

**Installation of Submarine Gas  
Pipelines and Associated Facilities  
from To Kwa Wan to North Point for  
Former Kai Tak Airport Development**

*Second Quarterly Environmental Monitoring &  
Audit (EM&A) Report*

8 January 2013

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# Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development

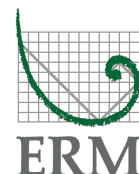
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### Second Quarterly Environmental Monitoring & Audit (EM&A) Report

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This document presents the Second Quarterly Environmental Monitoring and Audit (EM&A) Report for the Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development.		8 January 2013			
		Approved by:			
		 <hr/> <b>Mr Craig Reid</b> <i>Partner</i>			
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v0	2 <sup>nd</sup> Quarterly EM&A Report	RC	JT	CAR	4/1/13
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<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract 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.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>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 on the report at their own risk.</p>		Distribution <input checked="" type="checkbox"/> Internal <input checked="" type="checkbox"/> Public <input type="checkbox"/> Confidential			
		  			





**Installation of Submarine Gas Pipelines and Associated Facilities from To  
Kwa Wan to North Point for Former Kai Tak Airport Development  
Environmental Certification Sheet  
Environmental Permit No. EP-401/2010**

**Reference Document/~~Plan~~**

Document/~~Plan~~ to be Certified/ Verified: Second Quarterly Environmental Monitoring & Audit (EM&A) Report – September to November 2012

Date of Report: 4/1/2013

Date prepared by ET: 4/1/2013

Date received by IEC: 4/1/2013

**Reference EM&A Manual Requirement**

EM&A Manual Requirement: Section 12.4 iii

Content: *Quarterly EM&A Summary Report*

12.4 "The Quarterly EM&A Summary Report which should generally be around 5 pages (including about 3 of text and tables and 2 of figures) should contain at least the following information ....."

**ET Certification**

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced section of the EM&A Manual.

Ms Winnie Ko,  
Environmental Team Leader:

Date: 4/1/2013

**IEC Verification**

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced section of the EM&A Manual.

Dr Anne Kerr,  
Independent Environmental Checker:

Date: 8/1/2013

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## *EXECUTIVE SUMMARY*

The construction works of the installation of submarine gas pipelines and associated facilities from To Kwa Wan to North Point for former Kai Tak Airport Development (“the Project”) commenced on 13 June 2012. This is the 2<sup>nd</sup> Quarterly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works carried out during the quarterly period from 1 September to 30 November 2012 in accordance with the *EM&A Manual* of the Project <sup>(1)</sup>.

During the reporting period, environmental site inspections/ audits were carried out weekly by the representatives of the Contractor and the Environmental Team (ET). Environmental monitoring activities on marine water quality, air-borne noise and marine ecology have been undertaken in accordance with the requirements of the EM&A programme. Exceedances of Action and Limit Levels for water quality were recorded in thirty-nine monitoring events. Following the review of monitoring data and marine works details in accordance with the procedures stipulated in the Event and Action Plan of *EM&A Manual*, these exceedances were considered to be due to natural variation in water quality characteristic of Hong Kong waters and were unlikely to be due to the Project’s dredging activities. Environmental performance of the Project complied with the environmental requirements and all necessary mitigation measures were properly implemented.

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the construction of the Project were recorded in this reporting period. No environmental complaint or environmental summons was received in this quarterly reporting period.

(1) Mott MacDonald (2010). Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development: Environmental Monitoring and Audit Manual.

ERM-Hong Kong, Limited (ERM) and Mott MacDonald Hong Kong Limited were appointed by the Hong Kong and China Gas Company Limited and McDow-Kaden JV as the Environmental Team (ET) and the Independent Environmental Checker (IEC), respectively, to undertake the Environmental Monitoring and Audit (EM&A) activities for the installation of submarine gas pipelines and associated facilities from To Kwa Wan to North Point for former Kai Tak Airport Development (“the Project”).

### **1.1 PURPOSE OF THE REPORT**

This is the 2<sup>nd</sup> Quarterly EM&A Report which summarises the impact monitoring results and inspection/audit findings for the EM&A programme during the reporting period from **1 September to 30 November 2012**.

### **1.2 STRUCTURE OF THE REPORT**

The remainder of the report is structured as follows:

#### **Section 2 : Project Information**

summarises the background and scope of the Project, works locations, construction programme, construction works undertaken, project organisation and management structure, and the status of Environmental Permit (EP)/licences over the construction phase of the Project.

#### **Section 3 : EM&A Requirements**

summarises the environmental monitoring requirements including monitoring programmes, monitoring methodologies, monitoring parameters, monitoring frequency, monitoring locations, Action and Limit Levels, Event/ Action Plans, environmental mitigation measures as recommended in the approved EIA report, EP and relevant environmental requirements stated in the Contract Specifications.

#### **Section 4 : Implementation Status on Environmental Mitigation Measures**

summarises the implementation of environmental mitigation measures as recommended in the approved EIA report, EM&A Manual, EP and relevant environmental requirements stated in the Contract Specifications.

Section 5 : **Monitoring Results**

summarises the monitoring results obtained in the reporting period and the findings of the weekly site inspection including solid and liquid waste management undertaken within the reporting period.

Section 6 : **Environmental Non-conformance**

summarises and review any non-compliance of environmental performance standard, environmental complaints and environmental summons received within the reporting period.

Section 7 : **Future Key Issues**

summarises the impact forecast and monitoring schedule for the next reporting period.

Section 8 : **Conclusions**

## 2 PROJECT INFORMATION

### 2.1 PROJECT BACKGROUND

The Project proposed by the Hong Kong and China Gas Company Limited comprises the construction of a new gas pipeline network from To Kwa Wan to North Point so as to replace the existing one affected by the proposed Cruise Terminal dredging works adjacent to the former Kai Tak runway and the proposed Central Kowloon Route crossing the Kowloon Bay at To Kwa Wan.

The Environmental Impact Assessment (EIA) report (*Register No.: AEIAR-153/2010*) for the Project was approved by the Director of Environmental Protection (DEP) on 2 August 2010 under the Environmental Impact Assessment Ordinance (EIAO). Subsequent to the approval of the EIA, an Environmental Permit (Permit No. EP-401/2010) for the Project was granted by the DEP on 6 October 2010.

### 2.2 GENERAL SITE DESCRIPTION

The Project involves the construction of the twin submarine gas pipelines across the Victoria Harbour from To Kwa Wan to North Point and the construction of the land gas pipelines and pigging stations for pigging operation at both To Kwa Wan and North Point. The locations of the project areas and stations are presented in *Annex A*.

### 2.3 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

#### 2.3.1 Project Organization

The EM&A programme will require the involvement of the Hong Kong and China Gas Company Limited, an Environmental Team (ET), an Independent Environmental Checker (IEC) and the Contractor. The roles and responsibilities of the various parties involved in the EM&A process have been described in the *EM&A Manual* for this Project and the organization of these parties is presented in *Annex B*.

#### 2.3.2 Key Contact Information

Key contact information of the Project Organization is provided in *Annex B*.

### 2.4 CONSTRUCTION ACTIVITIES UNDERTAKEN DURING THE REPORTING PERIOD

A summary of the major construction activities undertaken in the reporting period is shown in *Table 2.1*. The locations of the construction activities are shown in *Annex A*. The construction programme of the Project is presented in *Annex C*.



**Table 2.1 Summary of Construction Activities Undertaken in Reporting Period**

<b>Construction Activities Undertaken</b>
<u>To Kwa Wan Site A1-2/ land main works areas:</u>
<ul style="list-style-type: none"> <li>• Implementation of TTA schemes for land works;</li> <li>• Road pavement;</li> <li>• Performing trial pit;</li> <li>• Excavation works;</li> <li>• Welding works; and</li> <li>• Piling works.</li> </ul>
<u>Marine work Section 2 and 3:</u>
<ul style="list-style-type: none"> <li>• Dredging;</li> <li>• Submarine adjustment works; and</li> <li>• Submarine pipe laying works.</li> </ul>
<u>Landing point at North Point:</u>
<ul style="list-style-type: none"> <li>• Piling works.</li> </ul>

**2.5 STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS**

A summary of the valid permits, licences and notifications on environmental protection for this Project is presented in *Table 2.2*.

**Table 2.2 Summary of Environmental Licensing, Notification and Permit Status**

<b>Permit/ Licences/ Notification</b>	<b>Reference</b>	<b>Validity Period</b>	<b>Remarks</b>
Environmental Permit	EP-401/2010	Throughout the Contract	Permit granted on 6 October 2010.
Notification of Commencement of Works	Ref No. 1123/01.01/12/0233/L	Throughout the Contract	-
Water Discharge License (North Point)	WT00012521-2012	Till 31 March 2017	Wastewater discharge licence was issued by EPD on 22 March 2012.
Water Discharge License (To Kwa Wan)	WT00012299-2012	Till 30 April 2017	Wastewater discharge licence was issued by EPD on 25 April 2012.
Construction Noise Permit (Marine works)	GW-RE0486-12	Till 17 December 2012	Issued on 20 June 2012.
Chemical Waste Producer Registration	5213-244-M2830-01	Throughout the Contract	Licence approved on 17 February 2012
Marine Dumping Permit (Sediment Type 1, Cheung Chau South)	EP/MD/12-125	Till 14 November 2012; Expired	Issued on 15 May 2012.
Marine Dumping Permit (Sediment Type 1, East Ninepin)	EP/MD/13-012	Till 30 September 2012; Expired	Issued on 29 May 2012.

<b>Permit/ Licences/ Notification</b>	<b>Reference</b>	<b>Validity Period</b>	<b>Remarks</b>
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-023	Till 17 July 2012; Expired; new permit granted	Issued on 15 June 2012.
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-042	Till 17 August 2012; Expired; new permit granted	Issued on 17 July 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-054	Till 20 September 2012; Expired; new permit granted	Issued on 20 August 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-078	Till 8 November 2012; Expired; new permit granted	Issued on 8 October 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-090	Till 8 December 2012	Issued on 8 November 2012
Marine Dumping Permit (Sediment Type 3, East Sha Chau)	EP/MD/12-127	Till 8 September 2012	Issued on 8 August 2012
Marine Dumping Permit (Sediment Type 3, East Sha Chau)	EP/MD/13-067	Till 24 October 2012; Expired;	Issued on 25 September 2012

### 3 EM&A REQUIREMENTS

#### 3.1 MARINE WATER QUALITY MONITORING

##### 3.1.1 Water Quality Parameters

The parameters measured *in situ* were:

- Dissolved Oxygen (DO) (% saturation and mg L<sup>-1</sup>)
- Salinity (ppt)
- Temperature (°C)
- Turbidity (NTU)

The only parameter to be measured in the laboratory was:

- Suspended solids (SS) (mg L<sup>-1</sup>)

In addition to the water quality parameters, other relevant data were measured and recorded in Water Quality Monitoring Logs, including monitoring location, time, tidal stages, weather conditions and any special phenomenon or work underway at the construction site that may influence the monitoring results.

##### 3.1.2 Monitoring Equipment

Table 3.1 summaries the equipment used for the water quality monitoring.

Table 3.1 Equipment used during the Water Quality Monitoring Programme

Equipment	Model
Global Positioning Device	Garmin etrex 10
Water Depth Detector (Echo sounder)	Speedtech Instrument SM-5A
Water Sampler	1510 Kemmerer Water Sampler
Salinity, DO, Temperature Measuring Meter	YSI Pro 2030
Turbidity Meter	HACH Model 2100P/2100Q Turbid Meter

##### 3.1.3 Sampling / Testing Protocol

All *in situ* monitoring instruments were checked, calibrated and certified by the analytical laboratory before use <sup>(1)</sup>. Responses of sensors and electrodes were checked with certified standard solutions before each use.

Wet bulb calibration for a DO probe was carried out at least once per monitoring day. A zero check in distilled water was performed with the turbidity probe at least once per monitoring day. The probe was calibrated

<sup>(1)</sup> Baseline water quality monitoring was undertaken by the HOKLAS accredited laboratory ETS-Testconsult Ltd.

with a solution of known NTU. In addition, the turbidity probe was calibrated at least twice per month to establish the relationship between turbidity readings (in NTU) and levels of suspended solids (in mg L<sup>-1</sup>).

On-site calibration of equipment was also carried out following the “*Guide to On-Site Test Methods for the Analysis of Waters*”, BS 1427:1993 to check the responses of sensors and electrodes using certified standard solutions before each use. Sufficient stocks of spare parts were maintained for replacements when necessary. Backup monitoring equipment was made available so that monitoring can proceed uninterrupted even when equipment is under maintenance, calibration etc.

Water samples for SS measurements were collected in high density polythene, packed in ice (cooled to 4 °C without being frozen) and delivered to the analytical laboratory as soon as possible after collection.

### **3.1.4 Laboratory Measurement and Analysis**

Analysis of SS was carried out in a HOKLAS accredited laboratory <sup>(1)</sup>. Water samples of about 1 L were collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work started within 24 hours after the collection of the water samples. The SS analyses followed the standard method APHA 2540D with a detection limit of 1 mg L<sup>-1</sup> as described in *APHA Standard Methods for the Examination of Water and Wastewater, 21<sup>st</sup> Edition*, unless specified.

Quality Assurance/ Quality Control (QA/ QC) details (such as blank, spike recovery, number of duplicate samples per batch etc) were provided in *Monthly EM&A Reports* in accordance with requirements of HOKLAS.

### **3.1.5 Sampling Depths & Replication**

Each station was sampled and measurements/ water samples were taken at three depths, namely, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth was less than 6 m, the mid-depth station may be omitted. For stations that were less than 3 m in depth, only the mid-depth sample was taken.

For *in situ* measurements, duplicate readings were made at each water depth at each station. Duplicate water samples were collected at each water depth at each station.

### **3.1.6 Monitoring Locations and Frequency**

Impact water quality monitoring was conducted during the dredging works period at the monitoring stations listed in *Table 3.2* and shown in *Annex D1*.

<sup>(1)</sup> Marine water quality monitoring was undertaken by the HOKLAS accredited laboratory ETS-Testconsult Ltd.

**Table 3.2 Water Quality Monitoring Stations**

<b>Monitoring Station</b>	<b>Area</b>	<b>Easting</b>	<b>Northing</b>
WM1	Tai Wan WSD Seawater Intake	837818.8258	818059.9297
WM2	City Garden	838278.6734	817209.9656
WM3	Provident Centre	838443.5777	817233.5234
WM4	North Point Government Offices	839536.1868	817215.6195
WM5	Quarry Bay WSD Seawater Intake	839781.4231	817107.8097
WM6	Taikoo Place	840026.6594	817000
C1	Control Station	836625.9264	817422.6424
C2	Control Station	836747.9445	816670.1762
C3	Control Station	840810.5828	817825.8986
C4	Control Station	840432.5877	816920.1674

In accordance with the *EM&A Manual*, marine water quality monitoring were conducted at six Water Sensitive Receivers (WM1, WM2, WM3, WM4, WM5 and WM6) as well as four Control stations (C1, C2, C3 and C4) (*Table 3.2*) at a frequency of three times a week during the marine works period for the Project. Monitoring was undertaken at mid-flood and mid-ebb tides during each monitoring day. The tidal range selected for the monitoring was at least 0.5 m for both flood and ebb tides as far as practicable. The interval between two sets of consecutive monitoring was not less than 36 hours.

For scheduling, reference were made to the predicted tides at Quarry Bay, which is the tidal station nearest to the Project Site, published on the website of the Hong Kong Observatory <sup>(1)</sup>. Schedule for impact monitoring has been submitted to the Contractor, Independent Environmental Checker (IEC), Engineer Representative (ER) and Environmental Protection Department (EPD) prior to the commencement of the monitoring works.

### 3.1.7 Water Quality Compliance

Water quality monitoring was evaluated against Action and Limit Levels. The proposed Action and Limit Levels which are determined from the baseline water quality monitoring results are shown in *Table 3.3*.

In the event that the levels are exceeded, appropriate actions in the Event and Action Plan (*Annex G1*) should be undertaken and a review of works will be carried out by the Contractor(s).

