

## Asia Pacific Gateway (APG) - Tseung Kwan O

### *Post Project Coral Survey Report*

7 July 2016

#### **Environmental Resources Management**

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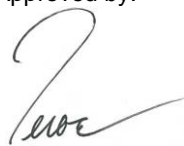


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## Post Project Coral Survey Report

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Client:		Project No:			
China Mobile International Limited (CMI Ltd)		0324228			
Summary:		Date:			
This document presents the Post Project Coral Survey Report for the APG – Tseung Kwan O section of the submarine telecommunication cable system		7 July 2016			
		Approved by:			
		 Terence Fong Partner			
v0	Post Project Coral Survey Report	RC	JT	TF	7/7/16
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p>		Distribution <input type="checkbox"/> Internal <input checked="" type="checkbox"/> Public <input type="checkbox"/> Confidential			
		 			

## Asia Pacific Gateway (APG) - Tseung Kwan O

### Environmental Certification Sheet

#### EP-485/2014


#### Reference Document/Plan

Document and Plan to be Certified/ Verified:	Post Project Coral Survey Report
Date of Report:	7 July 2016
Date prepared by ET:	7 July 2016
Date received by IEC:	7 July 2016


#### Reference EM&A Manual

EM&A Manual:	Section 2
Content:	<i>Reporting on Post Project Coral Survey</i>
3.4	“Post Project Survey Report should be submitted within one month after completion of the Project marine installation works and should include, but not be limited to, the following details: Brief project information; Review of the coral conditions at the monitoring stations and the health status of the corals after the Project marine installation works and comparison with results as presented in relevant Baseline Monitoring Report; and Discussion of any detected adverse impacts to coral communities as a result of the cable installation works.”
EP Condition:	Condition 2
Content:	<i>Post Project Coral Survey Report</i>
2.4	“To protect the coral communities at Cape Collinson, the Permit Holder shall confirm the identified coral communities will be more than 180m away from the cable alignment. The conditions of the identified coral communities shall be verified by coral inspections immediate prior to and after the cable laying works. The Permit Holder shall use a Differential Global Positioning System of typical real time horizontal accuracy within _10cm for the navigation system of the Cable Installation Barge. The burial tool position shall be logged during cable installation. The Permit Holder shall submit to the Director four hard copies and one electronic copy of the following, as defined in the Project Profile (Register No.:PP-496/2013):
(iii)	An as-built plan showing the location of the identified coral communities and tracking record of the coordinates and location of the constructed cable alignment within one month after completion of the marine installation works; and
(iv)	A Post Project Survey Report showing the review of the coral conditions within one month after completion of the marine installation works.

#### ET Certification

I hereby certify that the above referenced document and plan complies with the above referenced condition of EP-485/2014.	
Terence Fong, Environmental Team Leader:	
	Date: 7 July 2016

#### IEC Verification

I hereby verify that the above referenced document and plan complies with the above referenced condition of EP-485/2014.	
Vincent Lai, Independent Environmental Checker:	
	Date: 7 July 2016

## **CONTENTS**

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>1.1</b>	<b>PROJECT BACKGROUND</b>	<b>1</b>
<b>1.2</b>	<b>OBJECTIVE OF THE POST PROJECT CORAL SURVEY</b>	<b>1</b>
<b>1.3</b>	<b>PURPOSE OF THIS REPORT</b>	<b>2</b>
<b>1.4</b>	<b>STRUCTURE OF THE REPORT</b>	<b>2</b>
<b>2</b>	<b>POST PROJECT CORAL SURVEY METHODOLOGY</b>	<b>3</b>
<b>2.1</b>	<b>MONITORING LOCATIONS</b>	<b>3</b>
<b>2.2</b>	<b>MONITORING METHODOLOGY</b>	<b>3</b>
<b>3</b>	<b>POST PROJECT CORAL SURVEY RESULTS</b>	<b>9</b>
<b>3.1</b>	<b>RESULTS OF REA SURVEY</b>	<b>9</b>
<b>3.2</b>	<b>RESULTS OF CORAL COLONY MONITORING</b>	<b>19</b>
<b>4</b>	<b>CONCLUSION</b>	<b>27</b>

## **FIGURES**

**FIGURE 1.1 APG SUBMARINE CABLE SYSTEM**

**FIGURE 2.1 AS-BUILT PLAN SHOWING THE COORDINATES AND LOCATION OF THE IDENTIFIED CORAL COMMUNITIES AND CABLE ALIGNMENT**

## **ANNEX**

**ANNEX A PHOTOGRAPHIC RESULTS OF IDENTIFIED CORAL COLONIES IN ZONE A, B & C**



# 1 INTRODUCTION

## 1.1 PROJECT BACKGROUND

In order to help meet the tremendous telecommunication services requirements for intra-Asia connectivity between South East Asia and North Asia, the **APG Consortium** has decided to build a submarine telecommunication cable system, which will be approximately 10,400 km in length, connecting the major business hubs across the region – the Asia Pacific Gateway (APG). The cable will link up with several countries, including Malaysia, Singapore, Vietnam, Taiwan, Mainland China, Japan, Korea and the Hong Kong Special Administrative Region (HKSAR). Since the cable that branches to HKSAR will ultimately connect to land at Tseung Kwan O (TKO), the HKSAR section of the submarine cable are referred to as the APG-TKO cable (the “Project”). The submarine cable travels west and southward from TKO as it approaches the Tathong Channel (*Figure 1.1*). After crossing the Tathong Channel and near to Cape Collinson, the cable then runs approximately parallel to the Tathong Channel until north of Sung Kong Island where it then turns eastward to the boundary of HKSAR waters where it enters the South China Sea. As one of the members of the APG Consortium, **China Mobile International Limited (CMI)** is responsible for installing the APG-TKO section of the cable. The marine installation works of the Project were completed on 6 June 2016.

## 1.2 OBJECTIVE OF THE POST PROJECT CORAL SURVEY

A *Project Profile (PP-496/2013)*, which includes an assessment of the potential environmental impacts associated with the installation of the submarine telecommunications cable system within HKSAR, was prepared and submitted to the Environmental Protection Department (EPD) under section 5(1)(b) and 5(11) of the *Environmental Impact Assessment Ordinance (EIAO)* for the application for Permission to apply directly for Environmental Permit (EP). The EPD subsequently issued an *Environmental Permit (EP- 485/2014)* for the Project.

In accordance with the *EM&A Manual* appended with the approved *Project Profile*, Post Project Coral Survey should be conducted within one month after completion of the Project marine installation works. The objective of the Post Project Coral Survey is to collect coral data after completion of the Project marine installation works at the same locations and using the same methodology as Baseline Coral Surveys conducted before the jetting works for the Project marine installation. The comparison of baseline and post Project data would be used to determine any observable impacts to corals as a result of the cable installation works. The Post Project Coral Survey Report should be submitted within one month after completion of the Project marine installation works.

