



Contract No. HY/2011/03

**Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road
Section between Scenic Hill and Hong Kong Boundary Crossing
Facilities**

Forth Post-Translocation Monitoring Report

14 February 2013

Main Contractor



Designer

ATKINS

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Figure 1 - Area with Translocated Corals in R2

Photo Plate 1
Photo Plate 2

1 Introduction

1.1 Background

- 1.1.1 This Survey Report on Translocated Coral Monitoring is prepared for Contract HY/2011/03 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between Scenic Hill and Hong Kong Boundary Facilities (“the Contract”) for the Highways Department of HKSAR. The Contract was awarded to China State Construction Engineering (Hong Kong) Limited (“the Contractor”) and BMT Asia Pacific was appointed as the Environmental Team by the Contractor.
- 1.1.2 The Contract is part of the HKLR Project and HKBCF Project, these projects are considered to be “Designated Projects”, under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap 499) and Environmental Impact Assessment (EIA) Reports (Register No. AEIAR-144/2009 and AEIAR-145/2009) were prepared for the Project. The current Environmental Permit (EP) EP-352/2009/A for HKLR and EP-353/2009/E for HKBCF were issued on 31 October 2011 and 16 October 2012, respectively. These documents are available through the EIA Ordinance Register. The Contract commenced on 17 October 2012.

1.2 Purpose of the Report

- 1.2.1 This report presents the Post-Monitoring for all translocated corals inside the affecting area to the proposed recipient site.

2 Post-translocation Monitoring Requirements

- 2.1.1 Following coral translocation which was undertaken on 3 October 2012, the translocated coral colonies as well as the tagged natural coral colonies at the recipient site should be monitored within one week after the completion of the translocation, biweekly for the first month and then quarterly for one year (i.e. a total of six post-translocation monitoring events) in accordance with the Coral Translocation Methodology Plan (Rev6). The monitoring team will record the following parameters (using the same methodology adopted during the pre-translocation survey): size, presence, survival, health conditions (percentage of mortality) and percentage of sediment of each translocated coral colonies. The general environmental conditions including weather, sea, and tidal conditions of the coral recipient site will also be monitored.
- 2.1.2 Photographic records of the translocated and natural coral colonies will be taken as far as possible maintaining the same aspect and orientation as photographs taken for the pre-translocation surveys. All the tags for marking the translocated and natural coral colonies will be removed / retrieved once the monitoring programme is completed.
- 2.1.3 The results of the post-translocation monitoring surveys should be reviewed with reference to findings of the baseline survey and the data from original colonies at the recipient site.
- 2.1.4 If, during the post-translocation monitoring, observations of any die-off / abnormal conditions of the translocated corals are made, the ET will inform the Contractor, Independent Environmental Checker (IEC)/ Environmental Project Office (ENPO), Agriculture, Fisheries and Conservation Department (AFCD) and in liaison with AFCD investigate any measures needed.
- 2.1.5 Post-translocation monitoring results will be evaluated against Action and Limit Levels. Evaluation will be based on recorded changes in percentage of partial mortality of the gorgonian corals. Action and Limit Levels are defined in **Table 2-1**

Table 2-1 Action and Limit Levels for Coral Monitoring During Construction

Parameter	Action Level Definition	Limit Level Definition
Mortality	If during Impact Monitoring a 15% increase in the percentage of partial mortality on the corals occurs at more than 20% of the translocated coral colonies that is not recorded on the original corals at the recipient site, then the Action Level is exceeded.	If during the Impact Monitoring a 25% increase in the percentage of partial mortality at more than 20% of the translocated coral colonies occurs that is not recorded at the original corals at the recipient site, then the Limit Level is exceeded.

- 2.1.6 If the defined Action Level or Limit Levels for coral monitoring are exceeded, the actions set out in **Table 2-2** will be implemented.



Table 2-2 Action and Limit Level for Coral Monitoring

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level Exceedance	<ol style="list-style-type: none"> 1. Check monitoring data; 2. Inform the IEC, ER and Contractor of the findings; 3. Increase the monitoring to at least once a month to confirm findings; 4. Propose mitigation measures for consideration 	<ol style="list-style-type: none"> 1. Discuss monitoring with the ET and the Contractor; 2. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise the ER accordingly. 	<ol style="list-style-type: none"> 1. Discuss with the IEC additional monitoring requirements and any other measures proposed by the ET; 2. Make agreement on the measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the ER; 3. Implement the agreed measures.
Limit Level Exceedance	Undertake Steps 1-4 as in the Action Level Exceedance. If further exceedance of Limit Level, suspend construction works until an effective solution is identified.	<ol style="list-style-type: none"> 1. Discuss monitoring with the ET and the Contractor; 2. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise the ER accordingly. 	<ol style="list-style-type: none"> 1. Discuss with the IEC additional monitoring requirements and any other measures proposed by the ET; 2. Make agreement on the measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the ER; 3. Implement the agreed measures.