<sup>(1)</sup> Hong Kong Observatory (2012) <http://www.hko.gov.hk/tide/eQUBtide.htm> [Accessed in March 2012]

**Table 3.3 Action and Limit Levels for Water Quality <sup>(e)</sup>**

<b>Parameters</b>	<b>Action Level</b>	<b>Limit Level</b>
DO in mg L <sup>-1</sup> (Surface, Middle & Bottom)	<i>WSD Seawater Intakes</i> 2 mg L <sup>-1</sup>	<b>Surface and Middle</b> <i>WSD Seawater Intake</i> 2 mg L <sup>-1</sup>
	<i>Other Impact Monitoring Stations</i> 5 percentile of baseline data, i.e. 7.79 mg L <sup>-1</sup>	<i>Other Impact Monitoring Stations</i> 4 mg L <sup>-1</sup> or 1 percentile of baseline data, i.e. 7.46 mg L <sup>-1</sup>
		<b>Bottom</b>  <i>Impact Monitoring Stations</i> 2 mg L <sup>-1</sup> or 1 percentile of baseline data, i.e. 7.66 mg L <sup>-1</sup>
SS in mg L <sup>-1</sup> (depth-averaged)	<i>WSD Seawater Intakes</i> 10 mg L <sup>-1</sup>	<i>WSD Seawater Intake</i> 10 mg L <sup>-1</sup>
	<i>Other Impact Monitoring Stations</i> 95 percentile of baseline data, i.e. 5.13 mg L <sup>-1</sup> or 120% of upstream control station at the same tide of the same day	<i>Other Impact Monitoring Stations</i> 99 percentile of baseline data, i.e. 5.53 mg L <sup>-1</sup> or 130% of upstream control station at the same tide of the same day
Turbidity (depth-averaged)	<i>WSD Seawater Intakes</i> 10 NTU	<i>WSD Seawater Intakes</i> 10 NTU
	<i>Other Impact Monitoring Stations</i> 95 percentile of baseline data, i.e. 3.71 NTU or 120% of upstream control station at the same tide of the same day	<i>Other Impact Monitoring Stations</i> 99 percentile of baseline data, i.e. 4.03 NTU or 130% of upstream control station at the same tide of the same day

**Notes:**

- (a) "Depth-averaged" is calculated by taking the arithmetic means of the readings of the three depths.
- (b) For DO measurement, non-compliance occurs when monitoring result is lower than the limits.
- (c) For SS and turbidity, non-compliance of water quality results when monitoring results is higher than the limits.
- (d) All the figures given in the table are used for reference only the EPD may amend the figures whenever necessary.
- (e) The levels of SS, Turbidity and DO were confirmed to be similar amongst monitoring stations by statistical analysis. Therefore, the calculation of Action and Limit Levels was based on baseline monitoring data collected from all monitoring stations and the same set of Action and Limit Levels will be adopted for the *Impact Monitoring Stations* (ie not including the *WSD Seawater Intakes* and *Control Stations*).

## 3.2 CORAL MONITORING

### 3.2.1 Monitoring Locations

Impact Coral Monitoring was conducted at three Impact Sites near the pipeline (Areas 1, 2 and 3) and one Control Site (Area 4) at the far end of the seawall which is perpendicular to the pipeline run as shown in *Annex E*. The Impact Coral Monitoring Survey was undertaken weekly when dredging operations were being conducted within 250 m from the To Kwa Wan breakwaters. The start and end coordinates of each monitoring site was recorded using a portable GPS unit. Shoreline features for the start and end points of each monitoring sites was also noted to aid the re-location of the points for subsequent coral monitoring surveys (ie Impact Coral Monitoring Survey during dredging). The coordinates of the start and end points for each monitoring site are presented in *Table 3.4*.

**Table 3.4 GPS Coordinates of Coral Monitoring Sites**

		GPS				Depth (-mCD)
		Starting Point		Finishing Point		
Impact Sites	Area 1	22°18'50.87"	114°11'40.48"	22°18'49.86"	114°11'41.06"	2.5
	Area 2	22°18'40.90"	114°11'47.35"	22°18'41.73"	114°11'46.73"	1.8
	Area 3	22°18'35.18"	114°11'47.18"	22°18'35.71"	114°11'48.02"	3.0
Control Site	Area 4	22°18'43.57"	114°12'03.87"	22°18'43.05"	114°12'02.84"	3.5

### 3.2.2 Monitoring Methodology

The Impact Coral Monitoring was carried out at Areas 1 to 4. A total of 10 colonies were tagged at each site during the Baseline Coral Monitoring Survey which was undertaken on 23 May 2012 and Updated Baseline Coral Monitoring Survey was undertaken on 6 August 2012 before construction of the Project commenced, allowing 30 impact coral colonies and 10 control colonies. Beside the tagged coral colony, a white cable tie was tied around a rock. The tag which was laminated underwater paper of approximately 3 x 6 cm in size was attached to the cable tie. Tags and the target coral colonies were numbered 1-10 at each site (i.e. Area 1-4). Each of the tagged coral colonies was identified to species levels and photographed. These tagged colonies were monitored during the Impact Coral Monitoring Survey.

The following data were recorded for each tagged coral colonies during the Baseline Coral Monitoring Survey. These data were also recorded during the Impact Coral Monitoring Survey:

- Species
- Size (cm<sup>2</sup>)
- Growth form
- Partial mortality (%)
- Sediment (thickness, type and colour)

- The general health of the coral colony using the Asian Coral Watch Chart <sup>(1)</sup>

During the Impact Coral Monitoring Survey, photographic records of each tagged coral colony were collected from an angle that best represents the entire colony, maintaining the same aspect and orientation as the photographic records taken during the Baseline Coral Monitoring Survey. The adoption of the same monitoring method would allow for direct comparison of impact monitoring data with the baseline data in order to determine any changes in conditions of corals after commencement of the concerned dredging works. Should impacts caused by the dredging operations to corals are identified, appropriate remedial action can be implemented to reduce such impacts.

### 3.2.3 *Action and Limit Levels*

The Action and Limit levels for coral monitoring are summarised in *Table 3.5*.

**Table 3.5** *Determination of Action and Limit Level for Partial Mortality of the Tagged Coral Colonies*

Parameter	Action Level
Partial Mortality	If during Impact Monitoring, a 15% increase in the percentage of partial mortality of corals occurs at more than 20% of the tagged coral colonies at either of the Impact Monitoring Stations (ie Areas 1, 2 and 3) that is not recorded at the Control Station (ie Area 4).
	<b>Limit Level</b> If during Impact Monitoring, a 25% increase in the percentage of partial mortality at more than 20% of any tagged coral colonies occurs that is not recorded at the Control Station (ie Area 4).

### 3.2.4 *Event and Action Plan*

In the event that the levels are exceeded, appropriate actions in Event and Action Plan (*Annex G2*) should be undertaken and a review of works will be carried out by the Marine Ecologist.

## 3.3 *AIR-BORNE NOISE MONITORING*

### 3.3.1 *Monitoring Location*

In accordance with the *EM&A Manual*, monitoring of construction noise impact should be conducted at the designated monitoring stations. The construction noise monitoring location for this Project is listed in *Table 3.6* and is shown in *Annexes F1 and F2*.

**Table 3.6** *Noise Monitoring Location*

Monitoring Station	Area	Description
--------------------	------	-------------

(1) Coral Watch is a rapid assessment on the health of coral colonies by using coral health color charts to monitor bleaching stages of corals. Coral color, or more specifically brightness and saturation, correlate with chlorophyll content and density of symbiotic algae (zooxanthellae) in coral tissue, providing a measure of coral health. Coral bleaching results from a loss of symbiosis or pigmentation from stressed, unhealthy coral.



Monitoring Station	Area	Description
SCH02	To Kwa Wan	CCC Kei To Secondary School
FSQ	North Point	North Point Fire Services Married Quarters

### 3.3.2 *Monitoring Parameter and Frequency*

Weekly construction noise monitoring was conducted in accordance with the requirements stipulated in the *EM&A Manual*. Thirteen sets of noise monitoring were carried out within this quarterly reporting period.

The construction noise levels were measured in terms of A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ) in decibels dB(A).  $L_{eq(30min)}$  were used as the monitoring parameter for the period in between 0700 – 1900 hours on normal weekdays. In order to obtain supplementary information for data auditing, two statistical sound levels  $L_{10}$  and  $L_{90}$  (ie the levels exceeded for 10 and 90 percent of the time, respectively), were also recorded during the monitoring for reference. The measured noise levels were logged every 5 minutes throughout the impact monitoring period.

### 3.3.3 *Action and Limit Levels*

The Action and Limit levels for noise monitoring during different monitoring periods are summarised in *Table 3.7*.

**Table 3.7** *Summary of Action and Limit Levels for Construction Noise*

Time Period	Action Level	Limit Level (dB(A))
0700-1900 hrs on normal weekdays	When one documented compliant is received	75*
1900-2300 hrs on normal weekdays	When one documented compliant is received	70
Restricted hours (2300-0700 hrs)	When one documented compliant is received	55

Note:

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

### 3.3.4 *Monitoring Equipment and Methodology*

Construction noise measurements were conducted in accordance with the calibration and measurement procedures as stated in *Annex – General Calibration and Measurement Procedures of Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM)* issued under the *Noise Control Ordinance (NCO) (Cap.400)*.

The sound level meters and calibrator used for the noise measurement, as listed in *Table 3.8*, complies with IEC 651: 1979 and 804:1985 (Type 1) specification. The calibration certificates of the sound level meters and calibrator were shown in *Monthly EM&A Reports*.

**Table 3.8**      **Noise Monitoring Equipment**

<b>Monitoring Station</b>	<b>Monitoring Equipment (Sound Level Meter and Calibrator)</b>
SCH02	Rion NL-31 (S/N 00410224), NC-73 (S/N 10997142)
FSQ	Rion NL-31 (S/N 00410224/00603867) Rion NC-73 (S/N 10997142/10786708)

Immediately prior to and following the noise measurements, the accuracy of the measurement equipment was checked using an acoustic calibrator generating a known sound pressure level at a known frequency.

### **3.3.5**      **Event and Action Plan**

The Event and Action Plan (EAP) for noise monitoring is presented in *Annex G3*.

**IMPLEMENTATION STATUS ON ENVIRONMENTAL MITIGATION MEASURES**

The Contractor has implemented environmental mitigation measures and requirements as stated in the EIA Report, Environmental Permit and *EM&A Manual*. The implementation status during the reporting period is summarised in *Annex H*.

## 5.1 SITE INSPECTIONS &amp; AUDITS

Weekly site inspections were conducted by representatives of the Contractor and the ET on 6, 14, 20 and 26 September; 4, 11, 18 and 26 October; and 1, 8, 15, 21 and 29 November 2012.

Major observations during the reporting period were summarised as follows:

14 September 2012

- To Kwa Wan Site A1-2:
  - Stockpiles of excavated materials were temporarily stored at the construction site without covered by the tarpaulin sheet. However, it would be covered up completely by tarpaulin by the end of the working day.
  - More sandbags are recommended to be used at the land-based construction site to prevent direct run-off to the sea.
- Marine works area:
  - Good practice of dredging is recommended to allow excessive dredged materials to drip off within the enclosed silt curtain area before loading to the barge.
  - Regular maintenance of silt curtain is recommended to ensure the leakage of dredged materials to outside is minimized.
  - The Contractor was recommended to clean up the dripped out sediment at the edge of the barge regularly.

20 September 2012

- To Kwa Wan Site A1-2:
  - Sandbags have been put near the edge of the Land-based Construction Site A1-2.
  - Excavated materials are placed at Site A1-2 but they will be covered by tarpaulin sheet by the end of the working day.
- Marine works area:
  - Better dredging practice is recommended to minimize the excessive runoff from flowing out of area enclosed by silt curtain.

26 September 2012

- To Kwa Wan Site A1-2:
  - Sandbags were put at the edge of the To Kwa Wan Construction Site A1-2 to prevent the runoff from the construction site.
  - Excavated materials which were accumulated at Construction Site A1-2 have already been cleared away.

- Marine works area:
  - No dredging activity was taken place on the day of site audit. The sealing process of Geosynthetic Containers for Type 3 Sediment Disposal was observed.

4 October 2012

- To Kwa Wan Site A1-2:
  - Sandbags were put at the edge of the To Kwa Wan Construction Site A1-2 to prevent the runoff from the construction site.
  - Excavated materials at Construction Site A1-2 have all been covered by tarpaulin sheet.
- Dredging Barge near To Kwa Wan:
  - No dredging activity at the barge near To Kwa Wan as the preparation work for disposing of the sixth batch of Type III sediments was being undertaken.

11 October 2012

- To Kwa Wan Site A1-2:
  - Excavated materials at Construction Site A1-2 are not covered by tarpaulin sheet. The Contractor is reminded to cover them by the end of the day.
  - Tarpaulin sheet and sandbags are placed at the edge of the Construction Site A1-2 to prevent run-off into the sea.
- Dredging Barge near To Kwa Wan:
  - Dredging skills have been improved which allow excessive mud to runoff within the silt curtain area.

18 October 2012

- Marine works area:
  - Dredging skills of the operator is generally good.
  - Mud was observed on the floor of the barge. The Contractor was reminded to clear them to prevent them running off into the sea.

26 October 2012

- To Kwa Wan Site A1-2:
  - Some excavated materials were placed on the wooden platform at Site A1-2 which was intended to absorb any runoff from the site. However, the Contractor was reminded to place more sandbags to prevent any excessive runoff from the site into the sea.
- Dredger at To Kwa Wan:
  - Dredging has just finished upon the starting time of site audit at about 1615.

1 November 2012

- To Kwa Wan Site A1-2:
  - A silt curtain was deployed off To Kwa Wan Land-based Site A1-2 to prevent any runoff from spreading to the sea. The Contractor was still reminded to maintain good working environment during construction works.
  - The excavated materials were not covered fully. The Contractor was reminded to cover them by the end of the working day.
- Dredger at North Point:
  - No dredging activity was observed by the time of site audit.
- Landing point at North Point:
  - It was for storage purpose. No construction works were being undertaken.

8 November 2012

- To Kwa Wan Site A1-2:
  - Some excavated materials were not covered fully by Tarpaulin sheet. The Contractor was reminded to cover them fully by the end of the working day.
  - Silt curtain was removed just off the Land-based site A1-2. The Contractor was recommended to put some sand bags to minimize any runoff into the sea if works were still in progress.
- Landing point at North Point:
  - The Contractor was reminded to clear off any muds left on the platform of the dredging barge and at the edge of the hopper barge.

15 November 2012

- To Kwa Wan Site A1-2:
  - Some muddy water was found in the sea just off To Kwa Wan Land-based Construction Site. The Contractor was advised to install a silt curtain off the land-based site.
- North Point Dredger:
  - The Contractor was reminded to clear off any muds left on the platform of the dredging barge and at the edge of the hopper barge.
- Landing point at North Point:
  - A silt curtain was deployed to reduce any runoff from the site.

21 November 2012

- To Kwa Wan Site A1-2:
  - Some excavated materials were not covered fully by Tarpaulin sheet. The Contractor was asked to cover them fully by the end of the working day.
  - The silt curtain was deployed, but it is recommended that the silt curtain should be set in U-shape, so as to enclose the area to prevent sediments from coming out of the silt curtain.
- North Point Dredger:
  - The Contractor was reminded to clear off any muds left at the edge of the hopper barge.
- Landing point at North Point:
  - Silt curtain and sandbags were deployed to reduce any runoff from the site.

29 November 2012

- To Kwa Wan Site A1-2:
  - Silt curtain at TKW Land-based site A1-2 was removed. The Contractor was asked to follow up on the issue.
  - More new sandbags were placed at the edge of the Work Site to reduce any runoff from the Work Site into the sea.
  - Water accumulated in the drip tray of the container for chemical waste. The Contractor was asked to clear away any water accumulated.
  - The Contractor was asked to check if the exposed excavated materials would be covered fully by the end of the working day.
- Landing point at North Point:
  - Silt curtain was deployed and sandbags were placed at the boundary of the Work Site to reduce any runoff from the site.