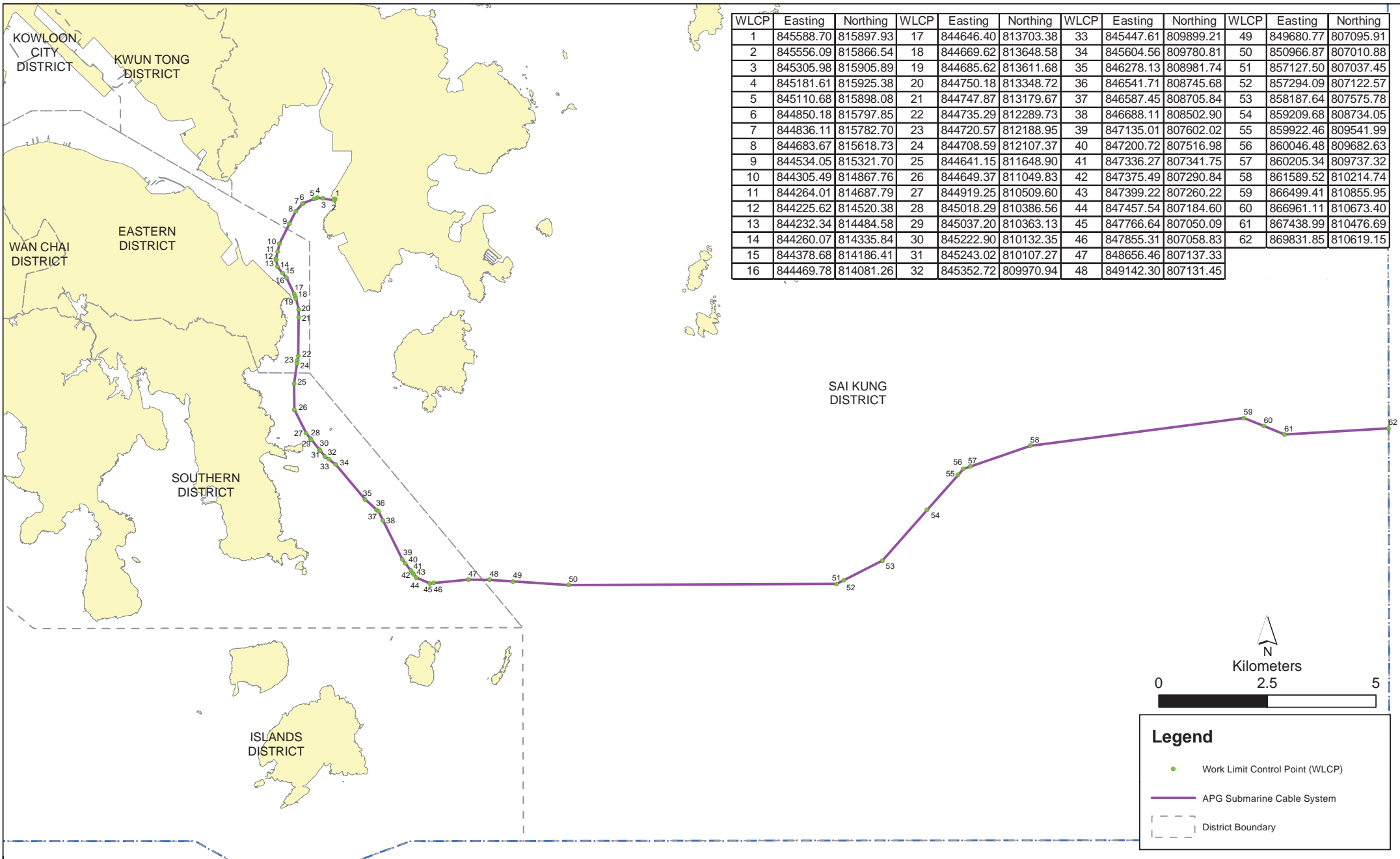


Figure 1.1

APG Submarine Cable System

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### 1.3 **PURPOSE OF THIS REPORT**

This Post Project Coral Survey Report (“the Report”) is prepared by ERM-Hong Kong, Limited (ERM) on behalf of CMI to present the methodology and findings of the Post Project Coral Survey in accordance with requirements of the *EM&A Manual*.

### 1.4 **STRUCTURE OF THE REPORT**

The remainder of the report is structured as follows:

#### ***Section 2: Post Project Coral Survey Methodology***

Presents the Post Project coral monitoring methodology, parameters monitored, monitoring locations and depth, monitoring date, time, frequency and duration in accordance with the *EM&A Manual*.

#### ***Section 3: Post Project Coral Survey Results***

Reviews the coral conditions at the monitoring stations and the health status of the corals after the Project marine installation works and compared with results as presented in the Baseline Coral Survey Report in order to discuss any detected adverse impacts to coral communities as a result of the cable installation works in accordance with the *EM&A Manual*.

#### ***Section 4: Conclusion***

Concludes findings from the Post Project Coral Survey.

This section presents the methodology of the Post Project Coral Survey which is undertaken within one month after the completion of marine installation works of the Project on 6 June 2016. The methodology adopted is the same as that for the Baseline Coral Survey undertaken before the jetting works for the Project marine installation works, except for the qualitative spot dive survey which was conducted for the Baseline Survey only to determine the locations of monitoring transects. The employment of the same methodology would allow for direct comparison of coral conditions and health status before and after the cable installation works and hence, determines any detectable changes in coral assemblages concerned after the works.

## 2.1 **MONITORING LOCATIONS**

Post Project Coral Survey was undertaken at two Monitoring Stations at Cape Collinson and Tai Long Pai, and a Control Station at Tung Lung Chau which is located more than 2 km from the cable alignment. The monitoring locations are shown in *Figure 2.1* and detailed below:

### *Monitoring Stations:*

- Zone A: Cape Collinson; and
- Zone B: Tai Long Pai.

### *Control Station:*

- Zone C: Tung Lung Chau.

