

Yiu Lian Dockyards Limited

Relocation of Yiu Lian Floating Dock No. 3

Environmental Monitoring
and Audit Manual

October 2006

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Environmental Monitoring and Audit Manual

Author: Various

Checker: Sharifah Or

Approver:  Dr. Gui Yi Li

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Hyder Consulting Ltd

Incorporated in Hong Kong with limited liability—COI Number 126012

47th Floor, Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

Tel: +852 2911 2233 Fax: +852 2805 5028 www.hyderconsulting.com



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1 Introduction

1.1 Background

The relocation of Yiu Lian Floating Dock No. 3 comprises decommissioning of the Yiu Lian No. 3 Floating Dock (the Dock) at Yam O Wan and a proposed site/reinstatement of the Dock at the south west coast of Tsing Yi.

A small scale of marine sediment dredging works will be undertaken at both the existing site and the proposed site for its decommissioning and reinstatement. During the dredging, marine sediments leaking through the dredger can be released into the water column, thus leading to an elevated level of water pollution such as an elevation of suspended solids (SS) in the adjacent marine water. The coarse materials, such as sand and gravel, of the released sediment, will quickly settle back to the seabed close to the dredging areas. However fine particles, such as silt and clay, together with any contaminants they may carry, will be transported away from the dredging site by oceanic currents and tides and then potentially lead to an adverse environmental effect on sensitive receivers (SRs).

The future operation of the Dock at Tsing Yi will generate a certain volume of intermittent industrial wastewater from hull washing which will be discharged into the marine water after effective screening. Disposal of the effluents will have potential adverse impacts on the marine environment and SRs. Domestic wastewater generated on the dock will be collected and treated on board with an appropriate sewerage treatment system. The treated effluent will then be discharged to the marine water. These effluents may cause potential impacts to the marine environment.

In accordance with the EIA report, an Environmental Monitoring and Audit (EM&A) programme for water quality should be implemented during the decommissioning, reinstatement and operation of the Dock to provide a monitoring mechanism for the potential water quality impacts.

1.2 Purpose of Manual

The purpose of this EM&A Manual is to guide the setup of a water quality monitoring and environmental audit procedure to ensure compliance with the relevant environmental regulations and legislations. This Programme will be used to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Programme outlines the water monitoring and audit to be undertaken during the dock decommissioning, reinstatement and operation. It aims to provide systematic procedures for monitoring, auditing and minimising of the water quality impacts associated with the sediment dredging works and the future dock operation.

Hong Kong Water Pollution Control Ordinance and the Hong Kong Planning Standards and Guidelines are the environmental standards and guidelines for the preparation of this Manual.

This Manual contains the following:

- (i) responsibilities of the Project Proponent, the Contractor, the Independent Environmental Checker (IEC) and the Environmental Team (ET) with respect to the environmental monitoring and audit requirements during the course of the project;
- (ii) information on project organisation and programming of construction activities for the project;
- (iii) requirements with respect to the project construction schedule and the necessary water quality monitoring and audit programme to track the water quality impacts;
- (iv) full details of the methodologies to be adopted, including all field, laboratory and analytical procedures, and details on quality assurance and quality control;
- (v) definition of Action and Limit Levels;
- (vi) establishment of Event and Action Plans;
- (vii) requirements of reviewing pollution sources and working procedures in the event of non-compliance with the environmental criteria or complaints;
- (viii) requirements of presentation of environmental monitoring and audit data and appropriate reporting procedures; and
- (ix) complaint resolution procedures.

1.3 Environmental Monitoring and Audit Requirements

The potential environmental impacts arising from both the construction and operation phases have been studied and presented in the EIA Report. Appropriate mitigation measures have been recommended and should be implemented to minimise the potential environmental impacts of the Project. An implementation schedule of the recommended mitigation measures for water quality control is presented in Appendix 1.

1.4 Project Organisation

The project organisation and lines of communication with respect to environmental protection work are shown in Figure 1-1.

The responsibilities of respective parties are given in the following sub-sections.

1.4.1 The Project Proponent

Yiu Lian, the project proponent, is responsible for:

- employing an IEC to audit and verify the overall environmental performance of the Project and to assess the effectiveness of the ET in their duties;
- employing an ET to implement the EM&A Programme;
- broad supervision of the EM&A Programme, the ET and the timely delivery and quality of the outputs;
- ensuring the EM&A Programme is fully implemented in accordance with the Environmental Permit (EP) and this EM&A Manual;
- liaison with the Contractor on environmental issues;
- providing appropriate information for the monthly EM&A report such as construction activities, design changes, public consultations and liaison meetings involving the District Councils, area committees, interest groups, etc.;
- meeting the agreed objectives and deadlines as set out in this EM&A Manual;
- monitoring the Contractor's compliance with contract specifications and environmental requirements including the effective implementation and operation of the environmental mitigation measures;
- instructing the Contractor to follow the agreed protocols or those in the Contract Specifications in the event of exceedances or complaints; and
- take prompt action in accordance with the Event Contingency Plan in the event of any exceedance.

1.4.2 The Independent Environmental Checker (IEC)

The Project Proponent shall employ an IEC before the commencement of the construction of the Project. The IEC shall have at least 7 years experience in EM&A or environmental management.

The duties of IEC shall comprise the following :

- review and audit all aspects of the EM&A programme;
- validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring locations, monitoring procedures and locations of sensitive receivers;
- carry out random sample check and audit on monitoring data and sampling procedures, etc.;
- audit EIA recommendations and requirements against the status of implementation of environmental protection measures on site;

- review the effectiveness of environmental mitigation measures and project environmental performance;
- on a need basis, audit the Contractor's construction methodology and agree the least impact alternative in consultation with the ET leader and the Contractor;
- check complaint cases and the effectiveness of corrective measures;
- review EM&A report submitted by the ET Leader; and
- feedback audit results to ET and Project Proponent by signing off relevant EM&A proformas.

1.4.3 The Contractor

The Contractor shall:

- work within the scope of the Contract Specifications and other tender conditions;
- comply with and observe Ordinances, by-laws, regulations and rules in force in Hong Kong relevant to the control of pollution;
- minimise the environmental impacts arising from the construction activities;
- cooperate with the environmental performance review undertaken by the ET and Project Proponent and take appropriate corrective actions as instructed by the Project Proponent;
- implement the mitigation measures recommended;
- submit proposals on mitigation measures in case of exceedances of Action and Limit Levels in accordance with the Event and Action Plans;
- implement the mitigation measures to reduce impact where Action and Limit Levels are exceeded; and
- adhere to the procedures for carrying out complaint investigation in accordance with Section 3.3 of this report.

1.4.4 The Environmental Team (ET)

The duties of the ET are:

- to monitor the various water quality parameters as required by this EM&A Manual;
- to review and comment on the Contractor's construction programme and working methodologies with respect to water pollution control and environmental mitigation, to identify environmental issues that may require mitigation before any problem arises, and to check that the construction work complies with the conditions stated in the environmental permit;

- to carry out water quality monitoring to audit the site environmental conditions and to prepare EM&A reports;
- to report the environmental monitoring and audit results to the Project Proponent and Contractor;
- to recommend suitable mitigation measures to the Project Proponent and the Contractor in the case of exceedance of Action and Limit Levels in accordance with the Event and Action Plans;
- to undertake regular site inspections and to report to the Project Proponent and the Contractor of any potential non-compliances;
- to adhere to the procedures for carrying out complaint investigation in accordance with Section 3.3 of this Manual;
- timely submission of the EM&A report to the Project Proponent and the Director of EPD; and
- to notify EPD of any exceedances of the Limit Level of water quality parameters. A template for the notification is provided in Appendix 2.

The ET shall be led by an ET Leader who shall have relevant education, training, knowledge, experience and professional qualifications and at least 7 years experience in EM&A and environmental management, subject to the approval of the Project Proponent and the Director of Environmental Protection.

1.5 Project Description

The existing floating dock, Yiu Lian No. 3 Floating Dock, is located at Yam O Wan northeast of Lantau and has been in operation since July 1989. In accordance with the Government's rezoning plan for northeast Lantau, Yiu Lian has proposed to relocate the Dock from the existing site at Yam O Wan to the southwest coast of Tsing Yi. Figure 1-2 shows the existing location and the proposed new location.