## 5.2 MARINE WATER QUALITY MONITORING

Marine dredging activities for pipeline trench construction commenced on 13 June 2012. In accordance with the requirements described in the *EM&A Manual*, marine water quality monitoring was conducted during periods when dredging activities were scheduled to be undertaken. Impact monitoring was undertaken three times per week from 1 September to 30 November 2012 for marine dredging works. During the period of impact monitoring, weather condition was generally fine.

Monitoring results are presented graphically in *Annex D2 – D6* and key observations are described below.

DO levels from surface, mid-depth and bottom waters were generally similar amongst Control, Impact and WSD Seawater Intake stations, and DO levels were variable throughout the monitoring period which represented natural background fluctuation in water quality.

Quarterly mean DO levels from surface, mid-depth and bottom waters of Impact Stations were significantly lower than those recorded in Baseline Water Quality Monitoring in March 2012 ( $p < 0.001$ ). Quarterly mean DO levels from surface, mid-depth and bottom waters of Control Stations were also significantly lower than those recorded in Baseline Water Quality Monitoring in March 2012 ( $p < 0.001$ ). It is considered that the significantly lower DO levels recorded in this quarterly period (ie compared to the baseline levels) are more likely to be representing natural background fluctuation in water quality rather than indicating any adverse water quality impacts from the Project since the lower DO levels were recorded at the Impact Stations as well as the Control Stations, which are far away from the dredging locations that should not be affected by the dredging works. When comparing quarterly mean DO levels between Impact Stations and Control Stations, no significant difference can be found ( $p > 0.05$ ).

Similar to DO levels, turbidity and SS levels were generally similar at all stations and variable throughout the monitoring period. High levels of turbidity and SS were occasionally recorded during both mid-ebb and mid-flood tides. Such fluctuations were also observed during baseline monitoring and are considered to be sporadic events and characteristic of water quality in this area of Hong Kong.

Quarterly mean turbidity and SS levels of Impact Stations were significantly higher than those recorded in Baseline Water Quality Monitoring in March 2012 ( $p < 0.001$ ). Quarterly mean turbidity and SS levels of Control Stations were also significantly higher than those recorded in Baseline Water Quality Monitoring in March 2012 ( $p < 0.001$ ). It is considered that the significantly higher turbidity and SS levels recorded in this quarterly period (ie compared to the baseline levels) are more likely to be representing natural background fluctuation in water quality rather than indicating any adverse water quality impacts from the Project since the higher turbidity and SS levels were recorded at the Impact as well as the Control Stations, which are far away from the dredging locations that should not be affected by the dredging works. Comparison of quarterly mean turbidity and SS levels between Impact and Control Stations indicated that turbidity and SS levels at Control Stations were significantly higher than that at Impact Stations ( $p = 0.002$  and  $p < 0.001$  respectively).

A total of thirty-nine exceedances were recorded and dated on 1, 4, 6, 8, 11, 13, 15, 18, 20, 22, 25, 27 and 29 September 2012; 2, 4, 6, 9, 11, 13, 16, 18, 20, 22, 25, 27 and 30 October 2012; and 1, 3, 6, 8, 10, 13, 15, 17, 20, 22, 24, 27 and 29 November 2012. Exceedances in the Action and Limit Levels of surface, mid-depth and bottom DO were observed. It is considered that the exceedances in DO levels are more likely to be representing natural background fluctuation in water quality rather than indicating any adverse water quality impacts



from the Project since the levels of DO at the Impact Stations where exceedances were recorded were similar to those at the Control Stations, which are far away from the dredging locations that should not be affected by the dredging works. In addition, some exceedances were recorded when no dredging works were being undertaken for the Project (eg on 8 September and 4, 30 October 2012 at mid-ebb tide; 22 September and 3 November 2012 at mid-flood tide; 6, 22, 25, 27 October and 6, 10, 29 November 2012 for both tidal periods).

Exceedances in the Action and Limit Levels of depth-averaged SS levels were also recorded. As explained above, high level of SS in this area are considered to be sporadic and characteristic of water quality in this area of Hong Kong. The observed SS exceedances were thus not considered to be of environmental concern.

Closed grab dredgers were used and silt curtains were deployed during dredging works, and the dredging rates were within the limits described in the approved EIA Report. Following the review of monitoring data and marine works details in accordance with the procedures stipulated in the Event and Action Plan of the *EM&A Manual*, these exceedances were considered to be due to natural background variation in water quality characteristic and were unlikely to be due to the Project's dredging activities.

### 5.3

#### *CORAL MONITORING*

A total of eight Impact Coral Monitoring Surveys were conducted on 6, 13, 21 and 28 September; 9 and 18 October; 7 and 16 November 2012 at four designated monitoring sites (including 3 Impact Sites and 1 Control Site) in accordance with the *EM&A Manual* during this reporting period. During the monitoring, 10 tagged coral colonies were re-visited and monitored at each site. The conditions of the tagged coral colonies during the Impact Coral Monitoring Surveys were compared with the baseline conditions which were recorded prior to the commencement of the concerned dredging operations within 250 m from the To Kwa Wan breakwaters.

No exceedances of the Action and Limit Levels were identified during this reporting period. There thus did not appear to be any deterioration in the general health and condition of the tagged coral colonies as a result of the dredging activities within 250 m from the To Kwa Wan breakwaters.

Further Impact Coral Monitoring Surveys will be conducted under the Coral Monitoring Programme when dredging operations are being undertaken within 250 m from the breakwaters. Findings of further Impact Coral Monitoring Surveys will be presented in subsequent Coral Impact Reports in order to determine any observable impacts to the tagged corals as a result of the concerned dredging operations. In the event that significant adverse impacts are identified as a consequence of the works, monitoring would also allow for implementation of appropriate remedial actions to reduce such impacts.

#### 5.4

#### *AIR-BORNE NOISE MONITORING*

A total of thirteen sets of 30-minute construction noise measurements were carried out at the monitoring station SCH02 and FSQ during normal working hours in weekdays of the reporting period. No exceedances of Action and Limit Levels for noise monitoring during normal working hours were recorded.

The monitoring results together with graphical presentations are presented in *Annex F3 – F8*. The local impacts observed near the monitoring stations of SCH02 and FSQ were due to traffic noise from Sung On Street and Island Eastern Corridor, respectively. Drilling was also observed as a major construction noise source near monitoring station SCH02.

#### 5.5

#### *WASTE MANAGEMENT EM&A*

Waste generated from this Project includes inert construction and demolition (C&D) materials, non-inert C&D materials and marine deposit. Marine deposits requiring Type 1, Type 2 and Type 3 disposal methods were generated during the reporting month. Reference has been made to the Monthly Summary Waste Flow Table prepared by the Contractor (*Annex I*). The waste statistics provided in this section represent the cumulative quantity of wastes generated from all sites in this Project. With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting months of this quarterly period are summarised in *Table 5.1*. The inert C&D materials and general refuse generated from the Project were disposed of at Tseung Kwan O Area 137 Fill Bank and SENT Landfill, respectively. The marine deposits requiring Type 1, Type 2 and Type 3 disposal were disposed of at the open sea floor disposal area of South Cheung Chau or East Ninepin (for Type 1) and at East Sha Chau Contaminated Mud Pits (for Types 2 and 3).

**Table 5.1 Quantities of Waste Generated from the Project for all Sites**

Month / Year	Quantity					
	C&D Materials (inert) <sup>(a)</sup>	C&D Materials (non-inert) <sup>(b)</sup>	Chemical Waste	Marine Deposit		
				Type 1 <sup>(c)</sup>	Type 2 <sup>(c)</sup>	Type 3 <sup>(c)</sup>
September 2012	136.5 tonnes <sup>(d)</sup>	1.5 tonnes	0 L	41,050 m <sup>3</sup>	4,280 m <sup>3</sup>	1,230 m <sup>3</sup>
October 2012	82.39 tonnes <sup>(e)</sup>	0.7 tonnes	0 L	15,530 m <sup>3</sup>	5,680 m <sup>3</sup>	0 m <sup>3</sup>
November 2012	71.23 tonnes <sup>(f)</sup>	0.2 tonnes	0 L	3,890 m <sup>3</sup>	4,140 m <sup>3</sup>	0 m <sup>3</sup>

**Notes:**

- (a) Inert C&D materials include bricks, concrete, building debris, rubble and excavated soil. Inert C&D materials.
- (b) The non-inert C&D materials consisted of general refuse and vegetation/ rubbish.
- (c) The marine deposits requiring Type 1 disposal were disposed of at South Cheung Chau and East Ninepin; and Type 2 and Type 3 disposal were disposed of at East Sha Chau.
- (d) 136.5 tonnes of inert C&D Materials was generated in September 2012. 80.5 tonnes have been reused on site. 56.1 tonnes were disposed of at the Tseung Kwan O Area 137 Fill Bank.
- (e) 82.39 tonnes of inert C&D Materials was generated in October 2012. 30 tonnes have been reused on site. 52.39 tonnes were disposed of at the Tseung Kwan O Area 137 Fill Bank.
- (f) 71.23 tonnes of inert C&D Materials was generated in November 2012. 44.84 tonnes have been reused on site. 26.39 tonnes were disposed of at the Tseung Kwan O Area 137 Fill Bank.

## 6 ENVIRONMENTAL NON-COMFORMANCE

### 6.1 SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE

No non-compliance of EIA/ EM&A/ EP/ legislative requirements was recorded during the reporting period.

### 6.2 SUMMARY OF ENVIRONMENTAL COMPLAINT

No complaint was received during the reporting period. The cumulative complaint/summons/prosecution log is shown in *Annex J*.

### 6.3 SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION

No summons/ prosecution was received during the reporting period. The cumulative compliant/summons/prosecution log is shown in *Annex J*.

7.1 *CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER*

Works to be undertaken for the coming reporting quarter are summarised in *Table 7.1*.

*Table 7.1 Construction Works to be undertaken in the Coming Quarter*

<b>Work to be taken</b>
<u>To Kwa Wan Site A1-2/ land main works areas:</u>
<ul style="list-style-type: none"> <li>• Implementation of TTA schemes for land works;</li> <li>• Road pavement;</li> <li>• Performing trial pit;</li> <li>• Excavation works;</li> <li>• Welding works; and</li> <li>• Piling works.</li> </ul>
<u>Marine work Section 2 and 3:</u>
<ul style="list-style-type: none"> <li>• Dredging;</li> <li>• Submarine adjustment works; and</li> <li>• Submarine pipe laying works.</li> </ul>
<u>Landing point at North Point</u>
<ul style="list-style-type: none"> <li>• Piling works.</li> </ul>

Potential environmental impacts arising from the above construction activities are mainly associated with dust, construction noise, site runoff, water quality marine ecology and waste management. The most updated construction programme for the Project is presented in *Annex C*.

7.2 *SOLID AND LIQUID WASTE MANAGEMENT STATUS*

As the major construction works in the coming reporting quarter are excavation and dredging, waste generated from this Project for the coming months will include inert C&D materials, non-inert C&D materials and marine deposit. Part of the inert C&D materials will be stockpiled on site for reuse and the remaining inert C&D materials will be disposed of at Tseung Kwan O Area 137 Fill Bank. Chemical waste will be stored at designed area and collected by a licensed collector. Surface runoff, sewage and wastewater will be minimized using proper site management such as the use of sedimentation tanks with sufficient capacity, vehicle and plant cleaning before leaving a construction site, etc (detailed in *Annex H*). General refuse generated from the Project will be disposed of SENT Landfill. The marine deposits requiring Type 1 and Type 2 disposal will be disposed of at the open sea floor disposal area of South Cheung Chau and East Sha Chau Contaminated Mud Pit, respectively.

This 2<sup>nd</sup> Quarterly EM&A Report presents the EM&A programme undertaken during the reporting period from 1 September to 30 November 2012 in accordance with *EM&A Manual* and requirements of the EP (EP-401/2010).

Dredging activities were undertaken during this quarterly period and construction phase water quality monitoring was conducted in accordance with the requirements described in the *EM&A Manual*. Exceedances of Action and Limit Levels for water quality were recorded in thirty-nine monitoring events from 1 September to 30 November 2012.

Dredging works were being undertaken within 250 m from the To Kwa Wan breakwaters and a total of eight impact coral monitoring surveys were conducted on 6, 13, 21 and 28 September; 9 and 18 October; 7 and 16 November 2012 at four designated monitoring sites (including 3 Impact Sites and 1 Control Site) in accordance with the *EM&A Manual*. No exceedances of the Action and Limit Levels were identified during this reporting period. The review of monitoring data suggested that marine dredging activities have proceeded in an environmentally acceptable manner.

Thirteen sets of 30-minute construction noise measurements were carried out at the monitoring stations SCH02 and FSQ during normal weekdays of the reporting period. No exceedance of Action or Limit Level was recorded during the reporting period.

Weekly site inspections were conducted in the reporting period. Most of the mitigation measures recommended in the EIA/ *EM&A manual*/ EP were implemented by the Contractor. Follow-up actions for the observed environmental deficiency during the site inspections were taken as reported by the Contractor and observed in the next weekly site inspection conducted.

No non-compliance event was recorded during the reporting period.

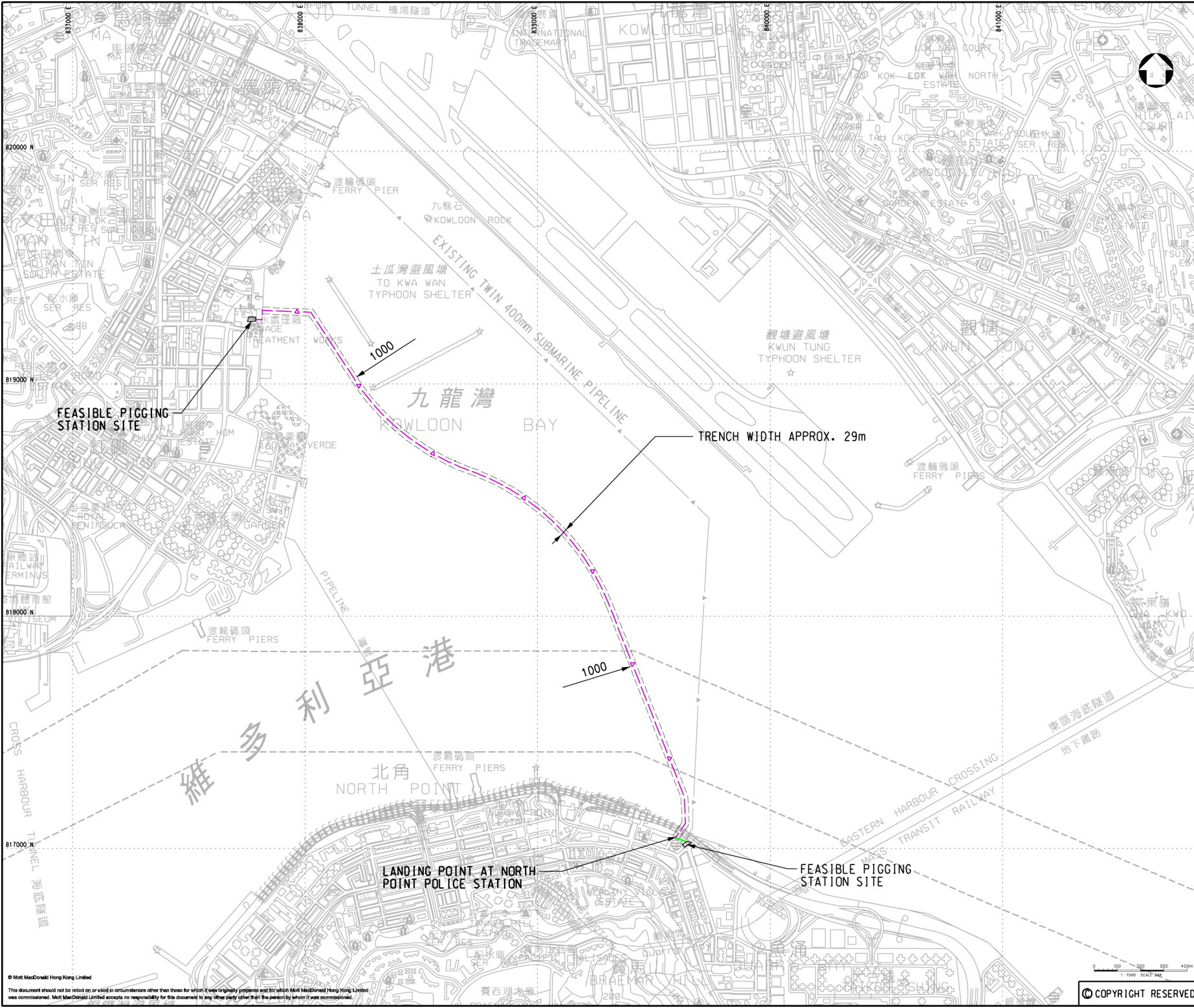
No complaint and summons/prosecution was received during the reporting period.



