

**China Harbour Engineering Company (Group)**


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**Contract No. CV/2002/09**

**Tai O Development  
Sheltered Boat Anchorage**

**Environmental Monitoring and Audit  
Quarterly Report (October 2003 – December 2003)**

**(Version 1.0)**

Certified By   
(Environmental Team Leader)

REMARKS:

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

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**EXECUTIVE SUMMARY**

1. This is the third Environmental Monitoring and Audit (EM&A) Quarterly Summary Report prepared by Cinotech Consultants Limited (the Environmental Team, ET) for the project “Tai O Development – Sheltered Boat Anchorage” (the Project). This summary report presents EM&A works performed in the period between October 2003 and December 2003.
2. The construction activities undertaken in the reporting quarter were:
  - Site investigation at seawall and promenade deck
  - Dredging works at breakwater and loading jetty No. 3
  - Dismantling of steel-structure police guard house
  - Installation of fencing for the preserved mangrove
  - Installation of tidal exchange along seawall
  - Predrilling at seawall
  - Rock filling at seawall
  - Percussive piling;
  - Bored piling and sheet piling works at Seawall;
  - Bored piling works at Promenade Deck; and
  - Site clearance and site investigation at Future Bus Stop.

**Environmental Monitoring Works**

3. Environmental monitoring for the Project was performed regularly as stipulated in the EM&A Manual and the results were checked and reviewed. Site audits were conducted once per week. The implementation of the environmental mitigation measures, Event Action Plans and environmental complaint handling procedures were also checked.
4. Summary of the non-compliance of the reporting period is tabulated Table I.

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

Media / Nature	No of Exceedances		Action Taken	Results of action taken	Remarks
	Action Level	Limit Level			
Noise	0	3	Continual measurement was undertaken.	No further exceedance was recorded for continual measurement.	-
Water Quality					
DO	92	282	N.A.	N.A.	The exceedances were not due to the Project works.
Turbidity	16	83			
SS	6	89			

*Construction Noise*

5. All construction noise monitoring was conducted as scheduled in the reporting period, except that evening-time monitoring on 8 December 2003 was re-scheduled to 9 December 2003 due to mechanical failure of monitoring equipments.
6. As the Contractor has granted the Construction Noise permit on restricted hours including 1900 – 2300 on weekdays and General Holidays including Sundays (CNP no. GW-UW0285-03), noise monitoring works on restricted hour were conducted.

7. Three limit level exceedances were recorded during the reporting period. Two of them were recorded during the evening-time monitoring at Station N1 on 10<sup>th</sup> Nov 2003 and at Stations N1 and N11 on 5<sup>th</sup> Dec 2003. No further exceedance was recorded for the continual measurements on 10<sup>th</sup> Nov 2003 and 9<sup>th</sup> Dec 2003. Another noise limit exceedance was recorded during the monitoring at N11 on 28<sup>th</sup> Dec 03 (Sunday). The exceedance was considered to be invalid.

#### *Water Quality*

8. Water quality monitoring was conducted as scheduled in this reporting period, except that monitoring works at A1 and A2 on 26<sup>th</sup> Nov 2003 during mid-flood tide were cancelled since the two stations were not accessible during the monitoring exercise.
9. A total of 16 Action Level and 83 Limit Level exceedances for turbidity were record. For suspended solids (SS), a total of 6 Action Level and 89 Limit Level exceedances were recorded in the reporting period.
10. A total of 92 Action Level and 282 Limit Level exceedances for DO were reported in the reporting quarter. However, no direct evidence showed that the exceedances were due to the Project works and the exceedances were all considered to be invalid.

#### **Environmental Complaint and Prosecution**

11. No environmental prosecution or complaint was received during the reporting quarter.

#### **Environmental Licensing and Permitting**

12. License/Permits granted to the Project include the Environmental Permit (EP), Waste Disposal (Chemical Waste) License, Marine Dumping Permits, Construction Noise Permit and Effluent Discharge License.

#### **Future Key Issues**

13. Pilling at Promenade Deck and dredging works at anchorage area will be the major construction activities for the coming quarter. The anticipated environmental impacts will be mainly on noise and water quality due to the piling works.