The existing dock is an individual caisson dock with continuous caisson and side wings, suitable for docking vessels of a total docking weight of up to 43,000 metric tons, or catering a ship in size up to 43 meters in width and 300 meters in length. Principle dimensions of the Dock are:

| | |
|---------------------------------|----------|
| Length over all | 304.00 m |
| Length over pontoon | 287.00 m |
| Breadth over pontoon | 54.80 m |
| Breadth of sidewall | 3.90 m |
| Depth of pontoon at centre line | 5.00 m |
| Depth of pontoon at side | 4.90 m |
| Height of top deck at side | 18.20 m |

| | |
|-------------------------------|---------|
| Height of safety deck at side | 13.90 m |
| Maximum submerged draught | 16.20 m |

1.6 Water Sensitive Receivers (SRs)

Water sensitive receivers of gazetted and non-gazetted bathing beaches, secondary contact recreation areas, water intakes, fish culture zones, marine conservation areas, the North Western Water Control Zone (WZC) and the Western Buffer WCZ have been identified in the EIA study.

Figure 1-3 shows the coverage of the North Western WCZ and the Western Buffer WCZ.

Figure 1-4 shows locations of the beaches subject to the potential impact of this Project. Most of the beaches are located along the southern coasts of New Territories and at Ma Wan. The beaches closest to the existing or the proposed site are the gazetted Ma Wan Tung Wan Beach and the beaches along the southern coasts of New Territories. They are located over 2000m away from either of the dock sites.

There are 4 marine parks and 26 fish culture zones in Hong Kong. Only one fish culture zone (Ma Wan fish culture zone with an approximate size of 10001 to 20000 m²) and no marine parks are located in the northern Lantau and Tsing Yi area, as shown in Figure 1-5. The distance from either the existing or proposed site to Ma Wan fish culture zone is over 2000m.

1.7 Proposed Work Programme

The construction works for the relocation of the Dock will take approximately 65 days. A tentative work programme is shown in Appendix 3.

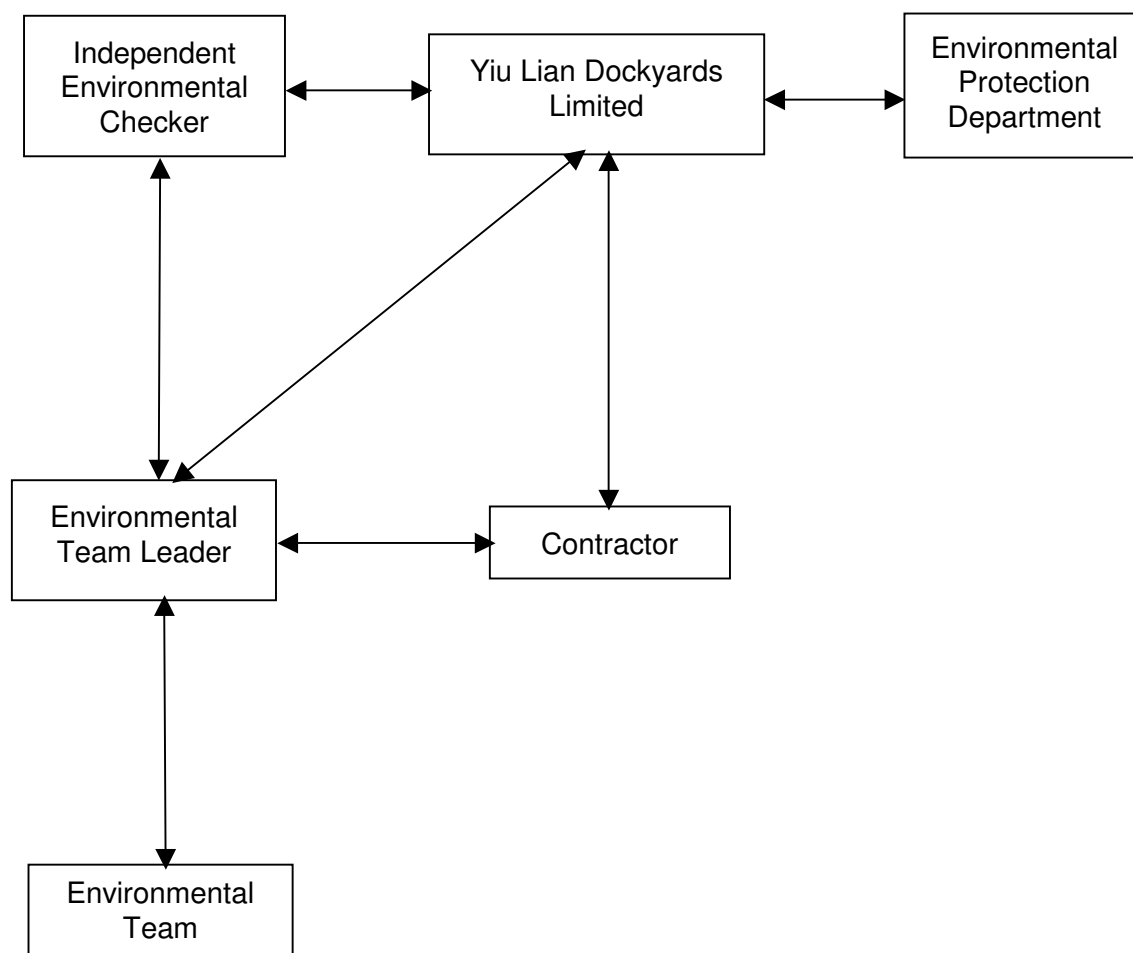
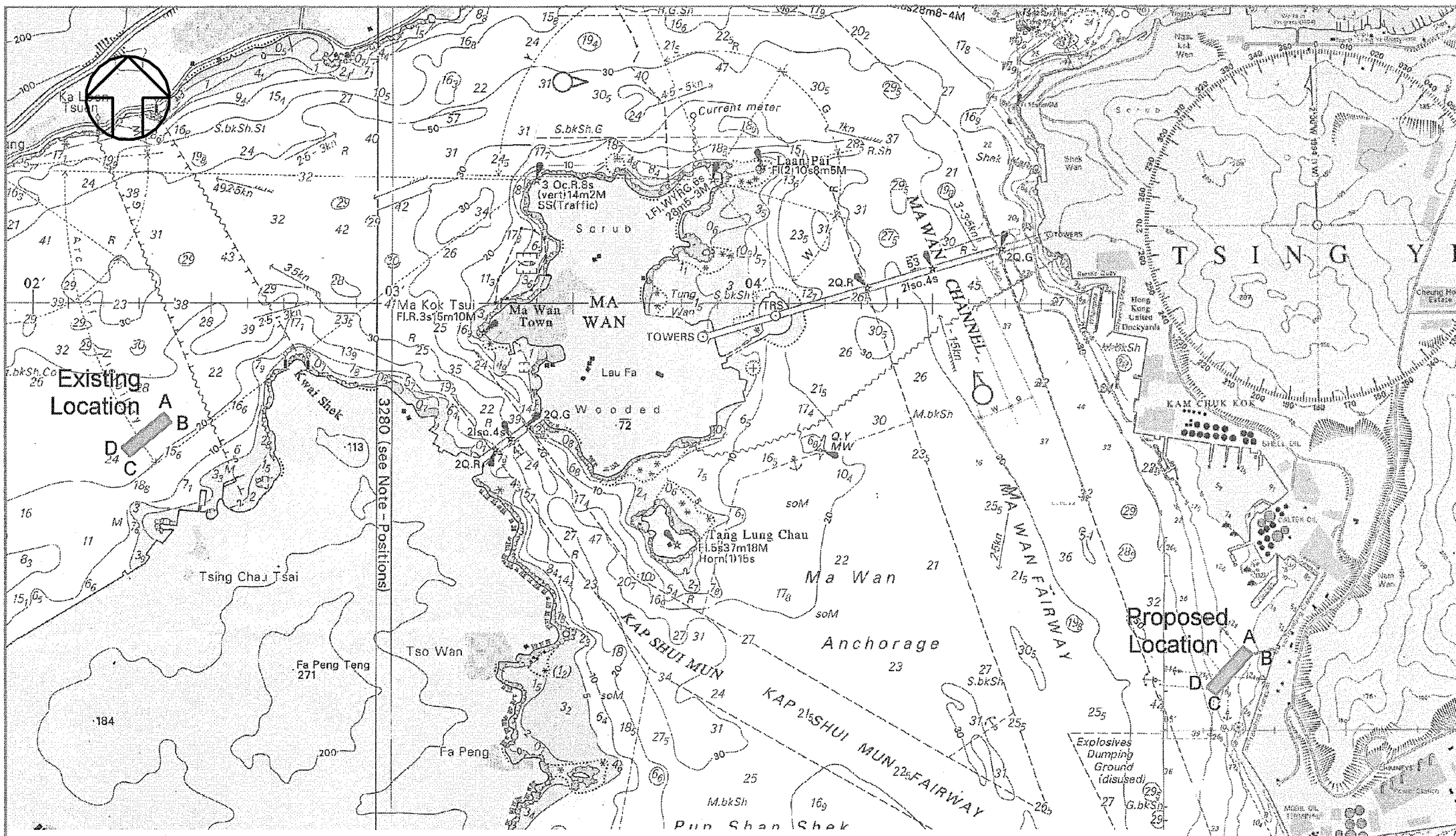