The EM&A programme is considered effective in reflecting the environmental conditions at the site. The site inspection results also indicated that the Project has no unacceptable environmental impacts and the mitigation measures were effectively implemented. The ET will keep track of the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures in the coming periods.

Change to the monitoring programme is not considered to be necessary at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period.

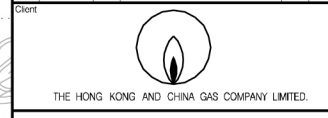
Annex A

## Locations of Works Areas



**LEGEND:**  
 PROPOSED TWIN 450 SUBMARINE GAS MAIN  
 CONNECTION TO NEW PIGGING STATION

P4	FEB 10	MING	GENERAL REVISION	FY	TI
P3	DEC 09	MING	GENERAL REVISION	BL	TI
P2	JUN 09	MING	MINOR AMENDMENT	BL	TI
P1	DEC 08	MING	FIRST ISSUE	BL	TI
Rev	Date	Drawn	Description	Chk'd	App'd




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Project  
**INSTALLATION OF SUBMARINE GAS PIPELINES AND ASSOCIATED FACILITIES FROM TO KWA WAN TO NORTH POINT FOR FORMER KAI TAK AIRPORT DEVELOPMENT**

Title  
**GENERAL LAYOUT**

Designed	DL	Eng. Chk.	TT
Drawn	YKL	Coordination	DL
Dwg. Chk.	DL	Approved	TT
Scale	Project	Status	
1:7500@A1	237926	PRE	
Drawing No.	Annex A1		P4

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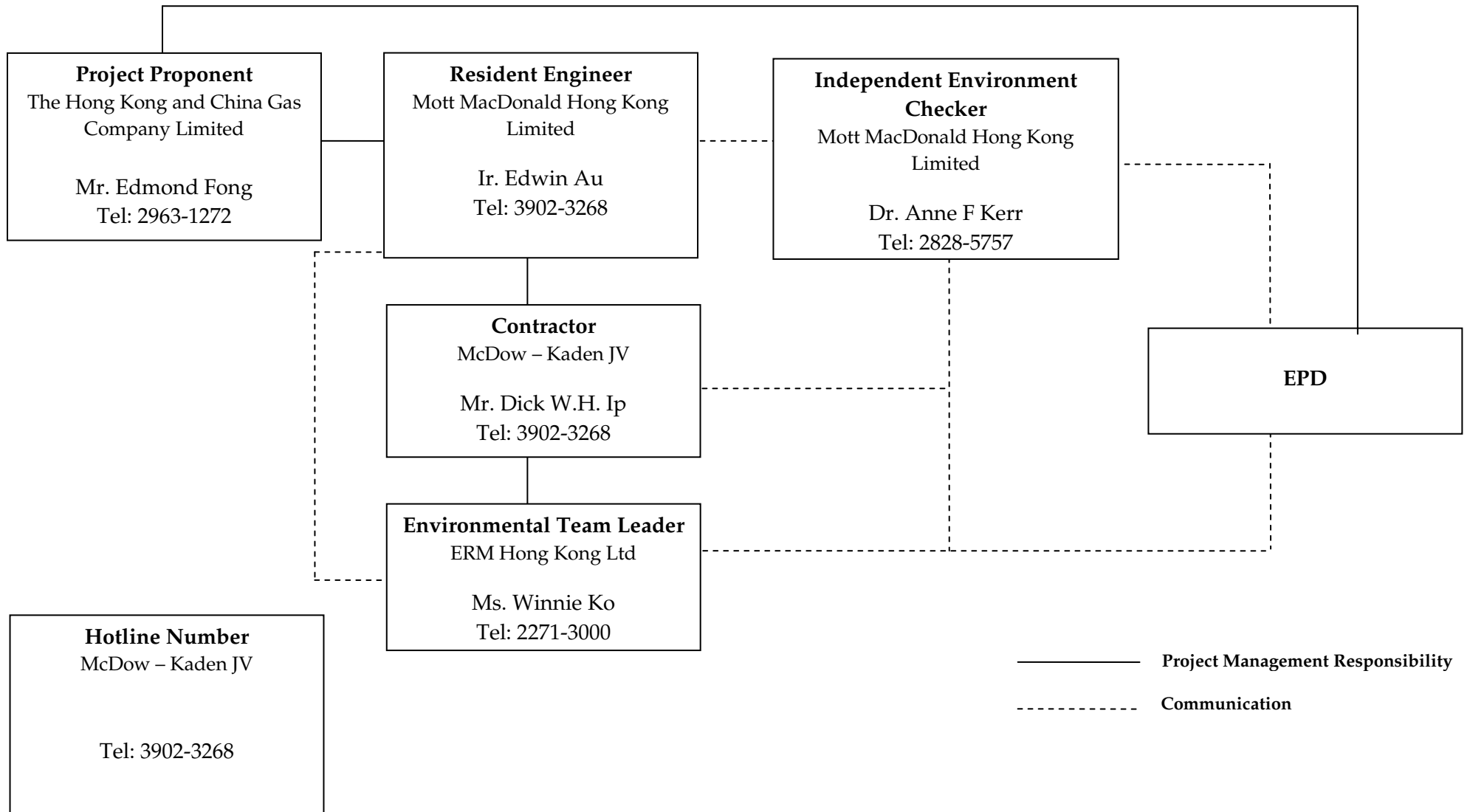
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Annex B

## Project Organization Chart and Contact Details

Annex B - Project Organization During Construction Phase (with contact details)



Annex C

## Construction Programme

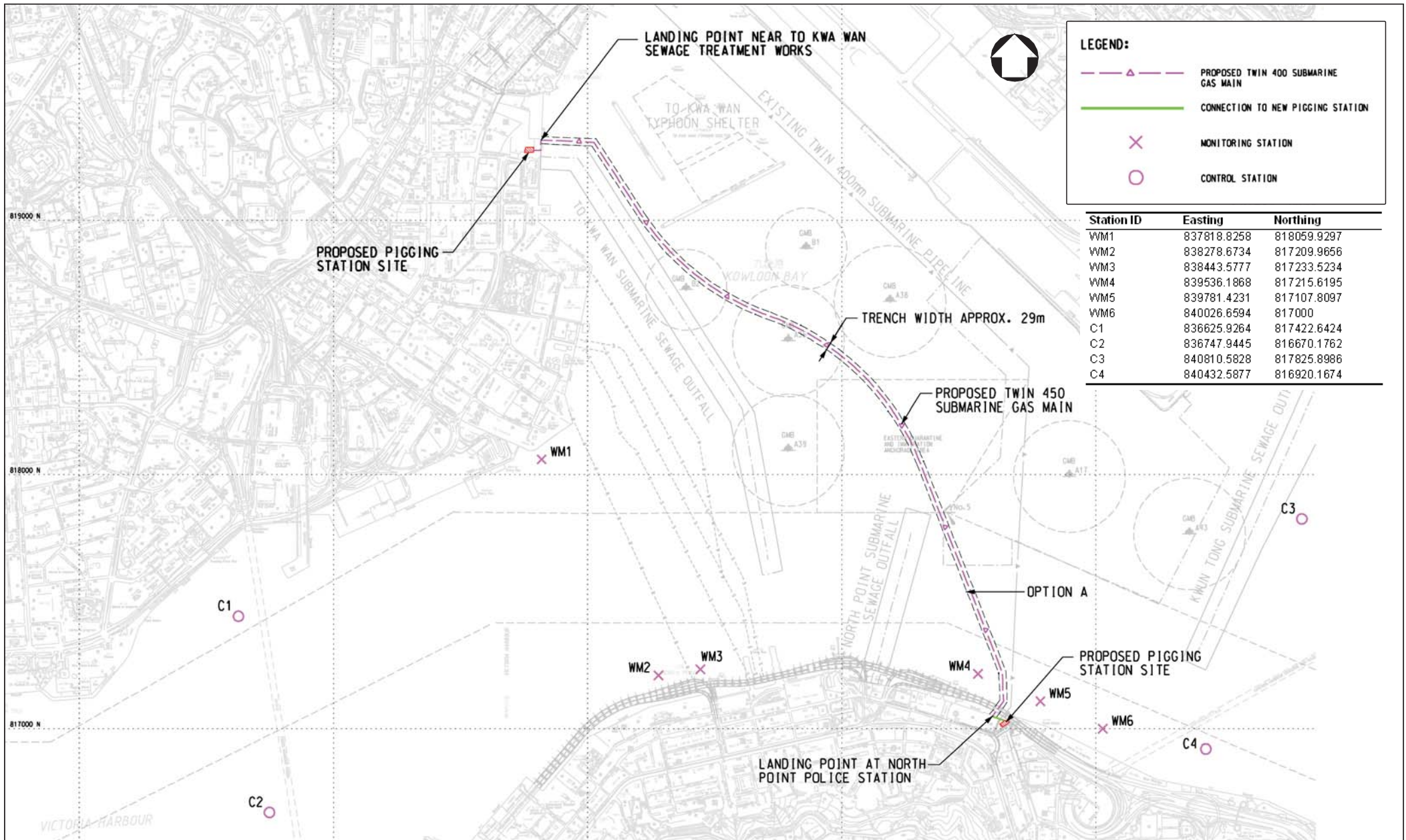
**Installation of Submarine Gas Pipelines and Associated facilities  
From To Kwa Wan to North Point for Former Kai Tak Airport Development  
Construction Programme**

ID	Task Name	Duration	Start	Finish	2012												2013												20
					D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	
1	<b>HKCG Gas Pipeline Laying Project</b>	<b>730 days</b>	<b>Mon 1/2/12</b>	<b>Tue 12/31/13</b>																									
2	To Kwa Wan Landline Construction	669 days	Mon 1/2/12	Thu 10/31/13																									
3	<b>Construction Works( Submarine gas Pipeline)</b>	<b>546 days</b>	<b>Mon 1/2/12</b>	<b>Sun 6/30/13</b>																									
4	Site Preparation, Mobilization and Permit Application	194 days	Mon 1/2/12	Fri 7/13/12																									
5	Trench Dredging	125 days	Wed 6/13/12	Mon 10/15/12																									
6	Pipeline Construction	200 days	Sun 7/15/12	Wed 1/30/13																									
7	Pipeline Testing	28 days	Fri 2/1/13	Thu 2/28/13																									
8	Backfilling and Reinstatement	92 days	Fri 3/1/13	Fri 5/31/13																									
9	Final Pipeline Testing	30 days	Sat 6/1/13	Sun 6/30/13																									
10	Testing and Commisioning	61 days	Fri 11/1/13	Tue 12/31/13																									

Project: HKCG Construction Program Date: Fri 7/13/12	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

Annex D

## Marine Water Quality Monitoring



Annex D1

Location of Water Quality Monitoring Stations

FILE: 0158059c  
DATE: 03/04/2012

Environmental  
Resources  
Management



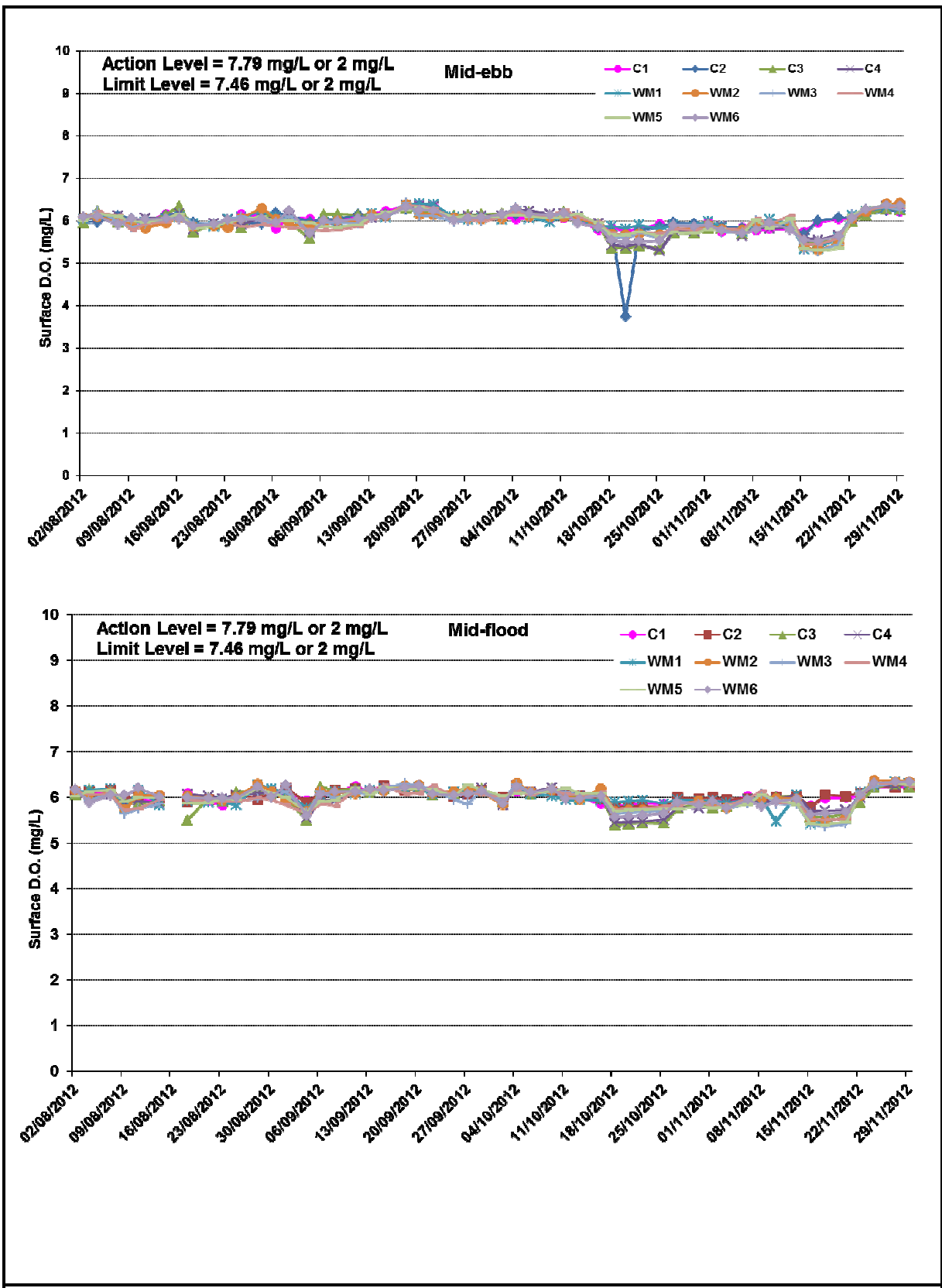


Figure D2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 2 August and 29 November 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex D\_Impact-WQ\_Graph June to November 2012.xls