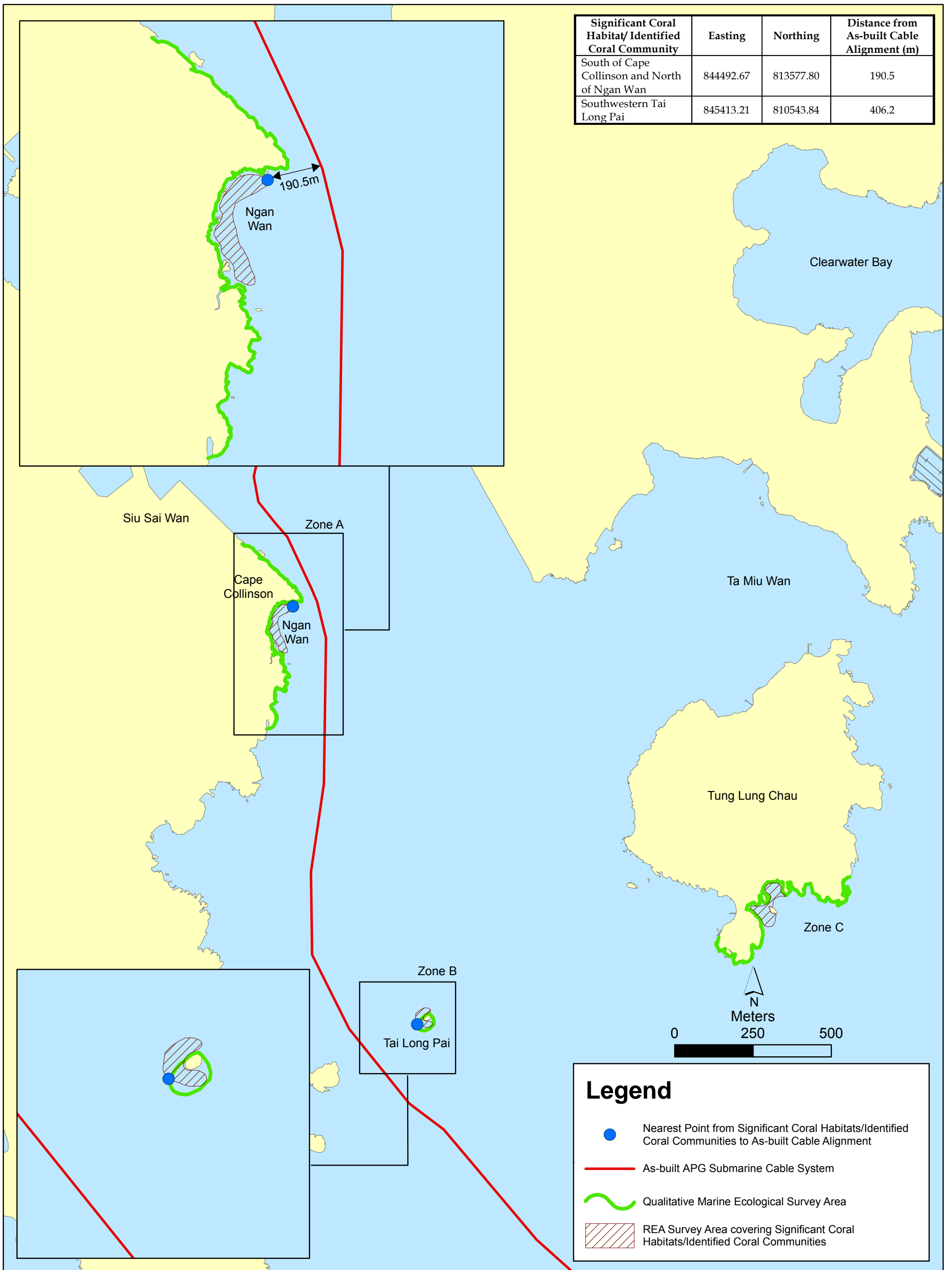
At each station, coral monitoring was undertaken in two depth zones (i.e. shallow water: -2 to -5 mCD and deep water: -5 to -15 mCD).

The identified coral communities at Cape Collinson (Zone A) and Tai Long Pai (Zone B) are more than 190m away from the cable alignment and it is thus in compliance with the *Condition 2.4* of the *Environmental Permit (EP- 485/2014)*. The as-built plan showing the location of the significant coral habitats/ identified coral communities at the south of Cape Collinson and northern part of Ngan Wan (Zone A) and at the southwestern part of Tai Long Pai (Zone B) is presented in *Figure 2.1*, together with their nearest distance to the constructed cable alignment.

## 2.2 **MONITORING METHODOLOGY**

### 2.2.1 **Monitoring Personnel**

The Post Project Coral Survey was undertaken by a qualified coral specialist. The qualified coral specialist is a degree holder in marine sciences with more than three years of post-graduate experience in the field of marine ecology and undertaking coral surveys. The same coral specialist was deployed for



**Figure 2.1**  
**As-built Plan Showing the Coordinates and Location of the Identified Coral Communities and Cable Alignment**

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 Date: 7/7/2016



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each dive survey to maintain consistency in the documentation of the coral condition. The specialist was approved by AFCD in advance of undertaking the coral monitoring works.

### 2.2.2 *Survey Methodology*

As representative transect locations for the coral monitoring at Cape Collinson, Tai Long Pai and Tung Lung Chau were identified during the qualitative spot dive survey of the Baseline Coral Survey, the Post Project Coral Survey focusses on the coral conditions at the identified coral monitoring locations and comprises the following two components:

- Semi-quantitative Rapid Ecological Assessment (REA) survey; and
- Coral Colony Monitoring.

Survey methodology of the two components is described below.

#### *Rapid Ecological Assessment (REA) Survey Method*

A standardised semi-quantitative REA survey technique was used to investigate the general conditions of the coral communities (hard, soft and black corals) associated with subtidal hard bottom habitats at the selected Monitoring and Control Stations. The collection of REA data during the Baseline and Post-Project Surveys would allow for a comparison of coral conditions before and after cable installation works in order to determine any observable changes in conditions due to the works.

The REA technique allows semi-quantitative information on the ecological attributes of the subtidal habitat to be obtained in a relatively simple way without compromising scientific rigour. This technique is the standard practices for EIA marine baseline surveys in Hong Kong and has been modified from the standardised REA survey technique established for the assessment of coral communities on the Great Barrier Reef <sup>(1)</sup> for marine environment of Hong Kong <sup>(2)</sup>.

A series of REA surveys were conducted by qualified coral specialist by SCUBA at the Monitoring Stations (Cape Collinson and Tai Long Pai) and Control Station (Tung Lung Chau) with the aim to record the condition of substratum, estimate the diversity and relative abundance of coral assemblages (i.e. hard corals, octocorals and black corals). The survey was undertaken on REA transects laid onto the seabed, each of which measure 100 m in length, at the following two depth zones of each station:

- Shallow depth region: -2 to -5 m CD (typically the depth range of hard coral colonies associated with subtidal hard bottom habitat at the monitoring locations); and

(1) DeVantier, L.M., G.De'Ath, T.J. Done and E. Turak (1998). *Ecological assessment of a complex natural system: A case study from the Great Barrier Reef*. Ecological Applications 8: 480-496.

(2) Fabricius, K.E. and D. McCorry. (2006). *Changes in octocoral communities and benthic cover along a water quality gradient in reefs of Hong Kong*. Marine Pollution Bulletin 52: 22-23.

- Deep depth region: -5 to -15 m CD.

The location of the REA transects as well as the depth ranges of the monitored depth zones were determined based on findings from the qualitative spot dive survey conducted during the Baseline Coral Survey. A total of three (3) REA transects were monitored at each depth region of Cape Collinson and Tung Lung Chau, while two (2) transects were monitored at each depth region of Tai Long Pai due to limited survey area at this Monitoring Station.

Following the laying of the transect line, the coral specialist swam along the transect slowly and conduct the REA survey. The REA methodology encompassed an assessment of the benthic cover (Tier I) and taxon abundance (Tier II) undertaken in a swathe ~ 4 m wide, 2 m either side of each transect. The belt transect width was dependent on underwater visibility and might be adjusted to a swathe ~ 2 m wide, 1 m either side of each transect in case of reduced visibility. An explanation of the two assessment categories (Tiers) used in the survey is presented below.

#### Tier I – Categorisation of Benthic Cover

Upon the completion of each survey transect, six (6) ecological and nine (9) substratum attributes were assigned to one (1) of seven (7) standard ranked (ordinal) categories (*Tables 2.1 and 2.2*).

**Table 2.1** *Categories used in the REA Surveys – Benthic Attributes*

<b>Ecological</b>	<b>Substratum</b>
Hard coral	Hard Substratum
Dead standing coral	Continuous pavement
Soft coral	Bedrock
Black coral	Rubble
Macroalgae	Sand
Turf Algae	Silt
	Large boulders (>50 cm)
	Small boulders (<50 cm)
	Rocks (<26 cm)

**Table 2.2** *Categories used in the REA Surveys – Ordinal Ranks of Percentage Cover*

<b>Rank</b>	<b>Percentage Cover (%)</b>
0	None recorded
1	1-5
2	6-10
3	11-30
4	31-50
5	51-75
6	76-100

#### Tier II – Taxonomic Inventories to Define Types of Benthic Communities

An inventory of benthic taxa was compiled for each transect. Taxa were identified *in situ* to the following levels:

- Scleractinian (hard) corals to species wherever possible;
- Soft corals, gorgonians, black corals, anemones and conspicuous macroalgae recorded according to morphological features and to genus level where possible; and
- Other benthos (including sponges, zoanthids, ascidians and bryozoans) recorded to genus level wherever possible but more typically to phylum plus growth form.