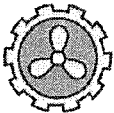


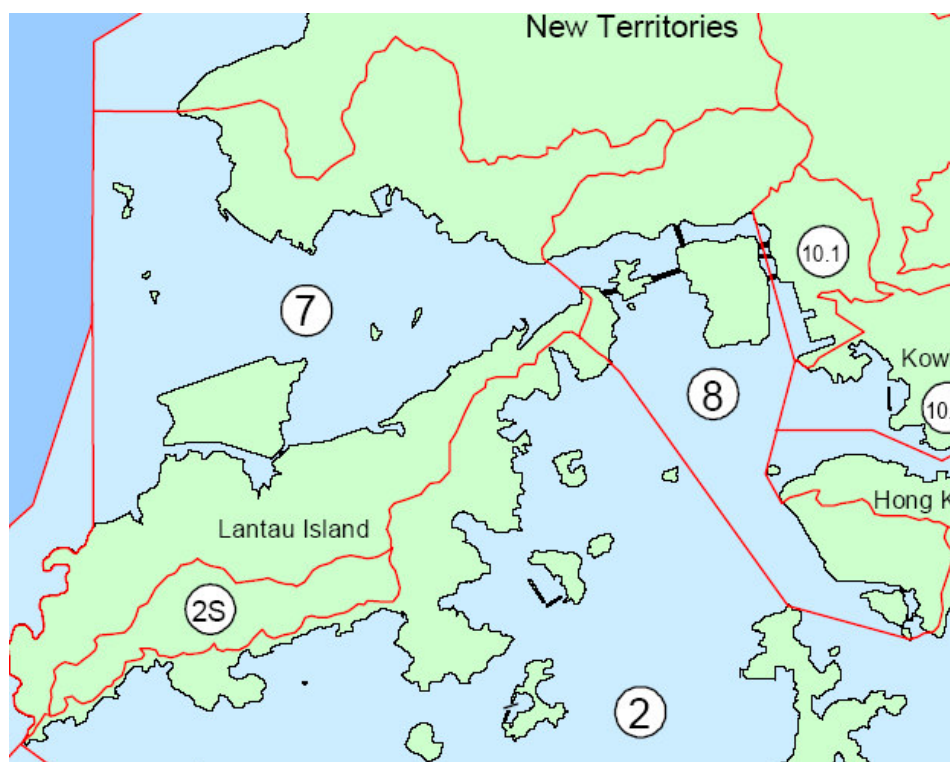
Figure 1-1 Project Organisation and Lines of Communication



| | | |
|--|---|---|
| CONSULTANT | CLIENT | DRAWING TITLE |
|  Hyder Consulting |  友聯船廠有限公司 Yiu Lian Dockyards Limited | <p>Relocation of Yiu Lian Floating Dock No. 3</p> <p>The Location of the Existing Floating Dock and Proposed New Site</p> |

| | | | |
|----------|------------|---|---------|
| DESIGNED | S. OR | CHECKED | G.Y. LI |
| DRAWN | T. KWAN | CHECKED | S. OR |
| APPROVED | G.Y. LI | © Copyright Reserved All dimensions are in mm unless shown otherwise. No measurement should be taken from drawing directly. | |
| DATE | 12-10-2005 | | |
| SCALE | 1 : 25000 | | |
| DRG NO. | | | |

Figure 1-2

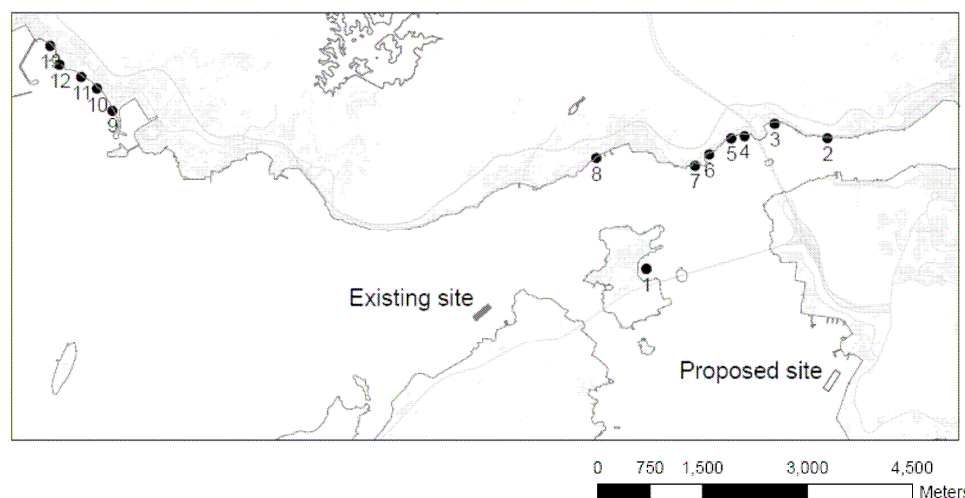


Source: EPD marine water quality in Hong Kong 2004

(7) – North Western WCZ

(8) – Western Buffer WCZ

Figure 1-3 Locations of Relevant Water Control Zones



Legend

- | | |
|---------------------------|--------------------------|
| 1 – Ma Wan Tung Wan Beach | 8 – Anglers' Beach |
| 2 – Approach Beach | 9 – Golden Beach |
| 3 – Ting Kau Beach | 10 – Cafeteria Old Beach |
| 4 – Lido Beach | 11 – Cafeteria New Beach |
| 5 – Casam Beach | 12 – Kadoorie Beach |
| 6 – Hoi Mei Wan Beach | 13 – Castle Peak Beach |
| 7 – Gemini Beach | |

Figure 1-4 Locations of Adjacent Beaches

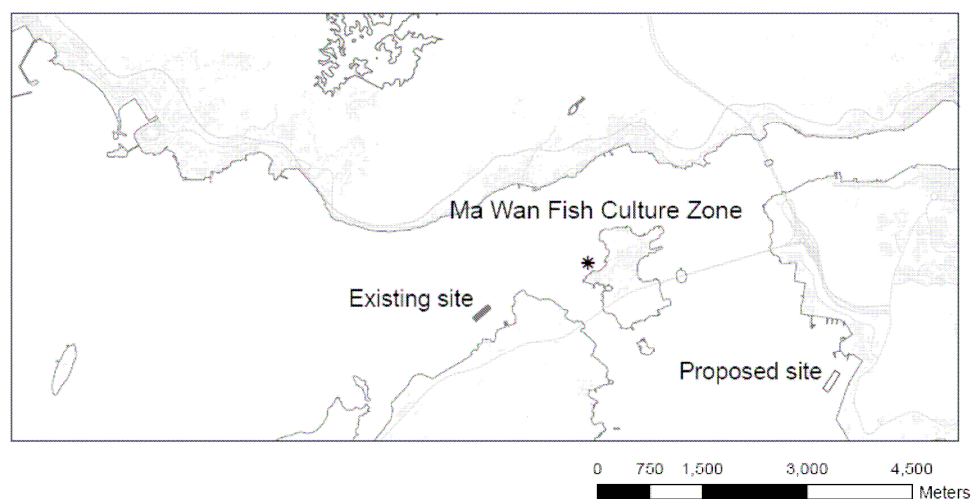


Figure 1-5 Locations of Adjacent Fish Culture Zones

2 Water Quality Monitoring

2.1 Construction Phase Monitoring

The key water quality impact during the construction phase is the potential elevation of suspended solids (SS) level in the marine water close to the works sites due to the dredging work of the Project. According to the EIA study, regular monitoring of the SS level near the works sites is recommended during both the decommissioning and reinstatement of the dock to ensure the compliance with the water quality standards.

2.1.1 Water Quality Parameters

Monitoring of turbidity, dissolved oxygen (DO) and suspended solids (SS) shall be carried out at both the existing site and the proposed new site. DO and turbidity are measured in-situ while SS is determined in laboratory.

In association with the water quality parameters, some relevant data shall also be measured, such as monitoring location/position, time, water depth, water temperature, salinity, DO saturation, weather conditions, sea conditions, tidal stage, and any special phenomena and work underway at the construction site etc.