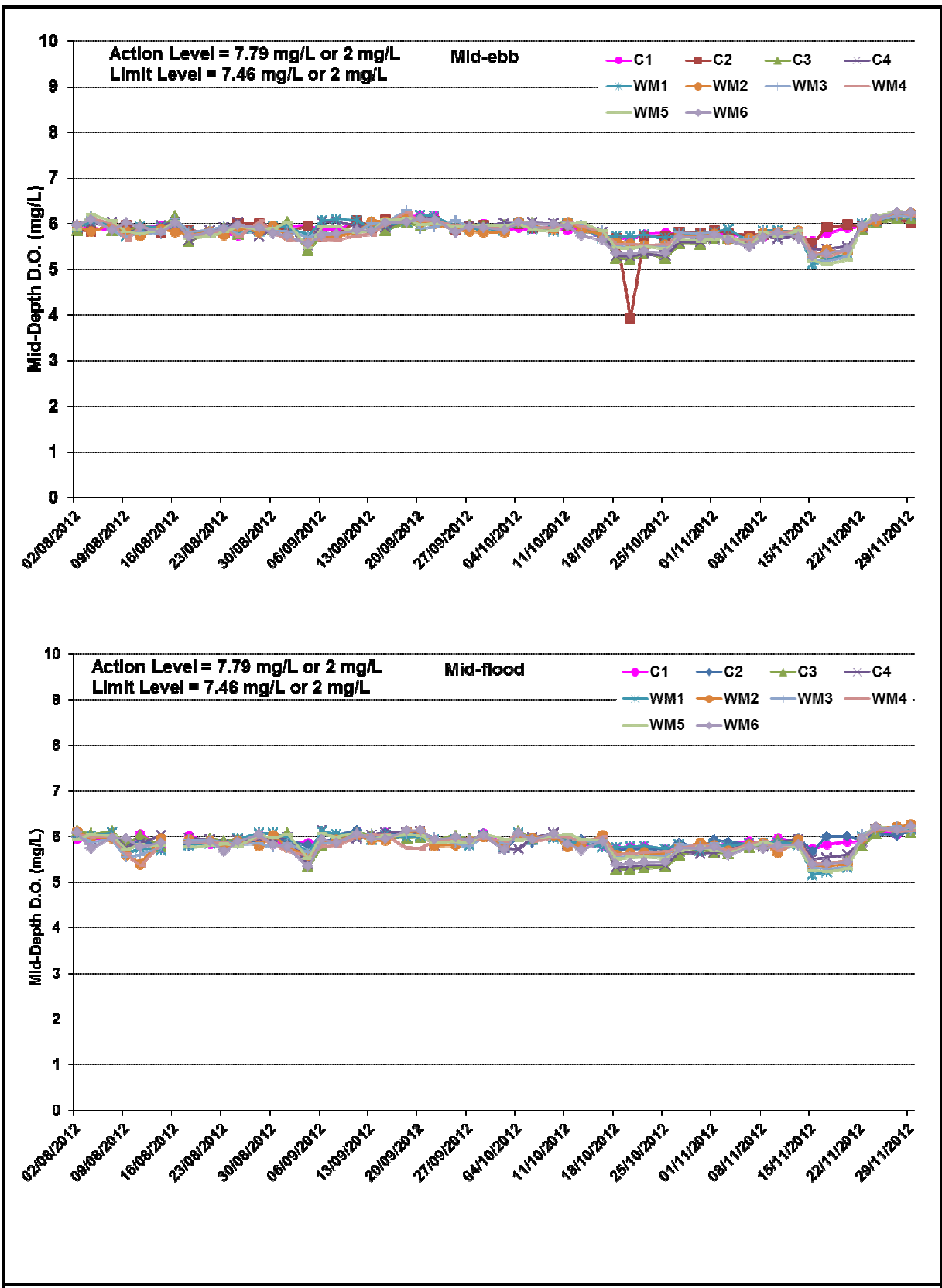


Figure D3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 2 August and 29 November 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex D\_Impact-WQ\_Graph June to November 2012.xls





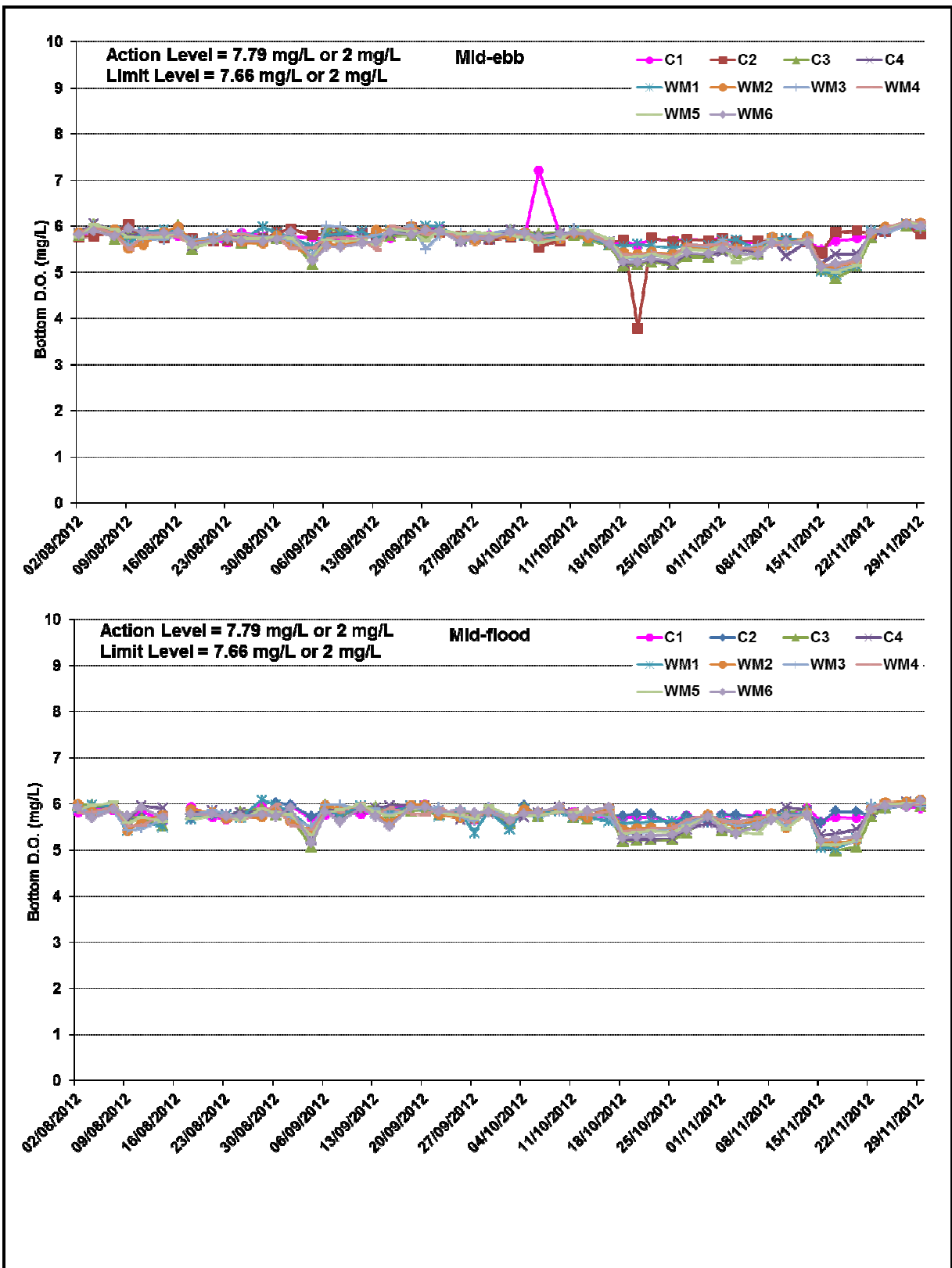


Figure D4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters between 2 August and 29 November 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex D\_Impact-WQ\_Graph June to November 2012.xls



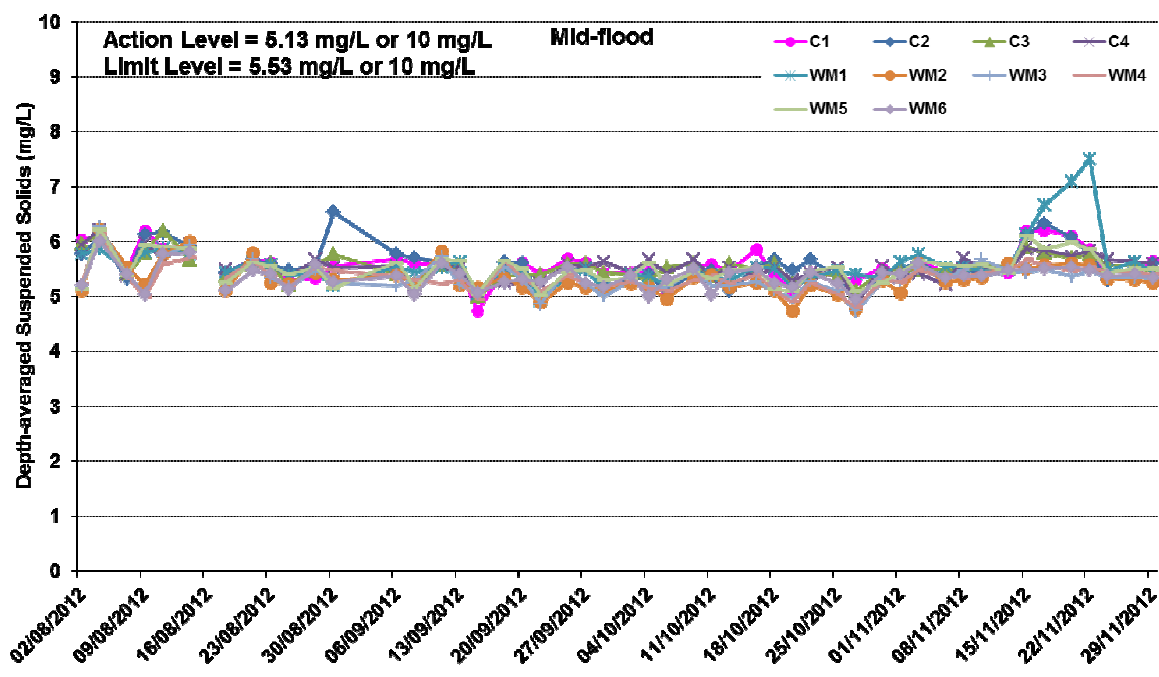
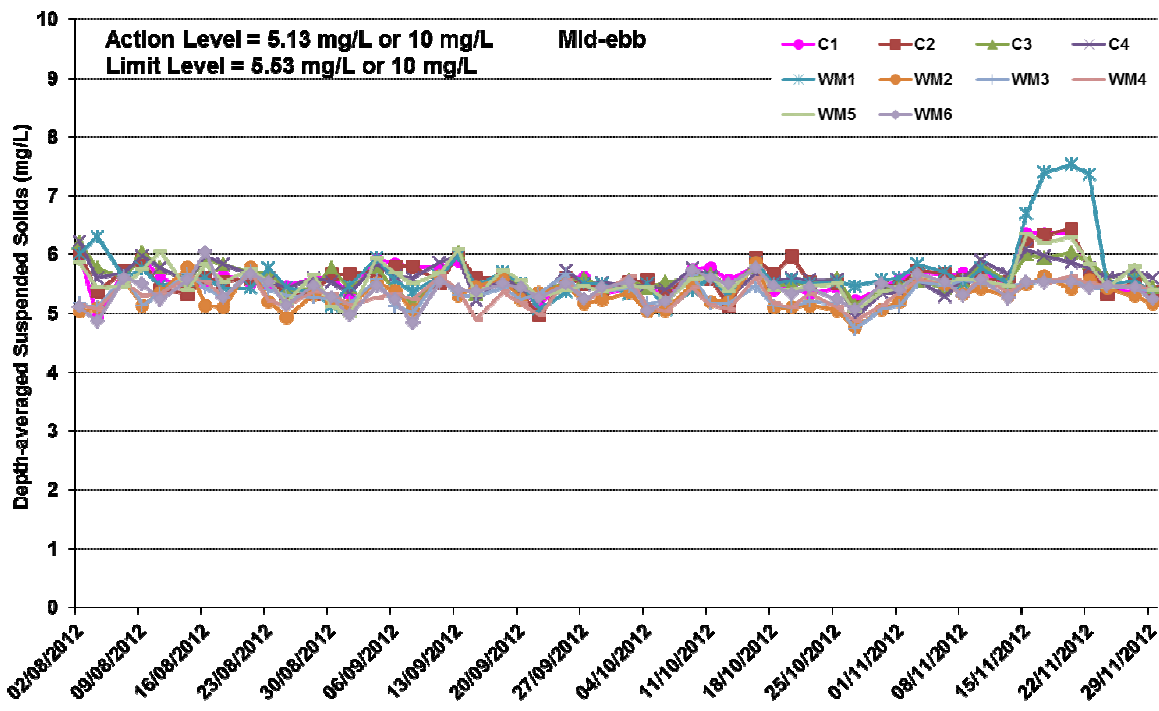


Figure D5 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 2 August and 29 November 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex D\_Impact-WQ\_Graph June to November 2012.xls



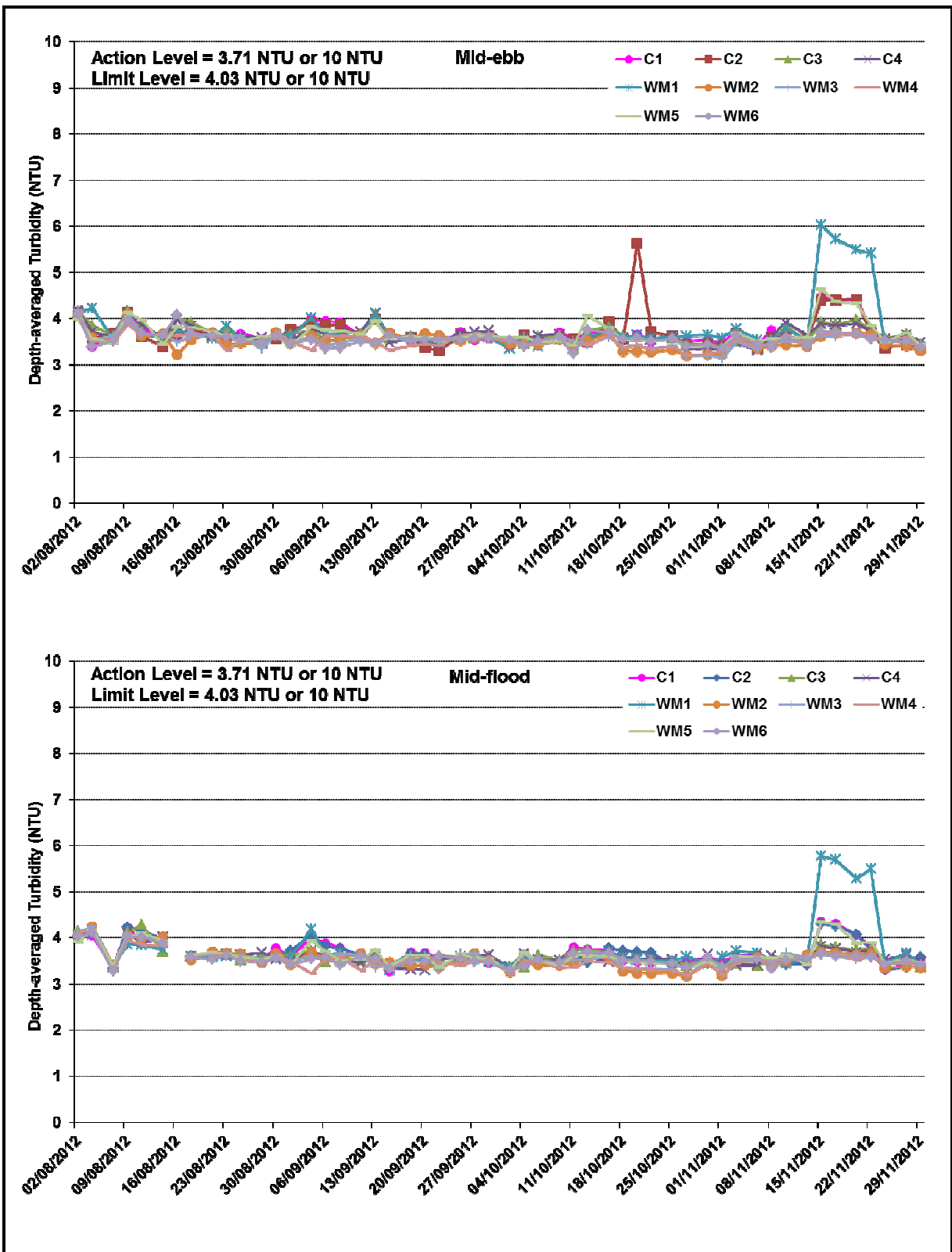


Figure D6 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 2 August and 29 November 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex D\_Impact-WQ\_Graph June to November 2012.xls