Following the completion of each transect survey, each taxon in the inventory was ranked in terms of abundance in the community (*Table 2.3*). These broad categories rank taxa in terms of relative abundance of individuals, rather than the contribution to benthic cover along each transect. The ranks are subjective assessments of abundance, rather than quantitative counts of each taxon.

**Table 2.3** *Ordinal Ranks of Taxon Abundance*

Rank	Abundance
0	Absent
1	Rare <sup>(a)</sup>
2	Uncommon
3	Common
4	Abundant
5	Dominant

Note:  
 (a) The classification of “rare” abundance refers to low abundance (small quantity) on the transect, rather than in terms of distribution in Hong Kong waters.

A set of environmental site descriptors were recorded for each REA transect as follows:

- The degree of exposure to prevailing wave energy was ranked from 1 – 4, where:
  - 1 = sheltered (highly protected by topographic features from prevailing waves);
  - 2 = semi-sheltered (moderately protected);
  - 3 = semi-exposed (only partly protected); and
  - 4 = exposed (experiences the full force of prevailing wave energy).
- Sediment deposition on the reef substratum (particle sizes ranging from very fine to moderately coarse) rated on a four point scale, from 0 -3, where:
  - 0 = no sediment;
  - 1 = minor (thin layer) sediment deposition;

2 = moderate sediment deposition (thick layer), but substrate can be cleaned by fanning off the sediment; and

3 = major sediment deposition (thick, deep layer), and substrate cannot be cleaned by fanning.

- A suite of representative photographs were taken for each REA transect. All field data were checked upon completion of each REA transect and a dive survey proforma sheet were completed at the end of the fieldwork day. Photographs were compiled for each REA transect which was then reviewed and REA data be verified.
- Verified REA data were presented in terms of:
  - Site (transect) information (Tier I and II data), depth and environmental descriptors;
  - Species abundance data for each transect; and
  - Species lists, species richness and mean values for ecological and substratum types were compiled. The rank abundance values were converted to a mid-value percentage cover.

#### *Coral Colony Monitoring*

Coral colony monitoring was undertaken during the Baseline Coral Survey and the Post-Project Coral Survey to identify any evidence of sediment stress to corals before and after cable installation works. At each station, a total of fifteen (15) hard coral colonies and fifteen (15) octocoral/black coral colonies were selected for monitoring. Priority was given to selecting colonies of horizontal plate-like and massive growth forms which present large stable surfaces for the interception and retention of settling solids. Each of the selected coral was identified to species or genus levels and photographed. The following data were collected:

- Maximum diameter of the identified hard coral and soft coral colonies;
- Maximum height and width of the identified gorgonians and black corals;
- Percentage of sediment cover on the identified colonies and the colouration, texture and approximate thickness of sediment on the coral colonies and adjacent substrate. Any contiguous patches of sediment cover >10 % were recorded;
- Percentage of bleached area on the identified colonies of which two categories were recorded: a. blanched (ie pale) and b. bleached (ie whitened);
- Percentage of colony area showing partiality mortality; and
- Physical damage to colonies, tissue distension, mucous production and any other factors relevant will be noted in the field.

Other information such as the survey date, time, weather, sea and tidal conditions was also recorded. The coral colony monitoring exercise was undertaken to ensure colonies of similar growth forms and size would be selected for the Baseline and Post Project Coral Surveys. Although coral tagging is a common practice for repeated monitoring of individual colony, this technique was not employed in this monitoring programme due to difficulties in locating the tagged corals given the generally low visibility in the area and low light conditions in deep water. Instead, colonies of similar growth forms and size would be selected for both the Baseline and Post Project Coral Surveys.



This section presents findings of the Post Project Coral Survey which is undertaken within one month after marine installation works of the Project. Findings from the Post Project Coral Survey are compared with those obtained from the Baseline Coral Survey which was undertaken before marine installations works in order to determine any detectable changes in coral conditions and health status and the relationship of such changes, if any, to the cable installation works of the Project.

The Post Project Coral Survey was conducted over two days on 20 and 21 June 2016. The weather condition was mainly sunny, with moderate (Force 3) south to southwesterly winds. Slight to moderate swell presented in the sea on the two survey days. The underwater visibility was fair and generally ranged between 0.5 m to 2.0 m. Coral communities at Zone A: Cape Collinson, Zone B: Tai Long Pai and Zone C: Tung Lung Chau were monitored (see *Figure 2.1* for monitoring locations). Detailed description and discussion of the monitoring results are presented below.

### 3.1 RESULTS OF REA SURVEY

The seabed compositions along each transect of Zone A to C are described in *Table 3.1* while the seabed attributes were ranked as shown in *Tables 3.2a* and *3.2b*. Each taxon in the inventory was ranked in terms of relative abundance in the community and results recorded during the Baseline and Post Project Coral Surveys are shown in *Table 3.3a* and *3.3b*, respectively. Findings of the REA surveys are discussed below.

#### 3.1.1 Zone A - Cape Collinson

The seabed at the REA survey area of Zone A was predominately composed of bedrocks in shallow depth region (-2 to -5 m CD) while at deep depth region (-5 to -15m CD) the seabed was also mainly composed of bedrocks and boulders (*Tables 3.2a-b*). However, the deep depth region of Transect 1 was mainly composed of sand and boulders (*Tables 3.2a-b*). The estimated percentage covers of the major abiotic attributes were noted to be similar between the Baseline and Post Project Coral Surveys.

Both hard coral and octocoral covers were less than 5% in shallow depth region (2-5 m CD) as recorded during both the Baseline and Post Project Coral Surveys (*Tables 3.2a-b*). Compositions of coral assemblages were also noted to be similar between the Baseline and Post Project Coral Surveys, with up to sixteen (16) hermatypic hard coral species, one (1) ahermatypic hard coral species and six (6) octocoral species being recorded during both surveys (*Tables 3.3a-b*). A relatively more diverse and abundant octocoral community was found at deep depth region beyond -5 m CD. Up to twelve (12) species of octocorals and one (1) species of black corals were recorded during the Baseline and Post Project Coral Surveys. *Echinomuricea* sp. was the dominant octocoral species found in the monitoring area. All coral species recorded are

common and have a widespread distribution throughout Hong Kong's nearshore waters.

Overall, comparison of the Baseline and Post Project Coral Survey results did not indicate any detectable changes in coral assemblages at Zone A before and after the cable installation works. Therefore, there did not appear to be any unacceptable ecological impacts to coral assemblages at Zone A as a result of the cable installation works.

### 3.1.2 *Zone B - Tai Long Pai*

Two areas were selected around Tai Long Pai for REA survey (i.e. one located on the northwestern side, one on the southwestern side). The seabed was predominately composed of bedrocks in both shallow and deep depth zones (Tables 3.2a-b). The estimated percentage covers of the major abiotic attributes were noted to be similar between the Baseline and Post Project Coral Surveys.