A sample monitoring record sheet is shown in Figure 2-8 for reference.

2.1.2 Sampling Procedures and Monitoring Equipment

In-situ measurements and water sampling shall be conducted in duplicate at three water depths, namely, 1m below water surface, mid-depth and 1m above seabed. If the water depth is less than 6m, the mid-depth may be omitted. Should the water depth be less than 3m, only the mid-depth will be monitored. Water samples for all monitoring parameters shall be collected, stored, preserved and analysed according to the Standard Methods, APHA 17 and/or agreed by IEC and EPD.

Dissolved Oxygen and Temperature Measuring Equipment

- (i) The instrument should be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and use a DC power source. It should be capable of measuring:-
 - a dissolved oxygen level in the range of 0-20 mg/l and 0-200% saturation
 - a temperature of 0-45 degree Celsius
- (ii) It should have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare

electrodes and cables should be available for replacement where necessary. (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

- (iii) Should salinity compensation not be build-in in the DO equipment, in-situ salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

Turbidity Measurement Instrument

The instrument should be a portable, weatherproof turbidity-measuring instrument complete with comprehensive operation manual. The equipment should use a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU and be complete with a cable (e.g. Hach model 2100P or an approved similar instrument).

Suspended Solids

A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres, and can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).

Water samples for suspended solids measurement should be collected in high density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to a HOKLAS laboratory as soon as possible after collection for analysis.

Water Depth Detector

A portable, battery-operated echo sounder shall be used for the determination of water depth at each designated monitoring station. This unit can either be handheld or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

Salinity

A portable salinometer capable of measuring salinity in the range of 0-40 ppt shall be provided for measuring salinity of the water at each of monitoring location.

Locating the Monitoring Site

A hand-held or boat-fixed type digital Global Positioning System (GPS) with way point bearing indication or other equivalent instrument of similar

accuracy shall be provided and used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

Calibration and Accuracy of Instrument

All in-situ monitoring instrument shall be checked, calibrated and certified by a laboratory accredited under HOKLAS or equivalent before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.

For the on site calibration of field equipment by the ET, the BS 127:1993, "Guide to Field and on-site test methods for the analysis of waters" should be observed.

Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration, etc.

2.1.3 Laboratory Measurement / Analysis

Analysis of suspended solids shall be carried out in a HOKLAS accredited laboratory. Water samples of about 1L shall be collected at the monitoring stations for carrying out the laboratory SS determination. The detection limit shall be 1mg/l or better. The SS determination work shall start within 24 hours after collection of the water samples. The SS determination shall follow APHA 17ed 2540D or equivalent methods subject to the approval of IEC and EPD.

If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment, analytical procedures, and quality control shall be approved by the IEC and EPD. All the analysis shall be witnessed by the IEC. The ET shall provide the IEC with one copy of the relevant chapters of the "Standard Methods for the Examination of Water and Wastewater" updated edition and any other relevant document for his reference.

2.1.4 Monitoring Locations

Monitoring will be carried out at the following locations for both existing site and proposed site:

Impact Monitoring Stations

There are three impact monitoring stations at the existing site. Their locations are shown in Figure 2-6.

There are three impact monitoring stations at the proposed site. Their locations are shown in Figure 2-7.

Control Stations

Control stations are located in areas unaffected by the dock decommissioning or reinstatement works. Control stations are necessary for comparing the water quality at potentially impacted sites with the ambient water quality. Control stations will therefore be used to determine the level for non-compliance. Figures 2-6 and 2-7 show the locations of four control stations, C1, C2, C3 and C4 which will be used during the course of the impact monitoring for the existing site and proposed site.

The water quality monitoring stations are listed in Table 2-1.

| Monitoring Station | Easting | Northing |
|-----------------------------------|---------|----------|
| Impact Monitoring Station 1 (WM1) | 821398 | 822239 |
| Impact Monitoring Station 2 (WM2) | 821811 | 823115 |
| Impact Monitoring Station 3 (WM3) | 822709 | 823376 |
| Impact Monitoring Station 4 (WM4) | 826848 | 821228 |
| Impact Monitoring Station 5 (WM5) | 827251 | 822114 |
| Impact Monitoring Station 6 (WM6) | 826916 | 821780 |
| Control Station 1 (C1) | 820448 | 822920 |
| Control Station 2 (C2) | 823553 | 824017 |
| Control Station 3 (C3) | 826995 | 822555 |
| Control Station 4 (C4) | 827246 | 820419 |

Table 2-1 Water Quality Monitoring Stations

If there is any change in the status and locations of water quality sensitive receivers and the marine activities site after issuing this report, the ET Leader shall propose updated monitoring locations and seek approval from the IEC and EPD.

2.1.5 Baseline Monitoring Programme

The aim of baseline monitoring is to determine the typical baseline water quality conditions without any works of this Project being undertaken, and to establish the suitability of the selected control and impact monitoring stations.

2.1.6 Baseline Monitoring at Control and Impact Stations

The baseline condition shall be established by measuring the water quality parameters specified in Section 2.1.1. The measurements shall be taken at all specified impact monitoring stations and control stations, 3 days per

week, at mid-flood and mid-ebb tides, for three weeks prior to the commencement of dredging work.

Prior to any sampling it should be ensured that there are no marine construction activities in the vicinity of the stations.

In exceptional cases when insufficient baseline monitoring data or questionable result are obtained, the ET Leader shall seek approval from the IEC and EPD on appropriate data to be used as the baseline reference.

Baseline monitoring schedule shall be provided to the Project Proponent, IEC and EPD 1 week before the commencement of baseline monitoring. The interval between 2 sets of monitoring shall not be less than 36 hours. Following the baseline monitoring a baseline monitoring report should be produced and approved by EPD prior to the commencement of the construction works. The baseline monitoring report should be certified by the ET Leader and verified by the IEC before submitting to EPD.

2.1.7 Impact Monitoring

During the course of the dredging activity at either the existing site or the propose site of the floating dock, monitoring shall be undertaken three days per week, at mid-flood and mid-ebb tides, with sampling/measurement at all monitoring stations during both mid flood tide and mid ebb tide. The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and/or Limit Levels, in which case the monitoring frequency will be increased.

Tentative water quality monitoring schedule should be provided to the IEC and EPD on or before the first day of the monitoring month. The IEC and EPD should be notified immediately of any changes in the tentative schedule.

2.1.8 Post-Construction Monitoring

Upon completion of dredging activities, a post-construction monitoring exercise on water quality shall be carried out for three weeks for both the existing site and proposed site in the same manner as for the impact monitoring.

2.2 Operational Phase Monitoring

The key water quality impact during the operational phase is the industrial effluents generated by hull washing during the normal dock operation. Monitor the industrial effluent quality for the first 6 months of the operation of the relocated dock in Tsing Yi is recommended in the EIA study. Thus, the ET shall carry out the operational phase monitoring in accordance with the requirements as described in the following subsections.

2.2.1 Monitoring Parameters

Monitoring parameters shall be those determinants for the industrial effluent arising from the operation of the dock as stated in the effluent discharge license issued by EPD.

2.2.2 Sampling Location and Frequency

The ET shall collect one effluent sample from different wastewater streams on a monthly basis at the sampling point(s) as specified in the effluent discharge licence for testing.

2.2.3 Laboratory Measurement / Analysis

Analysis shall be carried out in a HOKLAS accredited laboratory. Sample with sufficient sample size as advised by the laboratory shall be collected for analysing all parameters required in Section 2.2.1. The detection limit and analytical procedure and method shall be provided to the IEC and EPD for their approval prior to the operational monitoring work.

If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment, analytical procedures, and quality control shall be approved by the IEC and EPD. All the analysis shall be witnessed by the IEC. The ET shall provide the IEC with one copy of the relevant chapters of the "Standard Methods for the Examination of Water and Wastewater" updated edition and any other relevant document for his reference.

2.2.4 Sample Handling

Water samples for all monitoring parameters shall be collected, stored, preserved and analysed according to the Standard Methods, APHA 17 and/or agreed by the IEC and EPD.

2.3 Event and Action Plan for Water Quality Monitoring

The water quality criteria, namely Action and Limit Levels for the construction phase monitoring are shown in Table 2-2. For the operational phase monitoring, there will be no Action Level. The Limit Levels will be the limits of the determinants as stipulated in the effluent discharge licence.