Annex E

## Marine Ecology

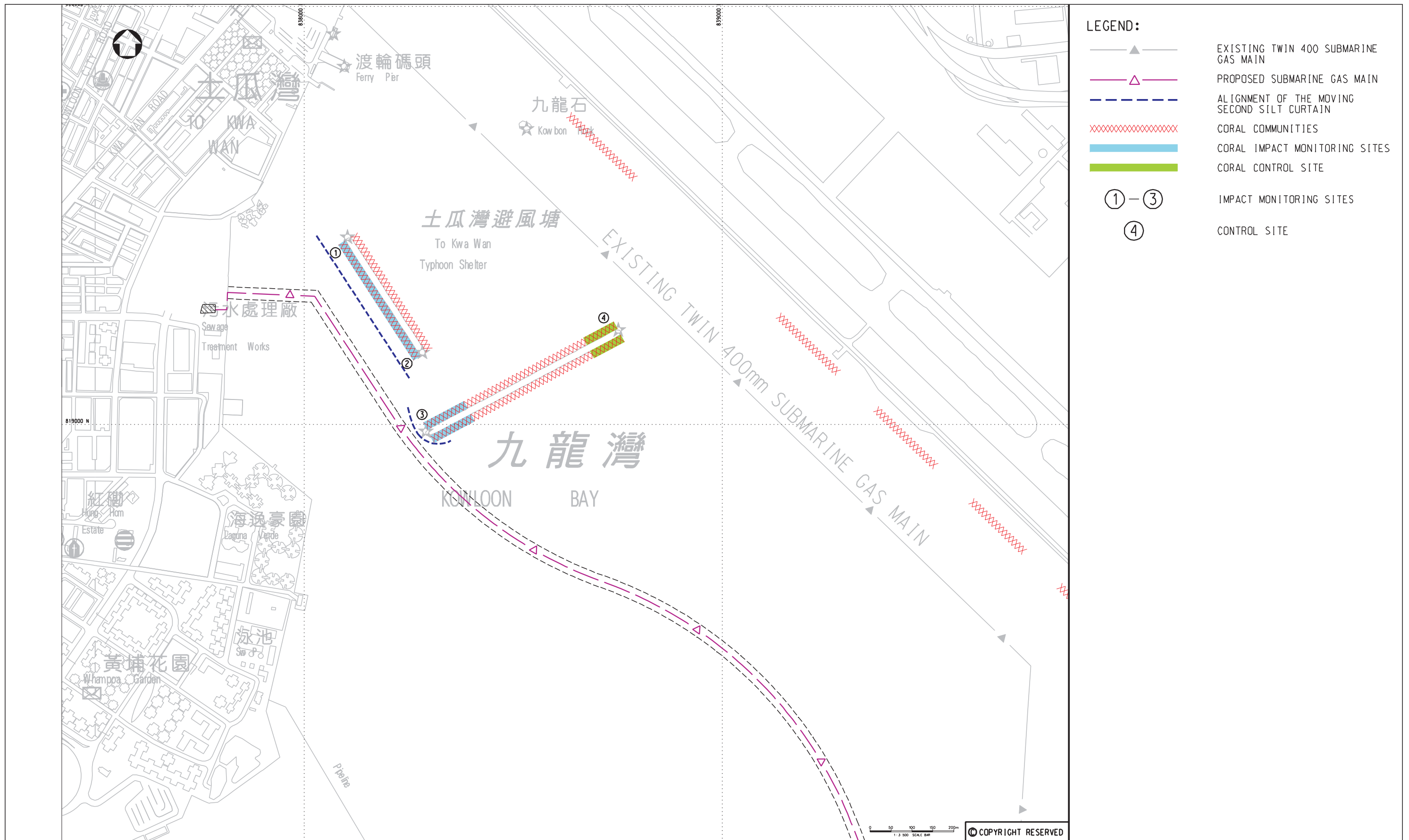


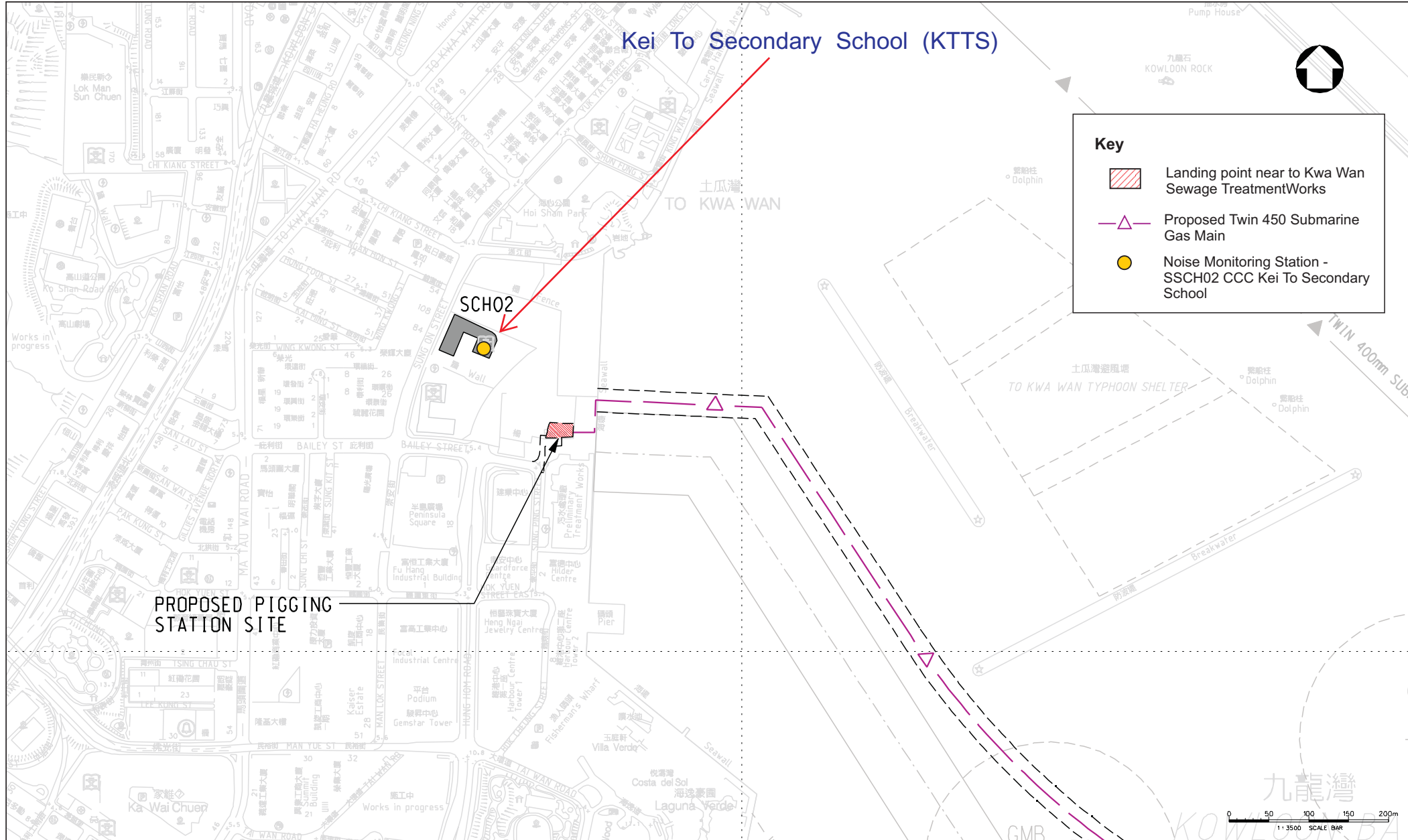
Figure 2.1 Locations of Coral Monitoring Sites at To Kwa Wan Breakwaters

FILE: 0158059e  
DATE: 30/05/2012

Annex F

## Air Borne Noise Monitoring

# Kei To Secondary School (KTTS)

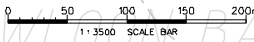


**Key**

- Landing point near to Kwa Wan Sewage Treatment Works
- Proposed Twin 450 Submarine Gas Main
- Noise Monitoring Station - SSCH02 CCC Kei To Secondary School

**PROPOSED PIGGING STATION SITE**





**SCH02**

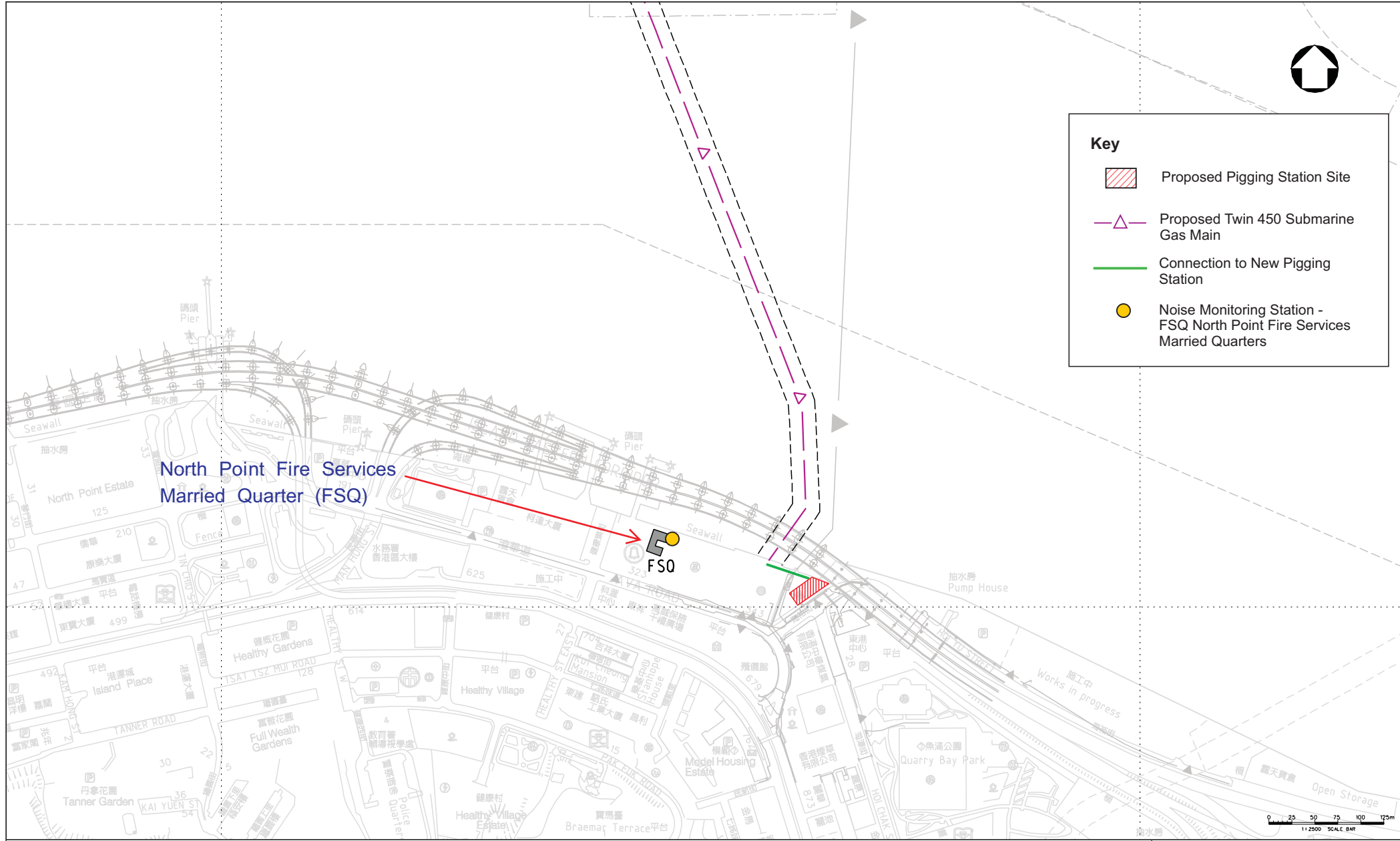


Annex F1 Location of Noise Monitoring Stations (To Kwa Wan)



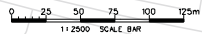
**Key**

-  Proposed Pigging Station Site
-  Proposed Twin 450 Submarine Gas Main
-  Connection to New Pigging Station
-  Noise Monitoring Station - FSQ North Point Fire Services Married Quarters



North Point Fire Services  
Married Quarter (FSQ)

FSQ





## Annex F3 Noise Monitoring Results (August 2012)

### Daytime Noise Monitoring Results

#### FSQ Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
01-Aug-12	10:00	10:30	Sunny	70.1	71.7	67.4	-	Traffic noise	-	31	0.2	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
08-Aug-12	13:20	13:50	Sunny	70.0	71.5	68.1	-	Traffic noise	-	32	0.4	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
15-Aug-12	17:50	18:20	Sunny	71.3	72.5	69.8	-	Traffic noise	-	32	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
22-Aug-12	14:55	15:25	Fine	72.3	73.9	70.2	-	Traffic noise	-	31	0.4	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
29-Aug-12	14:30	15:00	Sunny	70.0	71.1	68.0	-	Traffic noise	-	32	0.4	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>70.0</b>								
				<b>Max.</b>	<b>72.3</b>								

#### SCH02 Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
01-Aug-12	13:15	13:45	Sunny	62.4	64.3	60.0	-	Traffic noise	-	31	0.3	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
08-Aug-12	15:40	16:10	Sunny	61.0	62.9	58.8	-	Traffic noise	-	32	0.3	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
15-Aug-12	11:05	11:35	Sunny	62.4	64.4	60.4	-	Traffic noise	-	32	0.4	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
22-Aug-12	16:00	16:30	Sunny	63.0	64.7	60.3	-	Traffic noise	-	31	0.3	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
29-Aug-12	16:02	16:32	Sunny	62.9	65.1	60.8	-	Traffic noise	-	32	0.4	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>61.0</b>								
				<b>Max.</b>	<b>63.0</b>								

## Annex F4 Noise Monitoring Results (September 2012)

### Daytime Noise Monitoring Results

#### FSQ Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
05-Sep-12	13:00	13:30	Cloudy	71.2	72.7	69.2	-	Traffic noise	-	30	0.4	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
12-Sep-12	15:08	15:38	Sunny	71.7	73.0	69.1	-	Traffic noise	-	31	0.6	RION- NL31 (S/N 00603867)	RION- NC73 (S/N 10786708)
19-Sep-12	13:03	13:33	Cloudy	71.3	73.0	69.3	-	Traffic noise	-	28	0.9	RION- NL31 (S/N 00603867)	RION- NC73 (S/N 10786708)
26-Sep-12	13:15	13:45	Sunny	72.4	73.7	71.1	-	Traffic noise	-	29	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>71.2</b>								
				<b>Max.</b>	<b>72.4</b>								

#### SCH02 Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
05-Sep-12	11:10	11:40	Sunny	62.4	64.3	60.3	-	Traffic noise	-	30	0.3	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
12-Sep-12	15:05	15:35	Sunny	63.1	65.0	61.1	-	Traffic noise	-	31	0.3	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
19-Sep-12	13:05	13:35	Cloudy	62.8	65.5	60.2	-	Traffic noise	-	28	0.3	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
26-Sep-12	15:00	15:30	Sunny	62.8	64.5	60.1	-	Traffic noise	-	29	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>62.4</b>								
				<b>Max.</b>	<b>63.1</b>								

## Annex F5 Noise Monitoring Results (October 2012)

### Daytime Noise Monitoring Results

#### FSQ Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
03-Oct-12	13:20	13:50	Sunny	71.5	73.0	69.5	-	Traffic noise	-	30	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
10-Oct-12	13:10	13:40	Sunny	71.0	72.4	69.1	-	Traffic noise	-	30	0.4	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
17-Oct-12	13:05	13:35	Sunny	71.6	73.0	69.6	-	Traffic noise	-	29	0.9	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
24-Oct-12	11:27	11:57	Sunny	71.8	73.2	70.2	-	Traffic noise	-	29	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
31-Oct-12	09:49	10:19	Cloudy	72.3	73.6	70.8	-	Traffic noise	-	23	1.2	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>71.0</b>								
				<b>Max.</b>	<b>72.3</b>								