3 Post-translocation Monitoring Results

3.1 Site Conditions

- 3.1.1 Due to the winter monsoon and strong current after the first monitoring, the sea was too rough and not suitable for diving activities especially at the monitoring site. The fourth post-translocation coral monitoring was postponed and carried out on 9th January 2013.
- 3.1.2 The fourth post-translocation monitoring was performed on 9th January 2013 and the weather conditions were summarized in **Table 3-1**. The GPS location, average depth, bottom substrates and visibility of the translocated corals at the recipient site R2 were summarized in **Table 3-2**.

Table 3-1 Weather Condition for the Coral Translocation on 15th December 2012

Date	Condition	Average Underwater Visibility
9 th January 2013	- Northeast force 5 to 6 - Sunny periods	Less than 0.2 m

Table 3-2 GPS Coordinates, Average Depth, Bottom Substrate and Visibility of Translocated Corals in Recipient Site R2

Site	GPS Location at Starting Point	Average Depth	Bottom Substrate	Visibility
R2	E 819970.235 N 821491.654	2 m	Natural Bedrock and Boulders	Less than 0.2 m

3.2 Findings

- 3.2.1 Twenty-three (23) *Echinomuricea* sp. colonies were relocated and monitored at the recipient site R2. Area with translocated coral colonies in recipient site R2 was shown in **Figure 1**. The general health conditions (size, health condition, increased mortality and increased sediment) were recorded and summarized in **Table 3-3**.
- 3.2.2 Ten (10) *Echinomuricea* sp. colonies which grow naturally at the recipient site R2 were relocated and monitored. The general health conditions (size size, health condition, increased mortality and increased sediment) were recorded and summarized in **Table 3-4**.

Table 3-3 Size, Health Condition, Mortality and Sediment of Twenty-three Translocated Coral Colonies

Coral #	Species	Size (cm) – Max. Height	Condition	Mortality (%)		Sediment (%)	
				Baseline	Increased Mortality on 9 Jan	Baseline	Increased Sediment on 9 Jan
1	<i>Echinomuricea</i> sp.	22	Unhealthy	75	0	0	0
2	<i>Echinomuricea</i> sp.	25	Unhealthy	45	0	0	0
3	<i>Echinomuricea</i> sp.	19	Fair	30	0	0	0
4	<i>Echinomuricea</i> sp.	32	Unhealthy	50	0	0	0
5	<i>Echinomuricea</i> sp.	24	Unhealthy	40	0	0	0

Coral #	Species	Size (cm) – Max. Height	Condition	Mortality (%)		Sediment (%)	
				Baseline	Increased Mortality on 9 Jan	Baseline	Increased Sediment on 9 Jan
6	<i>Echinomuricea</i> sp.	18	Fair	30	0	0	0
7	<i>Echinomuricea</i> sp.	15	Fair	25	0	0	0
8	<i>Echinomuricea</i> sp.	17	Fair	30	0	0	0
9	<i>Echinomuricea</i> sp.	24	Fair	15	0	0	0
10	<i>Echinomuricea</i> sp.	15	Fair	10	0	0	0
11	<i>Echinomuricea</i> sp.	35	Unhealthy	60	0	0	0
12	<i>Echinomuricea</i> sp.	23	Unhealthy	40	0	0	0
13	<i>Echinomuricea</i> sp.	21	Fair	5	0	0	0
14	<i>Echinomuricea</i> sp.	17	Fair	20	0	0	0
15	<i>Echinomuricea</i> sp.	29	Fair	10	0	0	0
16	<i>Echinomuricea</i> sp.	32	Fair	5	0	0	0
17	<i>Echinomuricea</i> sp.	36	Fair	5	0	0	0
18	<i>Echinomuricea</i> sp.	27	Fair	10	0	0	0
19	<i>Echinomuricea</i> sp.	26	Fair	5	0	0	0
20	<i>Echinomuricea</i> sp.	31	Unhealthy	55	0	0	0
21	<i>Echinomuricea</i> sp.	29	Fair	5	0	0	0
22	<i>Echinomuricea</i> sp.	26	Fair	5	0	0	0
23	<i>Echinomuricea</i> sp.	34	Fair	5	0	0	0

Table 3-4 Size, Health Condition, Mortality and Sediment of Ten Natural Coral Colonies