Should the monitoring results of the water quality parameters at any designated impact monitoring stations during the construction phase and at any sampling points during operational phase indicate that the water quality criteria exceed the Action or Limit Levels, the actions in accordance with the Event and Action Plan in Table 2-3 shall be carried out.

| Parameters | Action Level | Limit Level |
|--|--|--|
| DO ¹ in mg/l (Surface Middle & Bottom) | <u>Surface & Middle</u> 5%-ile of baseline data for surface and middle layer <u>Bottom</u> 5%-ile of baseline data for bottom layer | <u>Surface & Middle</u> 1%-ile of baseline data for surface and middle layer <u>Bottom</u> 1%-ile of baseline data for bottom layer |
| Suspended Solids (SS) (depth-averaged) ² | 95%-ile of baseline data | 99%-ile of baseline data |
| Turbidity in NTU (depth-averaged) | 95%-ile of baseline data | 99%-ile of baseline data |

1 For DO, non-compliance of the water quality limits occurs when monitoring results are lower than the limits.

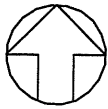
2 "depth-averaged" is calculated by taking the arithmetic means of reading of all three depths. Non-compliance of the water quality criteria occurs when monitoring results are higher than the limits.

Table 2-2 Action Levels for Water Quality

| Action / Limit Level | ET Leader | IEC | Project Proponent | Contractor |
|--|---|--|--|---|
| Action Level being exceeded by one sampling day | <ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; and 6. Repeat measurement on next day of exceedance. | <ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the Project Proponent accordingly; and 3. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigations measures; and 2. Make agreement on the mitigation measures to be implemented. | <ol style="list-style-type: none"> 1. Inform the Project Proponent and confirm notification of the non-compliance in writing; 2. Rectify any 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 Project Proponent; and 6. Implement the agreed mitigation measures. |
| Action Level being exceeded by more than one consecutive sampling days | <ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; and 8. Repeat measurement on next day of exceedance. | <ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the Project Proponent accordingly; and 3. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigations measures; and 2. Make agreement on the mitigation measures to be implemented. | <ol style="list-style-type: none"> 1. Inform the Project Proponent and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of the working methods; 5. Discuss with ET and IEC and propose mitigation measures to Project Proponent within 3 working days; and 6. Implement the agreed mitigation measures. |

| Action / Limit Level | ET Leader (ET) | IEC | Project Proponent | Contractor |
|---|--|--|---|--|
| Limit Level being exceeded by one sampling day | <ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Project Proponent and Contractor; 6. Ensure mitigation measures are implemented; and 7. Increase the monitoring frequency to daily until no exceedance of Limit Level. | <ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the Project Proponent accordingly; and 3. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; and 4. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Inform the Project Proponent 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, IEC and Project Proponent and propose mitigation measures to IEC and Project Proponent within 3 working days; and 6. Implement the agreed mitigation measures. |
| Limit Level being exceeded by more than one consecutive sampling days | <ol style="list-style-type: none"> 1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Project Proponent 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. | <ol style="list-style-type: none"> 1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise Project Proponent accordingly; 3. Assess the effectiveness of the implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. 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 dredging work/vessel maintenance work until no exceedance of Limit Level. | <ol style="list-style-type: none"> 1. Inform the Project Proponent and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of the working methods; 5. Discuss with IEC, ET and Project Proponent and propose mitigation measures to IEC and Project Proponent within 3 working days; 6. Implement the agreed mitigation measures; and 7. As directed by Project Proponent, to slow down or to stop all or part of the dredging work/vessel maintenance work. |

Table 2-3 Event and Action Plan for Water Quality

**LEGEND:**

● Water Quality Monitoring Station

⊕ Control Station

Water Quality Monitoring Station
at the Existing Site

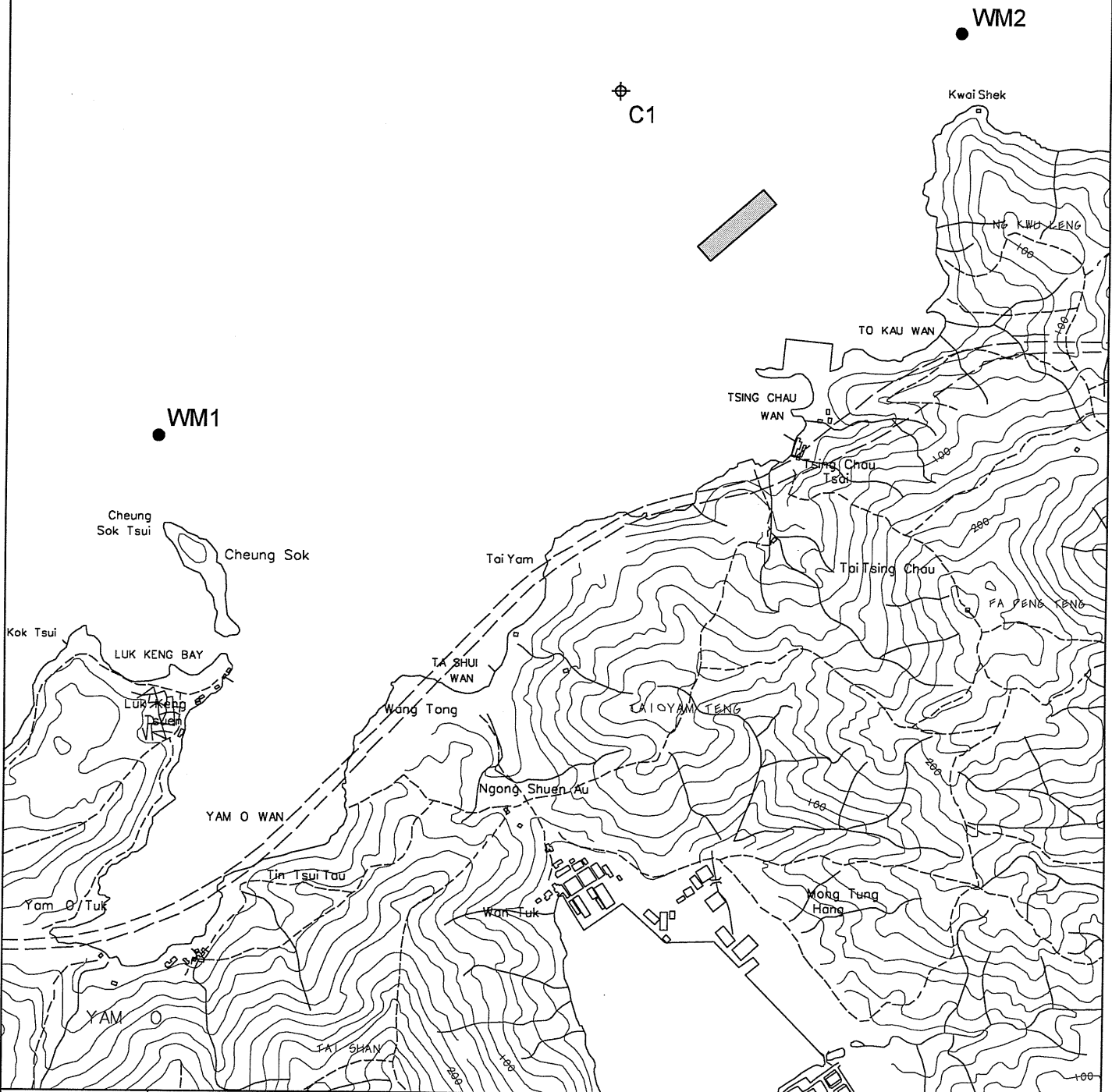
| | Easting | Northing |
|-----|---------|----------|
| WM1 | 820326E | 822166N |
| WM2 | 822709E | 823376N |
| C1 | 821692E | 823197N |

FILENAME: K:\EA01167 Yiu Lian Dockyard\ES-EA01167\Cad\Issue\2006-09-25\Fig 2-6.dgn

14-10-46

2006-9-25

PRINTED BY: Ikhkk063



CONSULTANT



CLIENT

友聯船廠有限公司
Yiu Lian Dockyards Limited

DRAWING TITLE

Location of Yiu Lian Floating Dock No. 3

Water Quality Monitoring Stations
at the Existing Site

| | |
|----------|------------|
| DESIGNED | S. OR |
| DRAWN | T. KWAN |
| APPROVED | G.Y. LI |
| DATE | 25-09-2006 |
| SCALE | 1 : 17500 |
| DRG. NO. | |

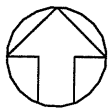
| | |
|---------|---------|
| CHECKED | G.Y. LI |
| CHECKED | S. OR |

© Copyright Reserved
All dimensions are in mm
unless shown otherwise.
No measurement should be
taken from drawing directly.