#### SCH02 Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
03-Oct-12	15:02	15:32	Sunny	63.9	66.2	61.4	-	Traffic noise	-	30	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
10-Oct-12	15:02	15:32	Sunny	62.9	65.3	60.5	-	Traffic noise	-	30	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
17-Oct-12	14:50	15:20	Sunny	64.2	66.3	61.0	-	Traffic noise	-	29	0.6	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
24-Oct-12	15:40	16:10	Sunny	64.0	66.0	60.8	Drilling	Traffic noise	-	29	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
31-Oct-12	16:00	16:30	Sunny	62.9	64.9	60.6	-	Traffic noise	-	23	0.8	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>62.9</b>								
				<b>Max.</b>	<b>64.2</b>								

## Annex F6 Noise Monitoring Results (November 2012)

### Daytime Noise Monitoring Results

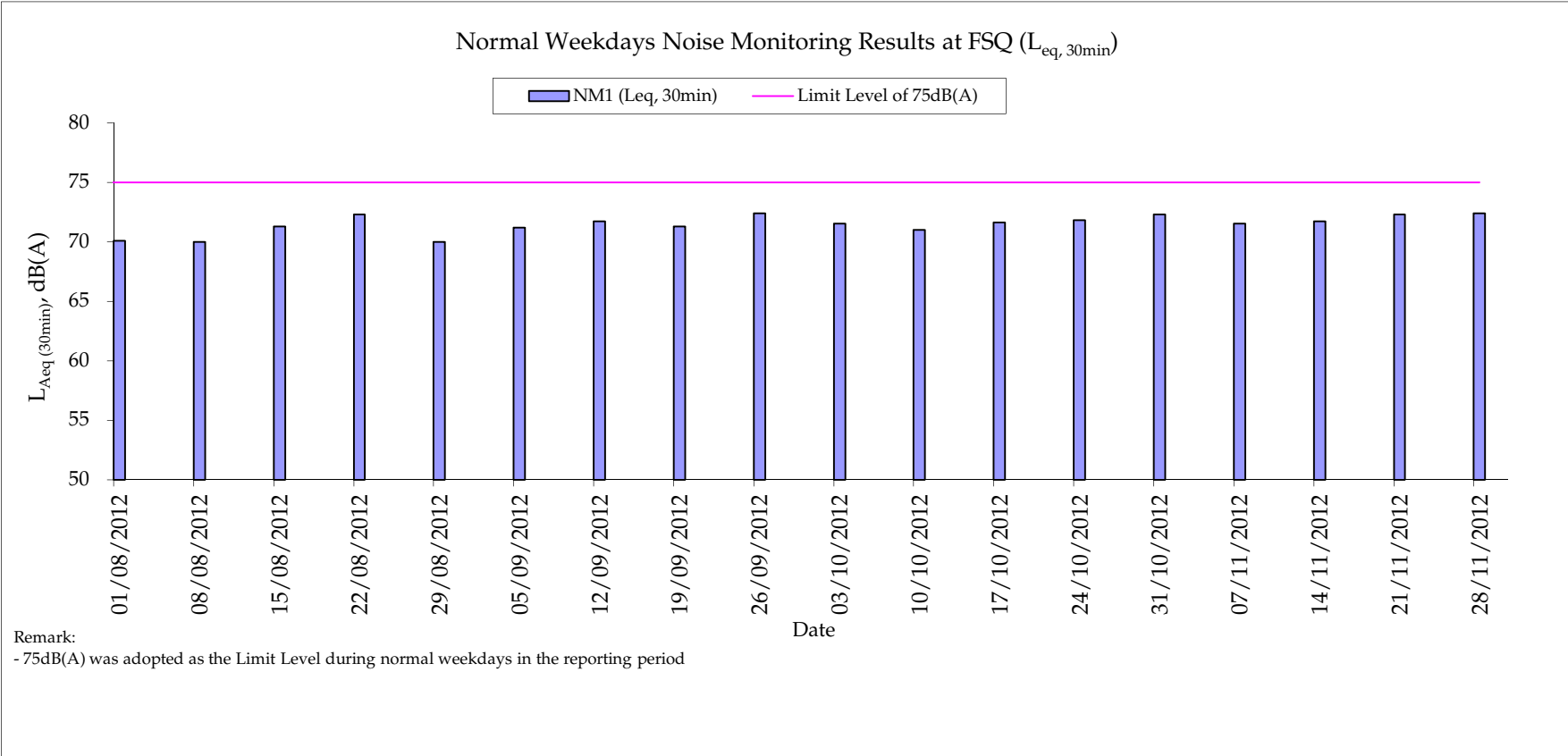
#### FSQ Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
07-Nov-12	16:00	16:30	Cloudy	71.5	73.0	69.6	-	Traffic noise	-	25	2.0	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
14-Nov-12	09:55	10:25	Sunny	71.7	73.2	69.9	-	Traffic noise	-	24	1.2	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
21-Nov-12	10:55	11:25	Cloudy	72.3	73.7	70.6	-	Traffic noise	-	23	2.8	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
28-Nov-12	08:55	09:25	Cloudy	72.4	73.6	70.6	-	Traffic noise	-	19	0.8	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>71.5</b>								
				<b>Max.</b>	<b>72.4</b>								

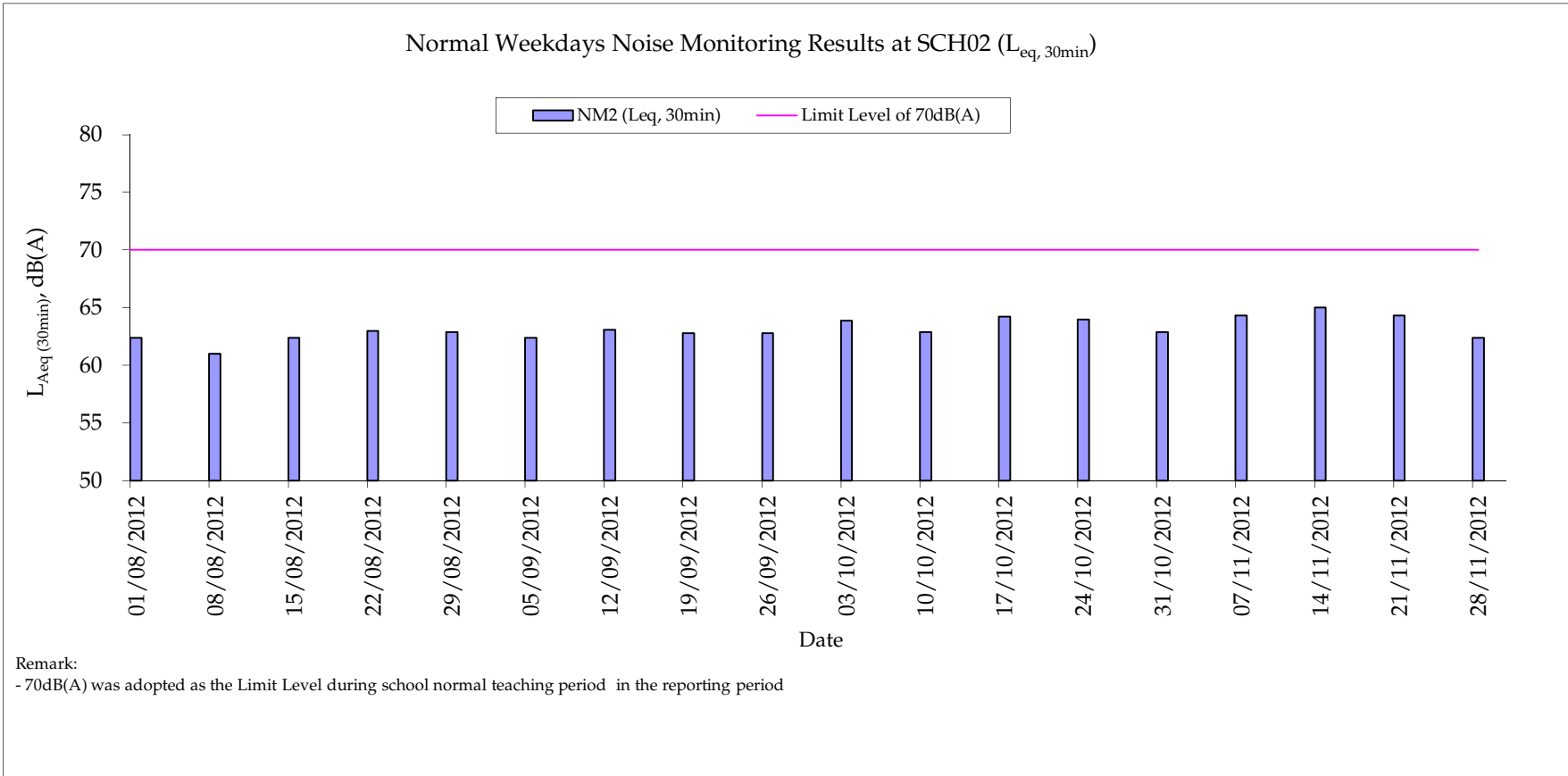
#### SCH02 Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (°C)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
07-Nov-12	14:00	14:30	Sunny	64.3	66.1	61.7	Drilling	Traffic noise	-	25	0.6	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
14-Nov-12	11:05	11:35	Sunny	65.0	67.1	60.8	Drilling	Traffic noise	-	24	0.3	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
21-Nov-12	16:00	16:30	Cloudy	64.3	66.2	60.9	Drilling	Traffic noise	-	23	0.5	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
28-Nov-12	11:10	11:40	Cloudy	62.4	63.9	60.6	-	Traffic noise	-	19	0.7	RION- NL31 (S/N 00410224)	RION- NC73 (S/N 10997142)
				<b>Min.</b>	<b>62.4</b>								
				<b>Max.</b>	<b>65.0</b>								

**Annex F7 - Noise Monitoring Result**



**Annex F8 - Noise Monitoring Result**



Annex G

Event / Action Plans for  
Marine Water Quality,  
Marine Ecology and Air  
Borne Noise Monitoring

## Annex G1

## Event and Action Plan for Water Quality Monitoring during Construction Phase

Event	Action			
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	Contractor(s)
<b>Action Level</b>				
Exceedance by one sampling day	1. Repeat <i>in situ</i> measurement to confirm findings;  2. Identify source(s) of impact;  3. Inform IEC and Contractor  4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measure with IEC and Contractor; and  6. Repeat measurement on next day of exceedance	1. Discuss with ET and Contractor on the mitigations measures;  2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures; and  2. Make agreement on the mitigation measures to be implemented  3. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice;  3. Check all plant and equipment 4. Consider changes of working methods;  5. Discuss with ET and IEC and propose mitigation measures to IEC and ER; and 6. Implement the agreed mitigation measures.
Exceedance for two or more consecutive sampling days	1. Repeat in-situ measurement to confirm finding;  2. Identify source(s) of impact;  3. Inform IEC and Contractor;  4. Check monitoring data, all plant, equipment and Contractor's working methods;  5. Discuss mitigation measure with IEC and Contractor;	1. Discuss with ET and Contractor on the mitigation measures;  2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures;  2. Make agreement on mitigation measures to be implemented; and  3. Assess the effectiveness of the implemented mitigation measures	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice;  3. Check all plant and equipment 4. Consider changes of working methods;  5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; and



Event	Action			
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	Contractor(s)
	<p>6. Ensure mitigation measures are implemented</p> <p>7. Prepare to increase the monitoring frequency to daily; and</p> <p>8. Repeat measurement on next day of exceedance.</p>			6. Implement the agreed mitigation measures.
<b>Limit Level</b>				
Exceedance by one sampling day	<p>1. Repeat <i>in situ</i> measurement to confirm findings;</p> <p>2. Identify source(s) of impact;</p> <p>3. Inform IEC and Contractor and EPD</p> <p>4. Check monitoring data, all plant, equipment and Contractor's working methods;</p> <p>5. Discuss mitigation measure with IEC and Contractor;</p> <p>6. Repeat measurement on next day of exceedance</p> <p>7. Increase the monitoring frequency to daily until no exceedance of Limit Level</p>	<p>1. Discuss with ET and Contractor on the mitigations measures;</p> <p>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and</p> <p>3. Assess the effectiveness of the implemented mitigation measures</p>	<p>1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</p> <p>2. Request Contractor to critically review the working methods</p> <p>3. Make agreement on mitigation measures to be implemented; and</p> <p>4. Assess the effectiveness of the implemented mitigation measures</p>	<p>1. Inform the Engineer and confirm notification of the non-compliance in writing;</p> <p>2. Rectify unacceptable practice;</p> <p>3. Check all plant and equipment</p> <p>4. Consider changes of working methods;</p> <p>5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days; and</p> <p>6. Implement the agreed mitigation measures.</p>
Exceedance two or more consecutive sampling days	<p>1. Repeat <i>in situ</i> measurement to confirm findings;</p> <p>2. Identify source(s) of impact;</p>	<p>1. Discuss with ET and Contractor on the mitigations measures;</p> <p>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and</p>	<p>1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</p> <p>2. Request Contractor to critically review the working methods</p>	<p>1. Inform the ER and confirm notification of the non-compliance in writing;</p> <p>2. Rectify unacceptable practice;</p>

Event	Action			
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	Contractor(s)
	3. Inform IEC and Contractor and EPD  4. Check monitoring data, all plant, equipment and Contractor's working methods;  5. Discuss mitigation measure with IEC, ER and Contractor;  6. Ensure mitigation measures are implemented; and  7. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days	3. Assess the effectiveness of the implemented mitigation measures	3. Make agreement on mitigation measures to be implemented;  4. Assess the effectiveness of the implemented mitigation measures; and  5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level	3. Check all plant and equipment  4. Consider changes of working methods;  5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days;  6. Implement the agreed mitigation measures; and  7. As directed by the Engineer, to slow down or to stop all to part of the marine work or construction activities.