## 1. INTRODUCTION

- 1.1 Tai O was formerly one of the largest fishing villages in Hong Kong and was a historical base for fishing boats in the western approaches of Lantau Island and the Pearl River estuary. However, the importance of the fishing industry in Tai O has declined in recent decades, which has resulted in a degradation of its population base.
- 1.2 The formation of the Tai O sheltered boat anchorage is fully supported by the Islands Provisional District Board members and is widely seen as a means of reviving the town's local fishing industry and contributing to the revitalization of Tai O.
- 1.3 Previous consultancies undertaken on behalf of the Civil Engineering Department (CED) to determine the feasibility of construction a sheltered boat anchorage (Agreement No. CE 41/98) Environmental and Drainage Impact Assessment for the Tai O Sheltered Boat Anchorage Study. The original development scheme comprised an 8 ha anchorage for 220 vessels and about 1 ha reclamation for boat maintenance facilities, parking area, bus terminus and a loading/unloading bay.
- 1.4 The original development scheme has been gazetted under the Foreshore & Sea-bed (Reclamations) Ordinance in December 2000. Following public consultation and interdepartmental discussion, the scope of the scheme was revised in the adoption of the current development scheme with a reduced area of boat anchorage, shortened breakwater and reduced area of reclamation.
- 1.5 The project now comprises construction of a 4 ha sheltered boat anchorage for small boats/fishing vessels and a breakwater of about 350 m length, formation of about 0.22 ha of land for a future bus terminus, construction of a 0.23 ha promenade, site formation and associated engineering works for a mangrove planting area and restoration of the existing historic seawall.
- 1.6 An Environmental Permit No. EP-144/2002 was issued on 11 Sep 2002 for this project (EP) to the Civil Engineering Department as Permit Holder. An updated Environmental Monitoring and Audit Manual (the EM&A Manual) was prepared to fulfill requirement stipulated in Condition 2.3 of the EP.
- 1.7 The works of the Project is constructed under CED's construction Contract No. CV/2002/09 "Tai O Development – Sheltered Boat Anchorage". The site layout of the Project is shown in Figure 1.1.
- 1.8 Cinotech Consultants Limited was commissioned by the China Harbour Engineering Company (Group) (the Contractor) to undertake the Environmental Team (ET) Services for the Project. This is the third quarterly EM&A report summarizes the EM&A works for the Project in the period between October 2003 and December 2003.

## 2. PROJECT CHARACTERISTICS

### Project Organization and Contacts of Key Management

- 2.1 An organization structure and the line of communication were set up for the Project between the Project Proponent, Engineer Representative (ER), Independent Environmental Checker (IEC), the Contractor and Environmental Team (ET). The organization chart and contact details are shown in Appendix A and Figure 1.2.

### Construction Programme and Synopsis of Work

- 2.2 The construction programme is presented in Appendix B. The site activities during the reporting period are summarized in Table 2.1.

**Table 2.1 Summary of Works Undertaken in the Reporting Months**

Item	Work Activity	Month		
		Oct 03	Nov 03	Dec 03
1.	Site investigation at seawall and promenade deck	✓	✓	
2.	Dredging works at breakwater and loading jetty No. 3	✓	✓	✓
3.	Dismantling of steel-structure police guard house	✓	✓	
4.	Installation of fencing for the preserved mangrove	✓	✓	
5.	Installation of tidal exchange along seawall	✓	✓	
6.	Predrilling at seawall	✓	✓	
7.	Rock filling at seawall	✓	✓	
8.	Percussive piling;			✓
9.	Bored piling and sheet piling works at Seawall;			✓
10.	Bored piling works at Promenade Deck; and			✓
11.	Site clearance and site investigation at Future Bus Stop.			✓

### **3. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS**

#### **Monitoring Parameters and Monitoring Locations**

- 3.1 The EM&A Manual designate locations for the ET to monitor environmental impacts in terms of noise and water quality due to the Project. The Project area and monitoring locations are depicted in Figures 2.1 and 3.1. Appendix C gives details of monitoring requirements.

#### **Monitoring Methodology and Calibration Details**

- 3.2 Monitoring works/equipments were conducted/calibrated regularly in accordance with the EM&A Manual. Copies of calibration certificates are attached in the appendices of the Monthly Reports.

#### **Environmental Quality Performance Limits (Action and Limit Levels)**

- 3.3 The environmental quality performance limits, i.e. Action and Limit Levels were derived from the baseline monitoring results. Should the measured environmental quality parameters exceed the Action/Limit Levels, the respective action plans would be implemented. The Action/Limit Levels for each environmental parameter are given in Appendix D.