Figure 2-6

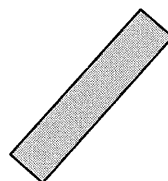
REV.

-



C2

WM3



WM4

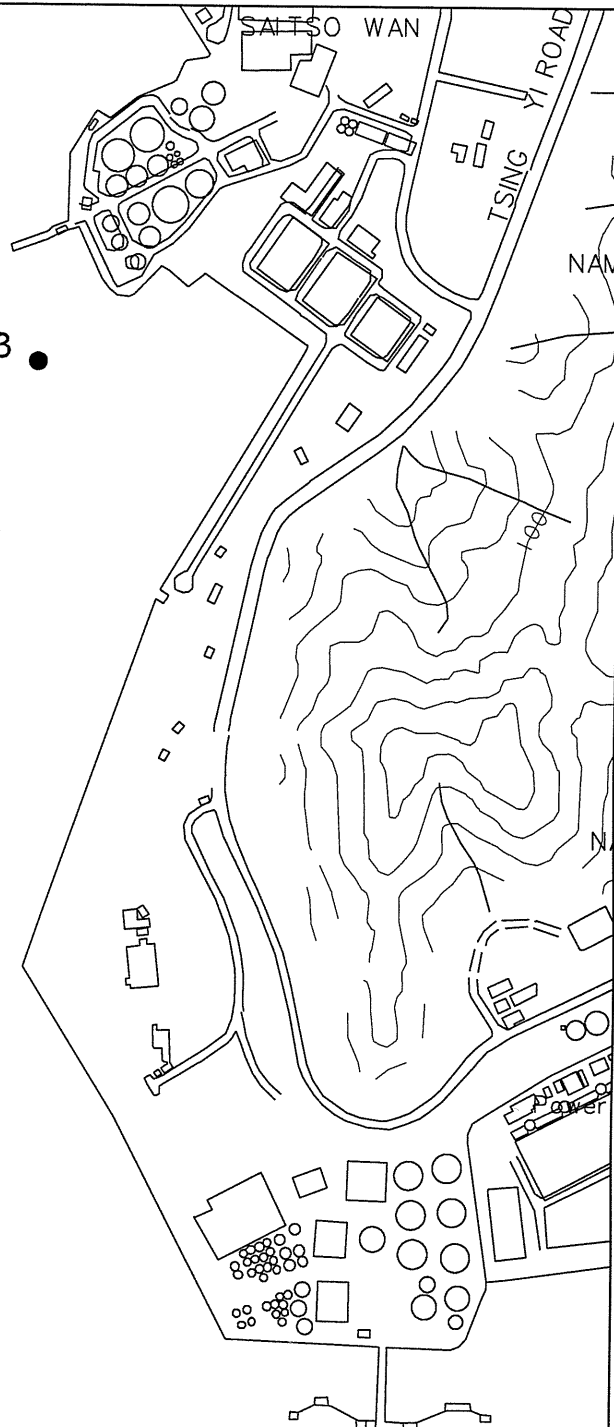
LEGEND:

● Water Quality Monitoring Station

⊕ Control Station

Water Quality Monitoring Station
at the Proposed Site

| | Easting | Northing |
|-----|---------|----------|
| WM3 | 827251E | 822114N |
| WM4 | 826962E | 821017N |
| C2 | 826312E | 822294N |



FILENAME: K:\EA01167 Yiu Lian Dockyard\ES-EA01167\Cad\Issue\2006-09-25\Fig 2-7.dgn

14-12-29

2006-9-25

PRINTED BY: Ikhkk063

CONSULTANT



CLIENT

友聯船廠有限公司
Yiu Lian Dockyards Limited

DRAWING TITLE

Location of Yiu Lian Floating Dock No. 3

Water Quality Monitoring Stations
at the Proposed Site

| | | | |
|----------|------------|---|---------|
| DESIGNED | S. OR | CHECKED | G.Y. LI |
| DRAWN | T. KWAN | CHECKED | S. OR |
| APPROVED | G.Y. LI | © Copyright Reserved All dimensions are in mm unless shown otherwise. No measurement should be taken from drawing directly. | |
| DATE | 25-09-2006 | | |
| SCALE | 1 : 10000 | | |
| DRG. NO. | Figure 2-7 | | REV. |
| | | | - |

| | | | | |
|----------------------------------|---------------------|---------|--------|--------|
| Location | | | | |
| Date | | | | |
| Start Time (hh:mm) | | | | |
| Weather | | | | |
| Sea Conditions | | | | |
| Tidal Mode | | | | |
| Water Depth(m) | | | | |
| Monitoring Depth | | Surface | Middle | Bottom |
| Salinity | | | | |
| Temperature (°C) | | | | |
| DO Saturation (%) | | | | |
| DO (mg/l) | | | | |
| Turbidity (NTU) | | | | |
| Copper (µg/l) | | | | |
| Tributyltin (µg/l) | | | | |
| SS Sample Identification | | | | |
| Observed Construction Activities | <100m from location | | | |
| | >100m from location | | | |
| Other Observations | | | | |

Name & Designation

Signature

Date

Recorded By :

Checked By :

Note: The SS results are to be filled up once they are available from the laboratory.

Figure 2-8 Water Quality Monitoring Data Record Sheet

3 Site Environmental Audit

3.1 Site Inspection/Audit

Site inspections/audits shall be undertaken by the ET during the water quality monitoring/sampling work to ensure that the construction activities shall not cause any adverse impact to the water quality. The construction activities shall be inspected during the water quality monitoring and visual inspection shall be carried out to observe any adverse impact on the water quality, such as any visible suspended solids, change of water colour or noticeable smell, etc. The Contractor and the Project Proponent shall also inspect the construction activities on a weekly basis. Site inspections/audits should also ensure that the construction activities comply with the conditions specified in the environmental permit.

3.2 Compliance with Legal and Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong with which the construction activities shall comply.

In order that the works are in compliance with the contractual requirements, all the works method statements submitted by the Contractor to the Project Proponent for approval shall be sent to the ET Leader for vetting to ensure whether sufficient environmental protection and pollution control measures have been included.

The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated and that any foreseeable potential for violating the laws can be prevented.

The Contractor shall regularly copy relevant documents to the ET Leader so that the checking work can be carried out. The documents shall at a minimum include the updated Work Progress Reports, the updated Works Programme, the application letters for different licence/permit under the environmental protection laws, and all valid licence/permit. The site diary shall also be available for the ET Leader's inspection upon his request.

After reviewing the document, the ET Leader shall advise the IEC, the Project Proponent and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works may not cope with the works programme or may result in potential violation of environmental protection and pollution control requirements, he shall also advise the Contractor and the Project Proponent accordingly.

Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The Project Proponent shall follow up to ensure that appropriate action has been taken by the Contractor in order that the environmental protection and pollution control requirements are fulfilled.

3.3 Environmental Complaints

Complaints shall be referred to the ET Leader for carrying out complaint investigation procedures. The ET Leader shall undertake the following procedures upon receipt of the complaint.

- (a) log complaint and date of receipt onto the complaint database;
- (b) investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- (c) if a complaint is valid and due to the works, identify necessary mitigation measures;
- (d) if mitigation measures are required, advise the Contractor accordingly;
- (e) review the Contractor's response on the identified mitigation measures, and the updated situation;
- (f) if the complaint is transferred from EPD, submit interim reports to EPD on status of the complaint investigation and follow-up actions within the time frame assigned by EPD;
- (g) undertake additional monitoring and audit to verify the situation if necessary;
- (h) report the investigation results and the subsequent actions to the source of complaint for responding to complaint (If the source of complaint is EPD, the results should be reported within the time frame assigned by EPD); and
- (i) record the complaint investigation work.

The Contractor and Project Proponent shall cooperate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation. The Project Proponent shall ensure that measures have been carried out by the Contractor.

A flow chart of the complaint response procedure is shown in Figure 3-9.