Coral #	Species	Size (cm) – Max. Height	Condition	Mortality (%)		Sediment (%)	
				Baseline	Increased Mortality on 9 Jan	Baseline	Increased Sediment on 9 Jan
1	<i>Echinomuricea</i> sp.	30	Unhealthy	55	0	0	0
2	<i>Echinomuricea</i> sp.	25	Unhealthy	50	0	0	0
3	<i>Echinomuricea</i> sp.	31	Fair	30	0	0	0
4	<i>Echinomuricea</i> sp.	25	Unhealthy	60	0	0	0
5	<i>Echinomuricea</i> sp.	34	Unhealthy	45	0	0	0
6	<i>Echinomuricea</i> sp.	26	Unhealthy	40	0	0	0
7	<i>Echinomuricea</i> sp.	23	Fair	35	0	0	0
8	<i>Echinomuricea</i> sp.	19	Unhealthy	45	0	0	0
9	<i>Echinomuricea</i> sp.	21	Fair	30	0	0	0
10	<i>Echinomuricea</i> sp.	28	Fair	25	0	0	0

4 Discussion and Conclusions

- 4.1.1 The fourth post-translocation coral monitoring was carried out on 9th January 2013. Twenty-three (23) translocated *Echinomuricea* sp. coral colonies were monitored at the recipient site R2. Similar to the baseline result, the health condition of the translocated coral colonies were fair to unhealthy with mortality from 5% to 75%. No increased mortality was recorded during the survey.
- 4.1.2 Ten (10) natural *Echinomuricea* sp. coral colonies were also monitoring at the recipient site as control and similar to the baseline result, most of the coral colonies are in unhealthy condition with mortality ranging from 25% to 60%. No increased mortality was recorded during the survey.
- 4.1.3 No sediment, bleaching or increased mortality in the general condition of coral colonies were observed during the monitoring period. No deterioration of the coral community was observed in the ecological monitoring results when compared with the baseline ecological monitoring results. There is no AL/LL exceedance during the monitoring period. Photos of each tagged translocated and natural corals were taken and shown in **Photo Plates 1 and 2**.



References:

1. Trail Scheme on Capping Layer of Contaminated Mud Pit and Monitoring Works, Management of Sediment Disposal Facility at Sha Chau, Contract no. CV/2008/06
2. Agreement No. SDW 01/2008 Monitoring and Audit Programme for Coral Recolonization along the Sloping Seawall at Penny's Bay Reclamation -Final Subtidal Dive Survey Report



Figure 1 Area with Translocated Corals in R2










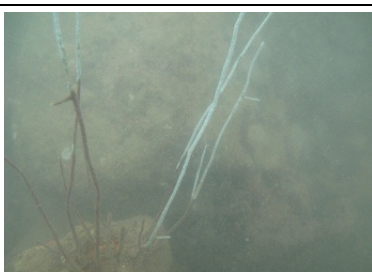


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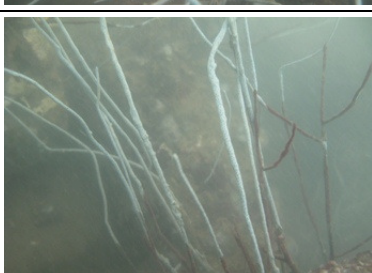
PHOTO PLATE 1





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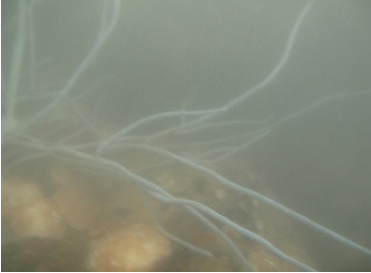
Coral No.	Translocated Corals (Baseline)	Translocated Corals During the 9th January 2013 Monitoring
1		
2		
3		
4		
5		

Coral No.	Translocated Corals (Baseline)	Translocated Corals During the 9th January 2013 Monitoring
6		
7		
8		
9		
10		

Coral No.	Translocated Corals (Baseline)	Translocated Corals During the 9th January 2013 Monitoring
11		
12		
13		
14		
15		

Coral No.	Translocated Corals (Baseline)	Translocated Corals During the 9th January 2013 Monitoring
16		
17		
18		
19		
20		



Coral No.	Translocated Corals (Baseline)	Translocated Corals During the 9th January 2013 Monitoring
21		
22		
23		













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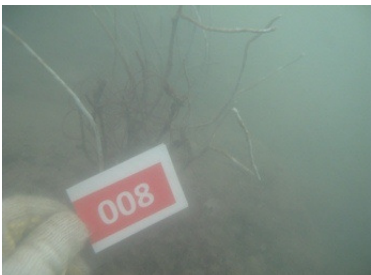



PHOTO PLATE 2



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Coral No.	Recipient Site Corals (Baseline)	Recipient Site Corals During the 9 th January 2013 Monitoring
1		
2		
3		
4		
5		



Coral No.	Recipient Site Corals (Baseline)	Recipient Site Corals During the 9 th January 2013 Monitoring
6		
7		
8		
9		
10	