large Broken Concrete (b)		Reused in the Contract (c)		Reused in other Projects (d)		Disposed as Public Fill (e)		Imported Fill (f)		Metals		Paper/ cardboard packaging		Plastics		Chemical Waste		Others, e.g. rubbish		
	(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000m ³)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in tonne)		
	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	YSW	SKW	
2010	4.522	0.030	0.068	0.104	0.488	0.000	0.000	0.000	0.000	4.033	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.460
Jan	0.985	3.110	0.003	0.013	0.120	0.484	0.000	2.626	0.865	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.240
Feb	0.377	0.000	0.000	0.043	0.000	0.000	0.000	0.000	0.377	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.350
Mar	0.758	1.430	0.002	0.106	0.006	0.255	0.000	1.175	0.752	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.360
Apr	1.135	1.249	0.017	0.025	0.112	0.090	0.000	1.159	1.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.160
May																							
Jun																							
Sub-total	7.7766	5.8193	0.0885	0.2913	0.7262	0.8290	0.0000	4.9600	7.0505	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	26.5700
Jul																							
Aug																							
Sep																							
Oct																							
Nov																							
Dec																							
Total	7.7766	5.8193	0.0885	0.2913	0.726	0.829	0.000	4.960	7.0505	0.0303	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.57
	13.596		0.380		1.555		4.960		7.081		0.000		0.000		0.000		0.000		0.000		26.57		

Remark: Assume 1.0 m³ vehicle dump load = 1.6 tonnes C&D materials

YSW: Yung Shue Wan

SKW: Sok Kwu Wan