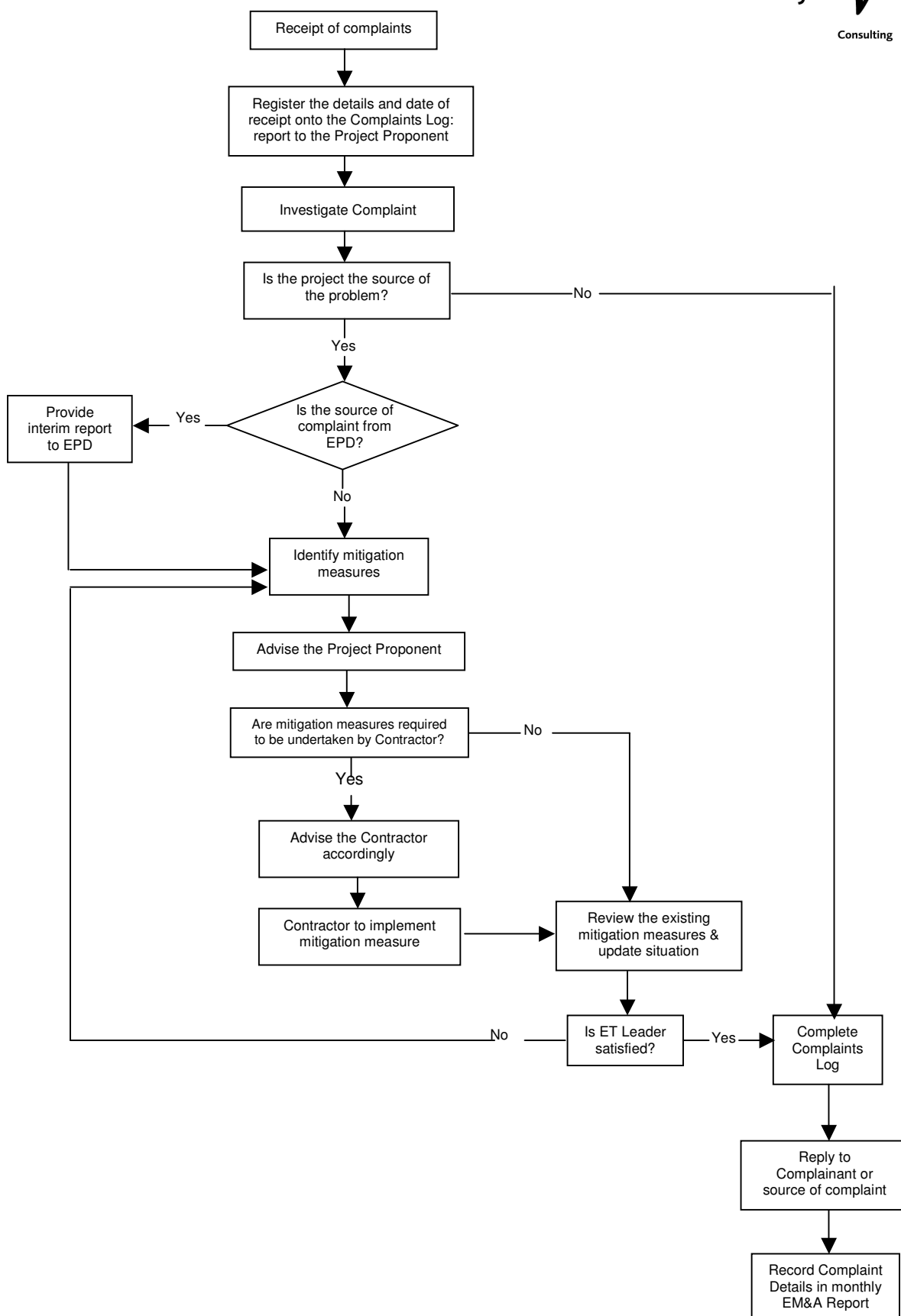


Figure 3-9 Complaint Response Procedure

4 Reporting

4.1 General

The following reporting requirements are based upon a paper documented approach. However, the same information can be provided in an electronic medium upon agreeing the format with the Project Proponent and EPD. This would enable a transition from a paper/historic and reactive approach to an electronic/real time proactive approach.

The Baseline Monitoring Report and Monthly EM&A Reports should be reviewed by Project Proponent & IEC and submit to EPD.

4.2 Baseline Monitoring Report

The ET Leader shall prepare and submit a Baseline Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Monitoring Report shall be submitted to the Contractor, the Project Proponent and EPD. The report should be supported by the baseline water quality monitoring data in electronic format, together with details of the monitoring locations, equipment and monitoring protocols. The Baseline Monitoring Report shall include at least the following:

- executive summary;
- project background information;
- drawings showing the locations of the baseline monitoring stations;
- an updated construction programme with milestones of environmental mitigation activities;
- monitoring methodology, equipment used and calibration details, parameters monitored, locations, dates and times, etc.;
- monitoring results (in both hard and diskette copies) including graphical plots;
- interpretation of the significance of monitoring results and details of influencing factors;
- determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data;
- revisions for inclusion in the EM&A Manual; and
- comments and conclusions.

4.3 Monthly EM&A Reports

The results and findings of all EM&A work required in this report for both construction and operational phases shall be recorded in the monthly

EM&A reports prepared by the ET Leader. Monthly EM&A Reports shall be prepared and submitted to the EPD within 10 working days from the end of each calendar month, the first report will be submitted in the month immediately after construction works commence. The ET Leader shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium requirement.

The monthly EM&A report shall include at least the following:

- (i) 1-2 pages executive summary, comprising:
 - breaches of Action or Limit levels
 - complaint log
 - notifications of summons and successful prosecutions
 - future key issues
- (ii) basic project information including a synopsis of the project organisation, programme and management structure, and the work undertaken during the month;
- (iii) a brief summary of EM&A requirements including:
 - all monitoring parameters
 - environmental quality performance limits (Action and Limit Levels)
 - Event-Action Plans
 - environmental mitigation measures
 - environmental requirements in contract documents
- (iv) advice on the implementation status of environmental protection and pollution control/mitigation measures, summarised in the updated Implementation Schedule of Mitigation Measures;
- (v) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring stations;
- (vi) monitoring results (in both hard and diskette copies) together with the following information;
 - monitoring methodology;
 - equipment used and calibration details;
 - parameters monitored;
 - monitoring locations;
 - monitoring date, time, frequency, and duration;
- (vii) graphical plots of trends of monitored parameters for all designated monitoring stations annotated against the following:
 - major activities being carried out on site during the period
 - weather conditions during the period

- any other factors which might affect the monitoring results
- (viii) a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels);
- (ix) a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- (x) a description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance;
- (xi) a summary record of all complaints received (written or verbal), including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xii) an account of the future key issues as reviewed from the works programme and work method statements;
- (xiii) monitoring schedule for the next reporting period; and
- (xiv) recommendations to EM&A programme (if any)

4.4 Data Keeping

The site documents such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, the document shall be well kept by the ET Leader and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. The monitoring data shall also be recorded in magnetic media form, and the soft copy shall be available upon request. All the documents and data shall be kept for at least one year after completion of the construction contract.

Appendix 1

Implementation Schedule of Mitigation Measures

| EIA Ref# | Environmental Protection Measures / Mitigation Measures | Location / Timing | Implementation Agent | Implementation Stages* | | | Relevant Legislation and Guidelines |
|----------------------|---|---|----------------------------------|------------------------|---|---|-------------------------------------|
| | | | | Des | C | O | |
| S 3.8.1 – S 3.8.3 | The dredging rate should not exceed the following: At existing site – 61.5 m ³ /hr At proposed site – 81.7 m ³ /hr A silt curtain should be deployed at the existing site during the dredging operation if the removal of the anchor blocks from the existing site is required. | Work site / During the construction period | Project Proponent and Contractor | | √ | | WPCO |
| S 3.8.6 | The fine mesh screen system for the industrial effluent treatment should be cleaned regularly to ensure its full functionality | The Dock/During operation period | Project Proponent | | | √ | WPCO |
| S 3.8.6 | Provision of a treatment system to treat the hull wash water. | The Dock / During operation period | Project Proponent | | | √ | WPCO |
| S 3.8.7 | Ships using TBT-containing paint should not be received during the future operation of the Dock at Tsing Yi. | The Dock / During operation period | Project Proponent | | | √ | WPCO |
| S 3.8.8 | During application of antifouling paint, the following measures should be adopted: <ul style="list-style-type: none">Provision of bunded area for the preparation of antifouling paints to avoid accidental spillage into the sea;Treating spillage with a suitable absorbent and disposal of this as chemical waste; | The Dock / During operation period | Project Proponent | | | √ | WPCO |