#### **Environmental Mitigation Measures**

- 3.4 Relevant mitigation measures as recommended in the project EIA report have been stipulated in the EM&A Manual for the Contractor to implement. A list of mitigation measures is given in Appendix G.



## 4. MONITORING RESULTS

### Weather Conditions

- 4.1 The weather during monitoring sessions was mainly sunny or rainy. The weather conditions for each individual monitoring session were presented in the field record sheets.

### Noise

- 4.2 All construction noise monitoring was conducted as scheduled in the reporting period, except that evening-time monitoring on 8 December 2003 was re-scheduled to 9 December 2003 due to mechanical failure of monitoring equipments.
- 4.3 As the Contractor has granted the Construction Noise permit on restricted hours including 1900 – 2300 on weekdays and General Holidays including Sundays (CNP no. GW-UW0285-03), noise monitoring works on restricted hour were conducted.
- 4.4 Three limit level exceedances were recorded during the reporting period. Two were recorded during the evening-time monitoring at Station N1 on 10th Nov 2003 and at Stations N1 and N11 on 5th Dec 2003. No further exceedance was recorded for the continual measurements on 10th Nov 2003 and 9th Dec 2003. Another noise limit exceedance was recorded during the monitoring at N11 on 28th Dec 03 (Sunday). The exceedance was considered to be invalid.

### Water Quality

- 4.5 Water quality monitoring was conducted as scheduled in this reporting period, except that monitoring works at A1 and A2 on 26<sup>th</sup> Nov 2003 during mid-flood tide were cancelled since the two stations were not accessible during the monitoring exercise.

### Turbidity and SS

- 4.6 A total of 16 Action Level and 83 Limit Level exceedances for turbidity were record. For suspended solids (SS), a total of 6 Action Level and 89 Limit Level exceedances were recorded in the reporting period.
- 4.7 The turbidity and SS level exceedances were considered not directly related to the Project due to the followings reasons:
- Exceedance of SS and Turbidity levels were recorded at W1, W2, W3 and W4 whereas those of stations A1, A2 and W5 were closer to the project site. This can be explained by the fact that the SS and turbidity were brought about from the Pearl River Delta region rather than the project itself.
  - The monitoring location at W4 (Control Point) is sheltered by the hinterland and hence the low levels of turbidity and SS at W4 cannot reflect the influence of tidal effect on turbidity and SS to the impact stations W1 – W3 at mid-flood tide
  - Limit level exceedances for turbidity and SS were recorded at impact monitoring stations whereas low levels of turbidity and SS were recorded at the control station (W1 at mid-ebb tide and W4 at mid-flood tide) at the corresponding tide.
  - The turbidity levels were well below the baseline level.

DO

- 4.8 A total of 92 Action Level and 282 Limit Level exceedances for DO were reported in the reporting quarter.
- 4.9 The DO level exceedances were considered not directly related to the Project due to the followings reasons:
- Among 374 exceedances recorded in the reporting period, only 30 exceedances (around 8%) were recorded at A1, A2 and W5, which were closer to the dredging site of the Project.
  - The DO levels at stations A1, A2 and W5, which were closer to the dredging area, were higher than those recorded at stations W1 to W4 for the same monitoring event.
  - DO levels may be affected by many other factors, e.g., salinity and water temperature. Graphical presentations of the variations of salinity and water temperature are shown in Appendix F.
  - It is noteworthy that as air temperature decreased from September 2003 to December 2003, the number of DO exceedances per monitoring day also decreased from 13.77 to 5.50.
  - Therefore, one possible reason for the increase of DO exceedance when compared with previous months may be due to the seasonal effects.

## 5. AUDIT RESULTS

### Implementation Status of Environmental Mitigation Measures

- 5.1 The implementation status of environmental mitigation measures (EMIS) is given in Appendix G.

#### Site Audit Summary

##### *Water Quality*

- 5.2 Following up the last audit on 31<sup>st</sup> October 2003, stagnant water near Bus Terminal was cleared up on 5<sup>th</sup> November 2003.
- 5.3 Some sand materials were observed in the sea around the conveyor barge on 19<sup>th</sup> November 2003. The Contractor was advised to provide mitigation measures to minimize and avoid the splashing of material during filling activities. The situation was improved during the follow-up audit on 26<sup>th</sup> November 2003.
- 5.4 On 22<sup>nd</sup> December 2003, water ponding was observed near the sea wall area. The Contractor was recommended to spray regularly with AFCD Registered pesticides.
- 5.5 Subsequent to the recommendation made by the Environmental Team on 22<sup>nd</sup> December 2003, the gully at the site entrance was covered with geotextiles in order to prevent the soil runoff into the gully on 31<sup>st</sup> December 2003.
- 5.6 On 31<sup>st</sup> December 2003, a thin layer of oil was observed on sea. The Contractor indicated that there was a ship sinking near Tai O that day.