Two (2) hermatypic hard coral species were recorded in shallow depth zone along the transect 1 located on the southwestern side of Tai Long Pai during the Baseline Coral Survey. However, owing to the low underwater visibility during the Post Project Coral Survey and the low abundance of hard corals at the monitoring area, hermatypic hard coral species was not recorded in the monitoring area during the Post Project Coral Survey. One (1) ahermatypic hard coral species was recorded in both shallow and deep depth region of the whole monitoring area during the Post Project Coral Survey. A relatively more diverse and abundant octocoral community was recorded in deep depth region in the entire Zone B. Ten (10) species of octocorals were recorded in relatively higher abundance while *Echinomuricea* sp. and *Dendronephthya* sp. were the dominant species. Two (2) species of black corals were recorded with higher abundance of *Cirrhopathes* sp. observed.

Overall, comparison of the Baseline and Post Project Coral Survey results did not indicate any detectable changes in coral assemblages at Zone B before and after the cable installation works. Therefore, there did not appear to be any unacceptable ecological impacts to coral assemblages at Zone B as a result of the cable installation works.

### 3.1.3 *Zone C - Tung Lung Chau*

The seabed in both shallow and deep depth zones of Zone C were predominately composed of bedrocks and large boulders (Tables 3.2a-b). The estimated percentage covers of the major abiotic attributes were noted to be similar between the Baseline and Post Project Coral Surveys.

Hard coral communities were recorded in shallow depth zone (- 2 to -5 mCD) with up to twenty one (21) hermatypic hard coral species, one (1) ahermatypic hard coral species and four (4) octocoral species recorded. Relatively high diversity and abundance of hard coral and octocorals were observed in deep depth zone (beyond -5 m CD) of Transect 2 compared to other transects. Hard coral including, *Montipora venosa*, *Pavona decussata*, *Plesiastrea versipora*

and *Porites* sp. and octocoral, including *Cladiella* sp., *Lobophytum* sp. and *Sinularia* sp., and *Dendronephthya* sp. were commonly observed in this area. All coral species recorded are common and have a widespread distribution throughout Hong Kong's nearshore waters.

Overall, comparison of the Baseline and Post Project Coral Survey results did not indicate any detectable changes in coral conditions at Zone C which serves as a Control station that is unlikely to be affected by the cable installation works.

**Table 3.1 Description of the Seabed Composition Recorded along Each REA Survey Transect <sup>(1)</sup>**

Transect	Depth (-m CD)	Description
<b>Zone A - Cape Collinson (Monitoring Station)</b>		
<b>Transect 1</b>		
Shallow	~3-5	The seabed was composed of rubbles and boulders. The hard coral cover was low (< 5%) with up to ten (10) hermatypic hard coral species recorded and the abundant species were <i>Porites</i> sp.. The octocoral cover was low (< 5%) with three (3) species ( <i>Sinularia</i> sp., <i>Dendronephthya</i> sp. and <i>Menella</i> sp.) recorded.
Deep	~10	The seabed was mainly composed of sand and boulders. The hard coral and black coral cover was low (< 5%) with six (6) hermatypic and one (1) ahermatypic hard coral species recorded and one (1) species of black coral. <i>Tubastrea/Dendrophyllia</i> sp., <i>Goniopora stutchburyi</i> and <i>Porites</i> sp. were commonly identified. The octocoral cover was low (< 6-10%) with eight (8) species of octocorals recorded. Gorgonians, <i>Echinomuricea</i> sp., were recorded to be dominant and growing on sand.
<b>Transect 2</b>		
Shallow	~3-5	The seabed was mainly composed of bedrocks (~60%) with some boulders (~30%). The hard coral cover was about 5% with up to eleven (11) hard coral species and colonies of <i>Porites</i> sp. were commonly recorded. The octocoral cover was low (< 5%) with only <i>Euplexaura</i> sp. recorded.
Deep	~8-9	The seabed was mainly composed of bedrocks (~50%). Sparse hard coral colonies of <i>Porites</i> sp., <i>Leptastrea pruinosa</i> and <i>Goniopora stutchburyi</i> and black coral, <i>Cirrhopathes</i> sp., were found with low coverage (< 5%). The octocoral cover was low (< 6-10%) with five (5) species recorded and the transect was dominant by gorgonians, <i>Echinomuricea</i> sp..
<b>Transect 3</b>		
Shallow	~3-5	The seabed was mainly composed of bedrocks and boulders. The coverage of hard coral and octocoral cover was low (< 5%) with five (5) species of hard coral and four (4) species of octocoral recorded. Small colonies of <i>Porites</i> sp. were commonly identified.

(1) Since conditions of major biotic and abiotic attributes are similar between the Baseline and Post Project Coral Monitoring Surveys, the descriptions of seabed composition provided in this table are based on data recorded from both surveys.

Transect	Depth (-m CD)	Description
Deep	~12	The seabed was mainly composed of bedrocks (~60%). Limited number of hard coral colonies, <i>Goniopora stutchburyi</i> and <i>Porites</i> sp., was found. The octocoral cover was about 6-10% with five (5) species recorded and the transect was dominant by gorgonians, <i>Echinomuricea</i> sp..

#### Zone B - Tai Long Pai (Monitoring Station)

##### Transect 1

Shallow	~2-5	The seabed was mainly composed of bedrocks (> 80%). Hard coral cover was very low (< 5%) with two hermatypic hard coral species ( <i>Plesiastrea versipora</i> and <i>Porites</i> sp.) recorded during the Baseline Coral Survey. The octocoral cover was about 5% with three (3) species ( <i>Dendronephthya</i> sp., <i>Scleronephythya</i> sp. and <i>Euplexaura</i> sp.) recorded.
Deep	~5-15	The seabed was mainly composed of bedrocks (> 80%). Ahermatypic hard coral species, <i>Tubastrea/Dendrophyllia</i> sp., was recorded with low coverage (<5%). The octocoral cover was about 11-30% with nine (9) species recorded. <i>Echinomuricea</i> sp. was the dominant soft coral species and <i>Anthogorgia</i> sp., <i>Dendronephthya</i> sp. and <i>Scleronephythya</i> sp. were commonly observed. Black coral colonies, <i>Antipathes curvata</i> and <i>Cirrhopathes</i> sp., were observed in low coverage (<5%).

##### Transect 2

Shallow	~2-5	The seabed was mainly composed of bedrocks (> 80%). No hermatypic hard coral cover was observed while one ahermatypic hard coral species, <i>Tubastrea/Dendrophyllia</i> sp., was recorded in low coverage (<5%) during the Post Project Coral Survey. The octocoral cover was about 5% with six (6) species recorded. The transect was dominated by <i>Dendronephthya</i> sp..
Deep	~5-15	The seabed was mainly composed of bedrocks (> 80%). Colonies of ahermatypic hard coral <i>Tubastrea/Dendrophyllia</i> sp. were found in high abundance. The octocoral cover was about 11-30% with eight (8) species recorded. <i>Echinomuricea</i> sp. was the dominant soft coral species and <i>Dendronephthya</i> sp., <i>Scleronephythya</i> sp. and <i>Astrogorgia</i> sp. were commonly found. Black coral colonies, <i>Antipathes curvata</i> and <i>Cirrhopathes</i> sp. were observed in low coverage (<5%).