| EIA Ref# | Environmental Protection Measures / Mitigation Measures | Location / Timing | Implementation Agent | Implementation Stages* | | | Relevant Legislation and Guidelines |
|----------|--|---|----------------------|------------------------|---|---|-------------------------------------|
| | | | | Des | C | O | |
| | <ul style="list-style-type: none"> Not performing paint spraying in high winds; and Provision of sheeting to prevent spray drift. | | | | | | |
| S 3.8.8 | During removal of antifouling paint, the following measures should be adopted: <ul style="list-style-type: none"> Containing wash water and segregating wash water from non-contaminated water; Avoid washing residues directly into the sea; and Treating the paint scrapings as the chemical waste. | The Dock / During operation period | Project Proponent | | | √ | WPCO |
| S 3.8.8 | During sand blasting: <ul style="list-style-type: none"> Cleaning up blasting residues (abrasive grit and paint flakes) immediately after the blasting activities to avoid these washing into the sea; and Close off wastewater drains on the floating dock whenever there are cleaning and blasting activities. | The Dock / During operation period | Project Proponent | | | √ | WPCO |
| S 4.6.1 | Provide sufficient enclosed skips on the working vessels to prevent waste materials being blown by wind into the sea. | Work vessels / During the construction period | Contractor | | √ | | Waste Disposal Ordinance |
| S 4.6.3 | Good site practices and waste reduction. <ul style="list-style-type: none"> Provision of training for workers for the proper waste | The Dock / During the operation period | Project Proponent | | | √ | Waste Disposal Ordinance (Cap.54) |

| EIA Ref# | Environmental Protection Measures / Mitigation Measures | Location / Timing | Implementation Agent | Implementation Stages* | | | Relevant Legislation and Guidelines |
|---------------------|--|---|----------------------------------|------------------------|---|---|-------------------------------------|
| | | | | Des | C | O | |
| | management and chemical waste handling procedures; <ul style="list-style-type: none"> • Provision of sufficient number of waste disposal points; • Nomination of an experienced and a dedicated staff to be responsible for good site practice and implementation of the waste management procedures; • Undertaking regular cleansing of the Dock to prevent any waste being washed or blown into the sea; • Provision of enclosed skips to prevent odour nuisance; and general refuse being blown into the sea and; • Proper storage and handling procedures for paints, solvent and chemicals to prevent leakage. | | | | | | |
| S 5.6.1 | Provide regular checking and maintenance of the generators to avoid nuisance to the nearby sensitive receivers. | The Dock / During the operation period | Project Proponent | | | √ | Air Pollution Control Ordinance |
| S 6.4.7 to S 6.4.10 | Implement the evacuation plan for the Yiu Lian Floating Dock No. 3 when necessary. | Work site and the Dock / During the construction and operation period | Project Proponent and Contractor | | √ | √ | EIAO-TM |
| S 6.4.11 | Training and drill for implementation of the Evacuation Plan should be arranged annually or when it is necessary. | The Dock / During the | Project Proponent | | | √ | EIAO-TM |

| EIA Ref# | Environmental Protection Measures / Mitigation Measures | Location / Timing | Implementation Agent | Implementation Stages* | | | Relevant Legislation and Guidelines |
|----------|---|---|----------------------------------|------------------------|---|---|-------------------------------------|
| | | | | Des | C | O | |
| | | operation period | | | | | |
| S 6.4.12 | Provide a safety induction course for all workers before construction works. | Work site / During the construction period | Project Proponent and Contractor | | √ | | EIAO-TM |
| S 6.4.13 | Establish a direct communication links between Emergency Command Centre and each working vessels for emergency communications. | Work site / During the construction period | Project Proponent and Contractor | | √ | | EIAO-TM |
| S. 3.10 | <p>Conduct Environmental Monitoring and Audit (EM&A) in accordance with the EM&A Manual</p> <p>Site inspection shall be carried out regularly by the Environmental Team (ET) to inspect construction and operation activities to ensure that the recommended environmental protection and pollution control mitigation measures are properly implemented. Details of the requirements and procedures in conducting site inspections are given in the EM&A Manual.</p> <p>On receipt of any complaints, the ET Leader (in co-operation with other parties) shall promptly undertake investigation work and the necessary actions carried out as based on the results of the investigation. Details of the recommended complaints handling procedures and actions are given in the EM&A Manual.</p> | Work Site/ During construction and operation period | Contractor and ET | | √ | √ | EIAO-TM |
| S 7.9.1 | Before emptying any water from a vessel at the Dock, check should | The Dock / | Project | | | √ | Shipping and Port |

| EIA Ref# | Environmental Protection Measures / Mitigation Measures | Location / Timing | Implementation Agent | Implementation Stages* | | | Relevant Legislation and Guidelines |
|----------|--|------------------------------------|----------------------|------------------------|---|---|---|
| | | | | Des | C | O | |
| | be carried out for any signs of oil contamination using a device capable of detecting the oil-water interface. No draining of the water from the vessel into the sea should be allowed if there is any signs of oil contamination. | During operation period | Proponent | | | | Control Ordinance, WPCO |
| S 7.9.1 | The fore and the aft entrances of the Dock should be fully enclosed with two layer oil booms during the process of lifting up the Dock. The oil booms should be regularly checked for any defects and replaced immediately should there be any significant defects. In any case, the rope of the oil booms should be replaced at least once every two years. | The Dock / During operation period | Project Proponent | | | √ | Shipping and Port Control Ordinance, WPCO |
| S 7.9.2 | Annual drills of the Oil Pollution Contingency Procedure should be carried out. The Procedure should be closely followed in the event of an oil spillage. The Procedure should be regularly reviewed and updated in view of any lessons learned from the drills or oil spillage incidents. | The Dock / During operation period | Project Proponent | | | √ | Shipping and Port Control Ordinance, WPCO |

All recommendations and requirements resulted during the course of EIA/EA Process, including ACE and / or accepted public comment to the proposed project.

* Des - Design, C – Construction and O – Operation

Table 1 Mitigation Measures Implementation Schedule

Appendix 2

Template for Notification of Water Quality Limit Level Exceedance

Incident Report on Limit Level Non-Compliance

| | |
|--|--|
| Project | |
| Date | |
| Time | |
| Monitoring Location | |
| Parameter | |
| Limit Level | |
| Measured Level | |
| Possible reason for Limit Level Non-compliance | |
| Actions taken / to be taken | |
| Remarks | |

Location Plan

Prepared by: _____

Designation: _____

Signature _____

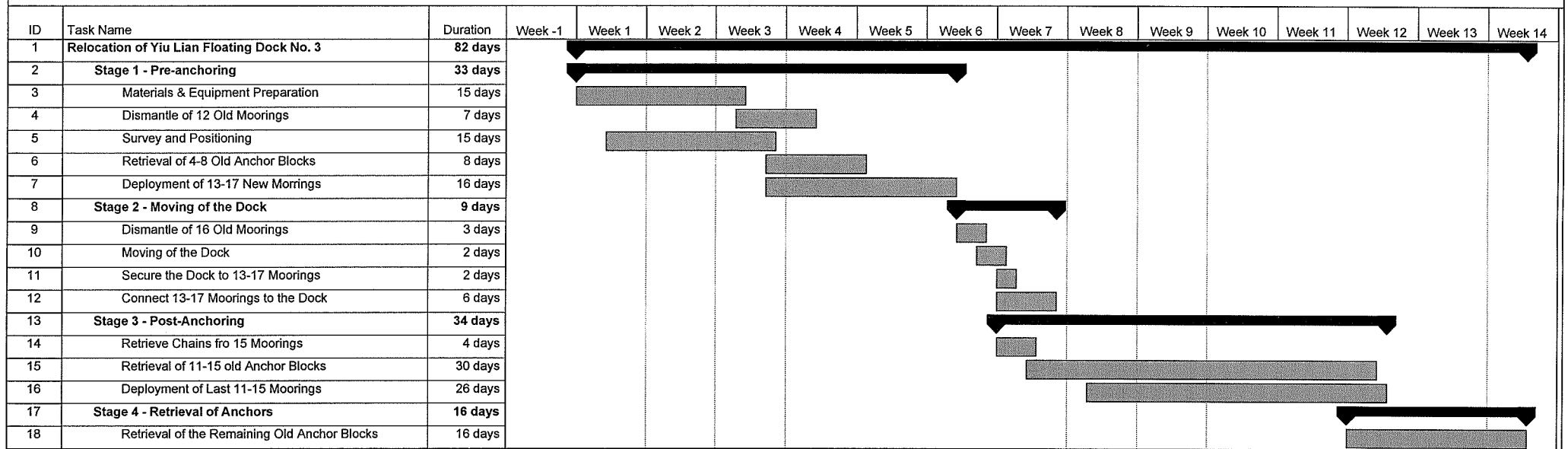
Date: _____



Appendix 3

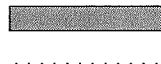
Construction Programme

Appendix 3 - Construction Programme



Project Schedule
Date: June 2006

Task
Split



Progress
Milestone



Summary
Project Summary



External Tasks
External Milestone



Deadline