Note: <sup>(1)</sup> ET – Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

<b>Event</b>	<b>Action</b>
<b>Action Level Exceedance</b>	<b>The Marine Biologist</b> Step 1 - Inform the Contractor, the Project Designer and AFCD and discuss the most appropriate method of reducing sediment in the discharge  Step 2 - Implement mitigation measures on site Step 3 - If non-compliance continues, check and confirm the effectiveness of mitigation measures and repeat monitoring survey measurements
<b>Limit Level Exceedance</b>	Undertake Steps 1- 3. If further exceedance of Limit Level, suspend construction works until an effective solution is identified. Once the solutions have been identified and agreed with all parties, construction works may commence

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**Annex G3**      *Event and Action Plan for Air-borne Noise Monitoring during Construction Phase*

Event	Action			
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	Contractor(s)
<b>Action Level</b>	<ol style="list-style-type: none"> <li>1. Notify IEC and the Contractor</li> <li>2. Carry Out investigation</li> <li>3. Report the results of investigation to IEC and the Contractor</li> <li>4. Discuss with the Contractor and formulate remedial measures</li> <li>5. Increase monitoring frequency to check mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Review with analysed results submitted by ET</li> <li>2. Review the proposed remedial measures by the Contractor and advise ER accordingly</li> <li>3. supervise the implement of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to proposed remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures are properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC</li> <li>2. Implement noise mitigation proposals.</li> </ol>
<b>Limit Level</b>	<ol style="list-style-type: none"> <li>1. Identify the source</li> <li>2. Notify IEC, ER, EPD and the Contractor</li> <li>3. Repeat measurement to confirm findings</li> <li>4. Increase monitoring frequency</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented</li> <li>6. Inform IEC, ER and EPD the causes and actions taken for the exceedances</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions</li> <li>2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly</li> <li>3. Supervise the implement of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing</li> <li>2. Notify the Contractor</li> <li>3. Require the Contractor to proposed remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification.</li> <li>3. Implement the agreed proposals.</li> <li>4. Resubmit proposals if problem still not under control.</li> <li>5. Stop the relevant activity of works as determined by the ER until exceedance is abated.</li> </ol>

Event	Action			Contractor(s)
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	
	7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results			
	8. If exceedance stops, cease additional monitoring			
Note:	<sup>(1)</sup> ET – Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative			

Annex H

## Implementation Schedule

## ANNEX H SUMMARY OF MITIGATION MEASURE IMPLEMENTATION SCHEDULE

Environmental Protection Measures	Location	Timing	Status
<b>Water Quality</b>			
<p><u>Mitigation Measures for Dredging</u> Although adverse water quality impact is not predicted during the construction phase, implementation of the following mitigation measures is recommended to minimise the potential SS impact from dredging activities:</p> <ul style="list-style-type: none"> <li>Dredging shall be carried out by closed grab dredger to minimize release of sediment and other contaminants during dredging;</li> <li>The maximum production rate for dredging from the seabed for installation of the submarine gas pipelines shall not be more than 4,000m<sup>3</sup> per day (and no more than 1 closed grab dredger); and</li> <li>Deployment of frame type silt curtain to fully enclose the grab while dredging works are in progress. An illustration of a typical configuration of frame type silt curtain is shown in EM&amp;A manual Figure 3.10.</li> </ul> <p>The frame type silt curtain shall be designed to enclose local pollution caused by the grab dredger and suspended by a steel frame mounted on the grab dredger and floating on water. This frame type silt curtain shall be fabricated from permeable, durable, abrasion resistant membrane like geotextiles and be mounted on a floating boom structure. The frame type silt curtain shall also extend to the seabed to cover the entire water column. Steel chain or ballast shall be attached to the bottom of the silt curtain. Mid-ballast may be added as necessary. The structure of the silt curtain shall be maintained by metal grids. The frame type silt curtain shall be capable or reducing sediment loss to outside by a factor of 4 (or about 75%).</p> <p><u>Other Good Site Practices for Dredging</u> Other good site practices that shall be undertaken during dredging includes:</p> <ul style="list-style-type: none"> <li>all vessels shall be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;</li> <li>all barges / dredgers used shall be fitted with tight fitting seals to their bottom openings to prevent leakage of material;</li> <li>construction activities shall not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds;</li> <li>barges or hopper shall not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation; and</li> <li>before commencement of dredging works, the holder of the Environmental Permit shall submit detailed proposal of the design and arrangement of the frame type silt curtain to EPD for approval.</li> </ul>	Construction Work Sites (Along the alignment of dredging)	During Marine Dredging works	√
<p><u>Effluent from Hydrostatic/ Commissioning Tests of the Gas Pipeline System</u> For hydrostatic testing of gas pipelines, the gas pipelines would be filled with potable water (a nearly incompressible liquid) and examined for leaks or permanent changes in shape with a specified test pressure. The test would be carried out at room temperature and dosing of chemicals into the water for testing is not required. Water used for testing shall be reused as far as possible (e.g. water</p>	Construction Work Sites (General)	During Hydrostatic Tests	N.A.

Environmental Protection Measures	Location	Timing	Status
<p>spray for dust suppression on site). To ensure compliance with the standards for effluent discharged into the inshore waters or marine waters of Victoria Harbour WCZ as shown in Tables 9a and 9b of the TM-DSS, sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m<sup>3</sup> capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and suited to applications where the influent is pumped.</p>			
<p><u>Surface Runoff, Sewage and Wastewater from Construction Activities</u>  Appropriate measures shall be implemented to control runoff and prevent high loads of SS from entering the marine environment. Proper site management is essential to minimize surface runoff and sewage effluents.</p>	Construction Work Sites (General)	Construction period	√
<ul style="list-style-type: none"> <li>• Construction site runoff shall be prevented or minimised in accordance with the guidelines stipulated in the EPD's Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94). All discharges from the construction site shall be controlled to comply with the standards for effluents discharged into the Victoria Harbour WCZ under the TM-DSS. Good housekeeping and stormwater best management practices, as detailed below, shall be implemented to ensure all construction runoff complies with WPCO standards and no unacceptable impact on the WSRs as a result of construction of the proposed submarine gas pipelines;</li> <li>• Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m<sup>3</sup> capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped;</li> <li>• Manholes (including newly constructed ones) shall always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the storm runoff being directed into foul sewers;</li> <li>• All vehicles and plant shall be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and located wheel washing bay shall be provided at every site exit, and wash-water shall have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road shall be paved with sufficient backfill toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains;</li> <li>• Precautions shall be taken at any time of year when rainstorms are likely. Actions shall be taken when a rainstorm is imminent or forecast. Actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention shall be paid to the control of silty surface runoff during storm events, particularly for areas located near steep slopes;</li> <li>• Fuel tanks and storage areas shall be provided with locks and be located on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank, to prevent spilled fuel oils from reaching the coastal waters of the Victoria Harbour and Western and Eastern Buffer WCZs;</li> <li>• Portable chemical toilets shall be used to handle construction workforce sewage prior to discharge to the existing trunk sewer. Sufficient numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers. The Contractor should also be responsible for waste disposal and maintenance practices.</li> </ul>			
<p><u>Waste Management</u></p>			
<p><u>Good Site Practices</u>  Adverse impacts related to waste management are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p>	Construction Work Sites (General)	Construction period	√



Environmental Protection Measures	Location	Timing	Status
<ul style="list-style-type: none"> <li>Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site</li> <li>Training of site personnel in proper waste management and chemical handling procedures, separation of chemical wastes with appropriate treatment which is mentioned in Section 4.6.5</li> <li>Provision of sufficient waste disposal points and regular collection of waste</li> <li>Barges filled with dredged sediment shall be towed away immediately for disposal. In doing so, odour is not anticipated to be an issue to distant sensitive receivers</li> <li>Well planned delivery programme for offsite disposal such that adverse impact from transporting sediment material is not anticipated</li> <li>Well maintained PME should be operated on site</li> <li>Regular cleaning and maintenance of the drainage systems for construction of the landing points</li> <li>Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers</li> </ul>			
<p><u>Waste Reduction Measures</u>  Good management and control can prevent the generation of a 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:</p> <ul style="list-style-type: none"> <li>Sort C&amp;D material from demolition and decommissioning of the existing facilities to recover recyclable portions such as metals;</li> <li>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;</li> <li>Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force;</li> <li>Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and</li> <li>Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.</li> </ul>	Construction Work Sites (General)	Construction period	√
<p><u>C&amp;D Material</u>  In order to minimise impacts resulting from collection and transportation of C&amp;D material for off-site disposal, the excavated materials shall be reused on-site as backfilling material and for landscaping works as far as practicable. Surplus C&amp;D material generated from excavation works shall be disposed of at public fill reception facilities for other beneficial uses. Other mitigation requirements are listed below:</p> <ul style="list-style-type: none"> <li>A Waste Management Plan shall be prepared;</li> </ul>	Construction Work Sites (General)	Construction period	√

<b>Environmental Protection Measures</b>	<b>Location</b>	<b>Timing</b>	<b>Status</b>
<ul style="list-style-type: none"> <li>A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) shall be proposed; and</li> <li>In order to monitor the disposal of C&amp;D material and solid wastes at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system (e.g. ETWB TCW No. 31/2004) shall be included.</li> </ul>			
<p><b>General Refuse</b> General refuse shall be stored in enclosed bins or compaction units separate from C&amp;D material. A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from C&amp;D material. Preferably an enclosed and covered area shall be provided to reduce the occurrence of 'wind blown' light material.</p>	Construction Work Sites (General)	Construction period	√
<p><b>Chemical Waste</b> Good quality containers compatible with the chemical wastes shall be used, and incompatible chemicals shall be stored separately. Appropriate labels shall be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the approved Chemical Waste Treatment Centre, or another licensed facility.</p>	Construction Work Sites (General)	Construction period	Δ
<p><b>Marine Dredged Sediment</b> During transportation and disposal of the dredged marine sediments, the following measures shall be taken to minimise potential impacts on water quality:</p> <ul style="list-style-type: none"> <li>Bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and dredgers before the vessel is moved;</li> <li>Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the EPD; and Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.</li> <li>The use of 300 m<sup>3</sup> geosynthetic container, with outer woven fabric tensile strength of 200 kN/m and seam strength of 140 kN/m for effective method for contained disposal which meets ETWB TCW No. 34/2002 requirements for assuring negligible loss of contaminants to marine environment during disposal.</li> <li>Allocation of marine disposal sites and all necessary permits shall be applied from relevant authorities for disposal of dredged sediment. Project Proponent will obtain confirmation from CEDD/Marine Fill Committee (MFC) on the disposal options before commencement of the Project.</li> </ul>	Construction Work Sites (Along the alignment of dredging)	During Marine Dredging works	√
<p><b>Marine Ecology</b> Placement of a second silt curtain between the dredger and the To Kwa Wan breakwater. The silt curtain shall be 75m long. This curtain shall be moved along with the dredger as the work progresses. The curtain shall be arranged so that at least 15m of the curtain shall extend past the dredger in each direction. This curtain shall remain in a suitable position between the dredger and the corals until the dredger is 250m from the corals.</p>	Proposed dredging near To Kwa Wan breakwaters	Construction period	√
<p><b>Hazard to Life</b> Proper general traffic management measures.</p> <ul style="list-style-type: none"> <li>Minimisation of works activity footprint – dredging and backfilling.</li> <li>Safety provision during dredging and backfilling.</li> <li>Liaison with relevant Government Departments before and during construction stage.</li> <li>Requirements during the submarine pipe pulling.</li> </ul>	Construction Work Sites	Construction period	√

<b>Environmental Protection Measures</b>	<b>Location</b>	<b>Timing</b>	<b>Status</b>
Risk mitigation measures to prevent the damage of submarine pipeline during operation will be adopted. They are listed as follows: <ul style="list-style-type: none"> <li>The submarine gas pipeline will be covered by armour rock, damage from anchor drop could be prevented.</li> </ul>	Construction Work Sites	Construction period	√
<u>Landscape</u> Screening of construction works by hoardings/ noise barriers around Works area in visually unobtrusive colours, to screen Works.	Construction Work Sites	Construction period	N.A.
Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone).	Construction Work Sites	Construction period	N.A.
Ensure no run-off into the harbour adjacent to the site.	Construction Work Sites	Construction period	N.A.
<b><u>Cultural Heritage</u></b>			
A Monitoring Brief shall be conducted as set out in Appendix H2 of the EIA. This can be done in parallel with the monitoring of barge loading as set out in section 4.6.	Construction Work Sites	Construction period	√
<b><u>Noise</u></b>			
<u>Construction Noise Impact from Test before Backfilling and Hydrostatic/ Commissioning Test</u> The total maximum allowable SWL of the test before backfilling and hydrostatic/ commissioning test is ranged from 112-126 dB(A) at different location and period, the Contractor shall strictly follow the specification listed above to meet the noise criteria and closely liaise with the schools nearby before carrying out the activities. Noise mitigation measures including the use of movable noise barriers and/ or noise enclosure to block the direct line of sight to the receivers, installation of mufflers and/ or silencers on the machine(s) should be implemented if necessary.	Construction Work Sites (Landmain work)	Construction period	√
<u>Using Quiet PME</u> The use of quiet PME recognized by the Noise Control Authority for the purpose of CNP application can effectively reduce the noise generated from the construction plants. Quiet PME are construction plants and equipments that are notably quieter, more environmental friendly and efficiently. The noise level reduction ranges from 5 – 10 dB(A) depending on the type of equipment used. The Contractor should note the required procedures involved in application of the QPME. A list of QPME recommended is list in <b>Table 10.11</b> of the EIA report.	Construction Work Sites (Along the alignment of dredging and landmain works)	Construction period	√
<u>Using Movable Noise Barriers</u> Movable noise barriers to be erected near to the construction plants would reduce the noise levels for commonly 5 – 10 dB(A) depending on the types of items of PME and materials of the barriers. It is recommended that the Contractor should screen noisy works and noise from stationary items of PME whenever practicable.	Construction Work Sites (Landmain work)	Construction period	√
<u>Good Site Practices</u> Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures shall be followed during construction: <ul style="list-style-type: none"> <li>The Contractor shall adopt the Code of Practice on Good Management Practice to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD;</li> <li>The Contractor shall observe and comply with the statutory and non-statutory requirements and guidelines;</li> <li>Before commencing any work, the Contractor shall submit to the Engineer Representative for approval the method of working, equipment and noise mitigation measures intended to be used at the site;</li> <li>The Contractor shall devise and execute working methods to minimise the noise impact on the surrounding sensitive uses, and provide experienced personnel with suitable training to ensure that those methods are implemented;</li> <li>Unused equipment shall be turned off. Number of operating PME shall be kept to a minimum and the parallel use of noisy</li> </ul>	Construction Work Sites (Along the alignment of dredging and landmain works)	Construction period	√

Environmental Protection Measures	Location	Timing	Status
<p>equipment / machinery shall be avoided;</p> <ul style="list-style-type: none"> <li>Regular maintenance of all plant and equipment; and</li> <li>Material stockpiles and other structures shall be effectively utilised as noise barriers, where practicable.</li> </ul>			
<b>Construction Dust</b>			
<u>Mitigation Measures for Fugitive Dust</u>	Construction Work Sites (General)	Construction period	√
<p>To mitigate fugitive dust impact, all dust control measures recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, shall be implemented. Relevant dust control measures include:</p>			
<ul style="list-style-type: none"> <li>The works area for site clearance shall be sprayed with water before, during and after the operation so as to maintain the entire surface wet;</li> <li>Restricting heights from which materials are to be dropped, as far as practicable to minimise the fugitive dust arising from unloading/ loading;</li> <li>Immediately before leaving a construction site, all vehicles shall be washed to remove any dusty materials from the bodies and wheels. However, all spraying of materials and surfaces should avoid excessive water usage;</li> <li>Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle;</li> <li>Any stockpile of dusty materials shall be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 4 sides; and</li> <li>All dusty materials shall be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.</li> </ul>			

Remark:

- √ Compliance of Mitigation Measures
- <> Compliance of Mitigation but need improvement
- x Non-compliance of Mitigation Measures
- Δ Deficiency of Mitigation Measures but rectified by the Contractor
- N.A. Not Applicable

Annex I

## Waste Flow Table

The installation of submarine gas pipelines and associated facilities from To Kwa Wan to North Point for former Kai Tak Airport

**Annex I - Monthly Summary Waste Flow Table for 2012 (year)**

Month	Actual Quantities of Inert C&D Materials Generated Monthly (see Note 1)						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete (see Note 2)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Stockpiling	General refuse	Vegetation / Rubbish	Disposal at Landfill	Chemical Waste Recycling (see Note 3)	Recycling of Rubbish
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in'000kg / '000L)	(in '000kg)
Jan	-	-	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-
Apr	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-
June	858.93	858.93	150	0	8.93	700	0	0	0	0	0
July	398.16	398.16	150	0	98.16	150	0	0	0	0	0
Aug	316	316.12	290	0	25.87	0	0.25	0.5	0	0	0.5
Sept	136.5	136.5	80.5	0	56.1	0	0.5	0.5	0	0	0.5
Oct	82.39	82.39	30	0	52.39	0	0.2	0.3	0	0	0.2
Nov	71.23	71.23	44.84	0	26.39	0	0.1	0.1	0	0	0.1
Dec											
<b>Total</b>	<b>1863.1</b>	<b>1863.1</b>	<b>745.3</b>	<b>0.0</b>	<b>267.9</b>	<b>850.0</b>	<b>1.05</b>	<b>1.4</b>	<b>0</b>	<b>0</b>	<b>1.3</b>

- Notes: (1) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m<sup>3</sup> by volume.  
(2) Broken concrete for recycling into aggregates.  
(3) For chemical waste, the actual quantities of empty paint cans will be in kilogram (kg) and spent lubrication oil will be in litre (L).

Annex J

Cumulative Complaint and  
Summons/Prosecutions  
Log

*Annex J Cumulative Complaint and Summons/Prosecutions Log*

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
June 2012	0	0
July 2012	0	0
August 2012	0	0
September 2012	0	0
October 2012	0	0
November 2012	0	0
Overall Total	0	0