#### Zone C - Tung Lung Chau (Control Station)

##### Transect 1

Shallow	~3-5	The seabed was mainly composed of bedrocks (~80%). Both hard coral and octocoral cover was very low (< 5%) with seven (7) hermatypic hard coral species, one (1) ahermatypic hard coral species and two (2) octocoral species recorded. This transect was dominated by ahermatypic hard coral <i>Tubastrea/Dendrophyllia</i> sp..
Deep	~10	The seabed was mainly composed of large boulders (~40%). The hard coral and octocoral cover was low (< 5%) with four (4) hermatypic hard coral species, one (1) ahermatypic hard coral species, two (2) octocoral species and one (1) black coral species recorded. Small colonies of <i>Porites</i> sp. were commonly found in this depth.

##### Transect 2

Shallow	~3-5	The seabed was mainly composed of bedrock and boulders. Both hard coral and octocoral cover was low (< 5%) with up to eleven (11) hermatypic hard coral species and three (3) species of octocoral recorded. Hard coral <i>Pavona decussata</i> were commonly recorded and only a few colonies of other hard coral and octocoral species were found.
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Transect	Depth (-m CD)	Description
Deep	~6-8	The seabed was mainly composed of bedrocks (~80%). The hard coral and octocoral cover was ~ 10% with higher diversity compared to other transects. Up to nineteen (19) hermatypic hard coral species, one (1) ahermatypic hard coral species and up to six (6) octocoral species were recorded. Commonly identified corals included <i>Montipora venosa</i> , <i>Pavona decussate</i> , <i>Plesiastrea versipora</i> and <i>Porites</i> sp. for hard coral species and <i>Cladiella</i> sp., <i>Lobophytum</i> sp., <i>Simularia</i> sp. and <i>Dendronephthya</i> sp. for octocoral species.
<b>Transect 3</b>		
Shallow	~3-5	The seabed was mainly composed of bedrocks and small boulders. The hard coral cover was low (<5%) with up to sixteen (16) hermatypic hard coral species recorded and most of the colonies identified were from Family Merulinidae, such as <i>Platygyra acuta</i> and <i>Favites pentagona</i> . The octocoral cover was very low (< 5%) with only small colonies of <i>Cladiella</i> sp. and <i>Dendronephthya</i> sp. recorded.
Deep	~9-10	The seabed was mainly composed of small boulders (~50%). The hard coral cover was low (< 5%) with fifteen (15) hermatypic hard coral species recorded, including <i>Montipora venosa</i> , <i>Plesiastrea versipora</i> , <i>Platygyra acuta</i> and <i>Porites</i> sp. The octocoral cover was low (< 10%) with only <i>Dendronephthya</i> sp. recorded.

**Table 3.2a Seabed Attributes along the REA Survey Transects during the Baseline Coral Survey**

Zone	A						B				C					
Depth <sup>(a)</sup>	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3
<b>Seabed attributes <sup>(b)</sup></b>																
Bedrock	2	5	3	1	5	5	6	6	6	6	6	4	4	3	6	1
Boulders - large	4	2	3	3	3	3	1	1	3	3	0	3	3	4	2	2
Boulders - small	2	2	3	3	2	2	1	1	2	2	0	3	3	2	0	4
Rock	1	1	1	1	1	1	0	0	0	0	1	2	1	1	0	1
Rubble	3	2	1	2	1	1	1	1	1	1	1	2	1	1	0	2
Sand	2	1	2	3	2	1	1	1	1	1	1	1	1	1	1	1
Silt	0	0	0	1	2	2	0	0	1	1	0	0	0	1	1	1
<b>Ecological attributes <sup>(b)</sup></b>																
Hard coral	1	1	1	1	1	1	1	1	0	1	1	1	1	1	2	1
Dead standing coral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octocoral	1	1	1	2	2	2	1	1	3	3	1	1	1	1	2	2
Black coral	0	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0
Turf algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macroalgae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coralline algae	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Notes:

(a) s = shallow water; d=deep water

(b) 1=<5% Cover, 2= 6-10% Cover, 3 = 11-30% Cover, 4 = 31-50% Cover, 5 = 51-75% Cover, 6 = 76-100% Cover.



**Table 3.2b Seabed Attributes along the REA Survey Transects during the Post Project Coral Survey**

<b>Zone</b>	<b>A</b>						<b>B</b>				<b>C</b>					
<b>Depth (a)</b>	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3
<b>Seabed attributes (b)</b>																
Bedrock	2	5	3	1	5	5	6	6	6	6	6	4	4	3	6	1
Boulders - large	4	2	3	3	3	3	1	1	3	3	0	3	3	4	2	2
Boulders - small	2	2	3	3	2	2	1	1	2	2	0	3	3	2	0	4
Rock	1	1	1	1	1	1	0	0	0	0	1	2	1	1	0	1
Rubble	3	2	1	2	1	1	1	1	1	1	1	2	1	1	0	2
Sand	2	1	2	3	2	1	1	1	1	1	1	1	1	1	1	1
Silt	0	0	0	1	2	2	0	0	1	1	0	0	0	1	1	1
<b>Ecological attributes (b)</b>																
Hard coral	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Dead standing coral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octocoral	1	1	1	2	2	2	1	1	3	3	1	1	1	1	2	2
Black coral	0	0	0	1	1	0	0	0	2	2	0	0	0	1	0	0
Turf algae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macroalgae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coralline algae	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Notes:

(a) s = shallow water; d=deep water

(b) 1=<5% Cover, 2= 6-10% Cover, 3 = 11-30% Cover, 4 = 31-50% Cover, 5 = 51-75% Cover, 6 = 76-100% Cover.

**Table 3.3a Ordinal Rank of Taxon Abundance along the REA Survey Transects during the Baseline Coral Survey**

Type	Taxon/ Family	Species	Zone																	
			A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C		
		<b>Depth <sup>(a)</sup></b>	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3		
Hard Coral	Acroporidae	<i>Acropora digitifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
		<i>Acropora valida</i>	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	1		
		<i>Acropora solitaryensis</i>	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1		
		<i>Montipora venosa</i>	0	0	0	0	0	0	0	0	0	0	0	1	1	0	3	2		
	Agariciidae	<i>Pavona decussata</i>	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0		
	Coscinaraeidae	<i>Coscinaraea</i> sp.	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Dendrophyllidae	<i>Turbinaria peltata</i>	0	1	0	1	0	0	0	0	0	0	0	1	0	0	2	0		
		<i>Tubastrea/</i>	0	0	0	3	0	0	2	2	5	5	5	0	0	2	1	0		
		<i>Dendrophyllia</i> sp.																		
	Incertae sedis	<i>Leptastrea pruinosa</i>	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0		
		<i>Plesiastrea versipora</i>	3	2	2	1	0	0	1	0	0	0	2	2	1	1	3	2		
	Lobophylliidae	<i>Acanthastrea echinata</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1		
		<i>Echinophyllia aspera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	Merulinidae	<i>Cyphastrea chalcidicum</i>	1	1	0	0	0	0	0	0	0	0	1	0	1	0	2	1		
		<i>Cyphastrea serailia</i>	2	2	0	1	0	0	0	0	0	0	1	0	2	0	2	0		
		<i>Dipsastraea lizardensis</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		<i>Dipsastraea speciosa</i>	1	2	0	1	0	0	0	0	0	0	1	0	1	0	2	0		
		<i>Dipsastraea rutumana</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		
		<i>Favites abdita</i>	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1		
		<i>Favites chinensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1		
		<i>Favites flexuosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1		
		<i>Favites pentagona</i>	0	2	0	0	0	0	0	0	0	0	0	1	3	0	2	1		
		<i>Hydnophora exesa</i>	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0		
		<i>Platygyra acuta</i>	0	0	0	0	0	0	0	0	0	0	0	1	3	0	2	2		
		<i>Platygyra carnosus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
		Poritidae	<i>Goniopora columna</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			<i>Goniopora stutchburyi</i>	3	0	1	3	1	1	0	0	0	0	1	0	1	0	0	0	
	<i>Goniopora planulata</i>		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
		<i>Porites</i> sp.	4	3	3	3	1	1	1	0	0	0	2	0	1	3	3	2		
Psammocoridae	<i>Psammocora superficialis</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0			