##### *Air Quality*

- 5.7 On 26<sup>th</sup> November 2003, fugitive dust emission was observed during the uploading of rock materials by a crane badge. The Contractor was reminded to provide dust suppression measure for similar works.

##### *Chemical and Waste Management*

- 5.8 Following up the previous audit on 25<sup>th</sup> September 2003, it was observed that drip tray was provided to prevent oily water from discharging into the sea during the audit on 2<sup>nd</sup> October.
- 5.9 On 15<sup>th</sup> October 2003, oily layer was observed near the drilling machine. The situation was improved during the audit on 23<sup>rd</sup> October 2003.
- 5.10 On 13<sup>th</sup> November 2003, several large drip trays were installed by the Contractor on the grab dredger for storage of liquid oil drums.
- 5.11 A little amount of oil spillage was observed beside drip tray near the site entrance on 13<sup>th</sup> November 2003.
- 5.12 On 3<sup>rd</sup> December 2003, oil dripping from drip trays was observed within the site area. The Contractor was recommended to provide valve or other alternative prevent oil leakage from drip tray. The situation was improved during the follow-up audit on 11<sup>th</sup> December 2003.

- 5.13 On 18<sup>th</sup> December 2003, oil stain was observed under mobile crane. The Contractor was recommended to rectify the situation. Paint oil buckets were placed on the bare ground. The Contractor was recommended to provide drip tray or other alternative to prevent oil leakage.
- 5.14 During the audit on 31<sup>st</sup> December 2003, oil drum and waste oil bucket was placed on the bare ground within the site area.

*Noise and Permit / Licenses*

- 5.15 No environmental deficiencies were observed during the site inspections.

**Status of Environmental Licensing and Permitting**

- 5.16 Environmental licenses and permits including the Environmental Permit (EP), Waste Disposal (Chemical Waste) License, Marine Dumping Permit and Construction Noise Permits (CNP) were in place and valid during the reporting quarter. A summary status of licenses and permits is given in Appendix H.

**Advice on Waste Management Status**

- 5.17 The waste generated from the Project was mainly non-inert C&D and uncontaminated dredged sediment.

## **6. NON-COMPLIANCE (EXCEEDANCES) OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS (ACTION AND LIMIT LEVELS)**

### **Summary of Exceedances**

- 6.1 Environmental monitoring works were performed in the reporting period and all monitoring results were checked and reviewed. A summary of exceedances is attached in Appendix J. The details of each exceedance were attached in the Monthly Reports.
- 6.2 Three limit level exceedances were recorded during the reporting period. Two were recorded during the evening-time monitoring at Station N1 on 10<sup>th</sup> Nov 2003 and at Stations N1 and N11 on 5<sup>th</sup> Dec 2003. No further exceedance was recorded for the continual measurements on 10<sup>th</sup> Nov 2003 and 9<sup>th</sup> Dec 2003. Another noise limit exceedance was recorded during the monitoring at N11 on 28<sup>th</sup> Dec 03 (Sunday). The exceedance was considered to be invalid.
- 6.3 A total of 16 Action Level and 83 Limit Level exceedances for turbidity were record. For suspended solids (SS), a total of 6 Action Level and 89 Limit Level exceedances were recorded in the reporting period.
- 6.4 A total of 92 Action Level and 282 Limit Level exceedances for DO were reported in the reporting quarter. However, no direct evidence showed that the exceedances were due to the Project works and the exceedances were all considered to be invalid.
- 6.5 No environmental complaint and prosecution was received since the commencement of the Project.

### **Review of the Reasons for and the Implications of Non-compliance**

- 6.6 There was no non-compliance from the site audits in the reporting quarter. The observations and recommendations made in each individual site audit session were attached in the Monthly Reports.

**7. ENVIRONMENTAL COMPLAINTS**

7.1 No environmental complaint was recorded since the Project commencement.

**8. COMMENTS, CONCLUSIONS AND RECOMMENDATIONS**

8.1 Piling at Promenade Deck and dredging works at anchorage area will be the major construction activities for the coming quarter. The anticipated environmental impacts will be mainly on noise and water quality due to the piling works.