Type	Taxon/ Family	Species	Zone																	
			A						B				C							
		Depth <sup>(a)</sup>	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3		
<b>Octocoral</b>	Acanthogorgiidae	<i>Acanthogorgia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		<i>Anthogorgia</i> sp.	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0		
		<i>Muricella</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Alcyoniidae	<i>Cladiella</i> sp.	0	0	0	0	0	0	0	1	0	0	0	1	3	0	3	0		
		<i>Lobophytum</i> sp.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0		
		<i>Sinularia</i> sp.	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0		
	Gorgoniidae	<i>Leptogorgia</i> sp.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		
	Nidaliidae	<i>Nephtyigorgia</i> sp.	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		
	Nephtheidae	<i>Dendronephthya</i> sp.	4	0	1	2	2	2	4	4	3	4	1	1	1	2	3	2		
		<i>Scleronephythya gracillicum</i>	0	0	0	1	0	0	3	1	3	2	0	0	0	0	0	0		
	Plexauridae	<i>Astrogorgia</i> sp.	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0		
		<i>Bebryce</i> sp.	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		
		<i>Echinogorgia</i> sp.	0	0	0	3	0	1	0	0	1	2	0	0	0	0	0	0		
		<i>Echinomuricea</i> sp.	0	0	0	5	5	5	0	1	5	3	0	0	0	1	0	0		
		<i>Euplexaura</i> sp.	0	1	2	1	2	1	1	3	3	1	0	0	0	0	0	0		
		<i>Menella</i> sp.	1	0	0	3	2	0	0	0	1	2	0	0	0	0	0	0		
		<i>Paraplexaura</i> sp.	0	0	1	1	0	1	0	3	0	0	1	0	0	0	1	0		
	Ellisellidae	<i>Ellisella</i> sp.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Dichotella gemmacea</i>		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0			
<b>Black Coral</b>	<i>Antipathidae</i>	<i>Antipathes</i> sp.	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0		
		<i>Cirrhopathes</i> sp.	0	0	0	1	2	0	0	0	4	1	0	0	0	0	0	0		

Notes:

(a) s = shallow water; d=deep water

(b) 1=Rare, 2= Uncommon, 3 = Common, 4 = Abundant, 5 = Dominant.

Table 3.3b Ordinal Rank of Taxon Abundance along the REA Survey Transects during the Post Project Coral Survey

Type	Taxon/ Family	Species	Zone																	
			A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C		
		<b>Depth <sup>(a)</sup></b>	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3		
Hard Coral	Acroporidae	<i>Acropora digitifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
		<i>Acropora valida</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2	1	
		<i>Acropora solitaryensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	
		<i>Montipora venosa</i>	1	2	0	0	0	0	0	0	0	0	0	0	1	1	0	3	2	
	Agariciidae	<i>Pavona decussata</i>	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0		
	Coscinaraeidae	<i>Coscinaraea</i> sp.	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0		
	Dendrophyllidae	<i>Turbinaria peltata</i>	0	1	0	1	0	0	0	0	0	0	0	1	0	0	2	0		
		<i>Tubastrea/</i>																		
		<i>Dendrophyllia</i> sp.	0	0	0	2	1	0	2	2	5	5	5	0	0	2	1	0		
	Incertae sedis	<i>Leptastrea pruinosa</i>	0	0	1	0	1	0	0	0	0	0	2	2	0	0	0	0		
		<i>Oulastrea crispata</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		<i>Plesiastrea versipora</i>	3	2	2	1	0	0	0	0	0	0	2	2	1	1	3	2		
	Lobophylliidae	<i>Acanthastrea echinata</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1		
		<i>Echinophyllia aspera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	Merulinidae	<i>Cyphastrea chalcidicum</i>	1	1	0	0	0	0	0	0	0	0	1	0	1	0	2	1		
		<i>Cyphastrea microphthalma</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0		
		<i>Cyphastrea serailia</i>	2	2	0	1	0	0	0	0	0	0	1	0	2	0	2	0		
		<i>Dipsastraea lizardensis</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		<i>Dipsastraea maritima</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0		
		<i>Dipsastraea speciosa</i>	1	2	0	1	0	0	0	0	0	0	1	0	1	0	2	0		
		<i>Dipsastraea rutumana</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		
		<i>Favites abdita</i>	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1		
		<i>Favites chinensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1		
		<i>Favites flexuosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1		
		<i>Favites pentagona</i>	0	2	0	0	0	0	0	0	0	0	0	1	3	0	2	1		
		<i>Hydnophora exesa</i>	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0		
		<i>Platygyra acuta</i>	0	0	0	0	0	0	0	0	0	0	0	1	3	0	2	2		
		<i>Platygyra carnosus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
		Poritidae	<i>Goniopora columna</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			<i>Goniopora stutchburyi</i>	3	0	1	3	1	1	0	0	0	0	1	0	1	0	0	0	

Type	Taxon/ Family	Species	Zone																	
			A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C		
		<b>Depth <sup>(a)</sup></b>	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3		
		<i>Goniopora planulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
		<i>Porites</i> sp.	4	3	3	3	1	1	0	0	0	0	2	0	1	3	3	2		
	Psammocoridae	<i>Psammocora superficialis</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		
<b>Octocoral</b>	Acanthogorgiidae	<i>Acanthogorgia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		<i>Anthogorgia</i> sp.	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	
		<i>Muricella</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Alcyoniidae	<i>Cladiella</i> sp.	0	0	0	0	0	0	0	0	1	0	0	0	1	3	0	3	0	
		<i>Lobophytum</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	
		<i>Sinularia</i> sp.	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	
	Gorgoniidae	<i>Leptogorgia</i> sp.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Nidaliidae	<i>Nephtyigorgia</i> sp.	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
	Nephtheidae	<i>Dendronephthya</i> sp.	4	0	1	2	2	2	2	4	4	3	4	1	1	1	2	3	2	
		<i>Scleronephythya gracillicum</i>	0	0	0	1	0	0	0	3	1	3	2	0	0	0	0	2	0	
	Plexauridae	<i>Astroorgia</i> sp.	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
		<i>Bebryce</i> sp.	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
		<i>Echinogorgia</i> sp.	0	0	0	3	0	1	0	0	0	1	2	0	0	0	0	0	0	
		<i>Echinomuricea</i> sp.	0	0	0	5	5	5	0	1	5	3	0	0	0	0	1	0	0	
		<i>Euplexaura</i> sp.	0	1	2	1	2	1	1	3	3	1	0	0	0	0	0	0	0	
		<i>Menella</i> sp.	1	0	0	3	2	0	0	0	1	2	0	0	0	0	0	0	0	
		<i>Paraplexaura</i> sp.	0	0	1	1	0	1	0	3	0	0	1	0	0	0	0	1	0	
	Ellisellidae	<i>Ellisella</i> sp.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		<i>Dichotella gemmacea</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
	<b>Black Coral</b>	Antipathidae	<i>Antipathes</i> sp.	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	
<i>Cirrhopathes</i> sp.			0	0	0	1	2	0	0	0	4	1	0	0	0	0	1	0	0	

Notes:

(a) s = shallow water; d=deep water

(b) 1=Rare, 2= Uncommon, 3 = Common, 4 = Abundant, 5 = Dominant.

Coral Colony Monitoring was undertaken at Zone A, Zone B and Zone C during Baseline and Post Project Coral Surveys. The monitoring area was the same as the REA survey area (Figure 2.1).

The following data were collected for the identified hard coral, soft coral, black coral and gorgonian colonies and summarized in Tables 3.4 to 3.9:

- Maximum diameter of the identified hard coral and soft coral colonies;
- Maximum height and width of the identified gorgonians and black corals;
- Percentage of sediment cover on the identified colonies and the colouration, texture and approximate thickness of sediment on the coral colonies and adjacent substrate. Any contiguous patches of sediment cover >10 % were recorded;
- Percentage of bleached area on the identified colonies of which two categories were recorded: a. blanched (i.e. pale) and b. bleached (i.e. whitened);
- Percentage of colony area showing partiality mortality; and
- Physical damage to colonies, tissue distension, mucous production and any other factors relevant will be noted in the field.

Photographic records of the identified coral colonies are shown in Annex A. Coral colonies with similar growth forms and size to those monitored during the Baseline Coral Survey were being selected and measured during the Post Project Coral Survey.

Due to the natural high sedimentation rate in the Monitoring stations and Control station, encrusting (i.e. *Leptastrea pruinosa*, *Porites* sp.) and submassive (i.e. *Goniopora stutchburyi*, *Cyphastrea serailia*) hermatypic hard corals were commonly found to be covered by sediments of less than 1 mm thickness during both Baseline and Post Project Coral Surveys (Tables 3.4 – 3.9). Octocorals, except for *Lobophytum* sp., *Sinularia* sp., *Bebryce* sp., *Dendronephthya* sp., *Scleronephthya gracillicum*, were generally free of sediments. Monitoring results indicated that similar sediment cover was recorded on the selected coral colonies, which were mainly encrusting and submassive forms of hard coral colonies, at all three monitoring stations (Cape Collinson, Tai Long Pai and Tung Lung Chau) during both Baseline and Post Project Coral Surveys. In addition, the selected coral colonies did not exhibit any sign of bleaching, partial mortality or physical damage at all monitoring stations during both surveys.

Overall, the conditions of coral colonies recorded during the Post Project Coral Survey were similar to those recorded during the Baseline Coral Survey.

There thus did not appear to be any unacceptable impacts to the conditions of coral colonies as a result of the cable installation works.

Table 3.4 Results of Coral Colony Monitoring in Zone A (Cape Collinson) during the Baseline Coral Survey

Coral No.	Family	Genus	Species	Max. diameter (cm)	Max. height (cm)	Max. width (cm)	Sediment cover (%)	Sediment color	Sediment Texture	Sediment thickness (cm)	Bleached area (%)	Partial mortality (%)	Physical damage to colonies
<b>Hard Corals</b>													
1	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	18	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
2	Poritidae	<i>Goniopora</i>	<i>stuchburyi</i>	17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	21	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	60	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
6	Poritidae	<i>Porites</i>	-	64	N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A
7	Merulinidae	<i>Favites</i>	<i>abditata</i>	19	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
8	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	54	N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A
9	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	53	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Poritidae	<i>Porites</i>	-	47	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
11	Poritidae	<i>Porites</i>	-	38	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
12	Poritidae	<i>Porites</i>	-	33	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
13	Merulinidae	<i>Dipsastraea</i>	<i>speciosa</i>	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	69	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
15	Dendrophylliidae	<i>Turbinaria</i>	<i>peltata</i>	20	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
<b>Octocorals/Black Corals</b>													
1	Plexauridae	<i>Menella</i>	-	N/A	30	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Ellisellidae	<i>Dichotella</i>	<i>gemmaea</i>	N/A	42	11	1	N/A	N/A	N/A	N/A	N/A	N/A
3	Nephtheidae	<i>Dendronephthya</i>	-	33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Plexauridae	<i>Echinomuricea</i>	-	N/A	20	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Plexauridae	<i>Menella</i>	-	N/A	50	58	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Nephtheidae	<i>Dendronephthya</i>	-	36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Plexauridae	<i>Echinomuricea</i>	-	N/A	41	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Plexauridae	<i>Echinomuricea</i>	-	N/A	37	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Plexauridae	<i>Echinomuricea</i>	-	N/A	24	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Plexauridae	<i>Echinogorgia</i>	-	N/A	27	12	N/A	N/A	N/A	N/A	N/A	10	N/A
11	Nephtheidae	<i>Dendronephthya</i>	-	22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Nephtheidae	<i>Dendronephthya</i>	-	16	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
13	Plexauridae	<i>Paraplexaura</i>	-	N/A	10	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Ellisellidae	<i>Ellisella</i>	-	N/A	18	22	1	N/A	N/A	N/A	N/A	N/A	N/A
15	Plexauridae	<i>Euplexaura</i>	-	N/A	39	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A



Table 3.5 Results of Coral Colony Monitoring in Zone A (Cape Collinson) during the Post Project Coral Survey

Coral No.	Family	Genus	Species	Max. diameter (cm)	Max. height (cm)	Max. width (cm)	Sediment cover (%)	Sediment color	Sediment Texture	Sediment thickness (mm)	Bleached area (%)	Partial mortality (%)	Physical damage to colonies
<b>Hard Corals</b>													
1	Poritidae	<i>Porites</i>	-	34	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
2	Poritidae	<i>Porites</i>	-	22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Poritidae	<i>Porites</i>	-	26	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Merulinidae	<i>Favites</i>	<i>abditia</i>	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Merulinidae	<i>Favites</i>	<i>abditia</i>	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Merulinidae	<i>Favites</i>	<i>abditia</i>	36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	72	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
9	Merulinidae	<i>Cyphastrea</i>	<i>serailia</i>	23	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	43	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
11	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Merulinidae	<i>Favites</i>	<i>abditia</i>	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Acroporidae	<i>Montipora</i>	<i>venosa</i>	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Octocorals/Black Corals</b>													
1	Plexauridae	<i>Echinomuricea</i>	-	N/A	25	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Plexauridae	<i>Echinomuricea</i>	-	N/A	34	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Plexauridae	<i>Echinomuricea</i>	-	N/A	23	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Plexauridae	<i>Paraplexaura</i>	-	N/A	22	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Plexauridae	<i>Echinomuricea</i>	-	N/A	25	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Plexauridae	<i>Echinomuricea</i>	-	N/A	26	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Plexauridae	<i>Echinomuricea</i>	-	N/A	40	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Plexauridae	<i>Echinomuricea</i>	-	N/A	23	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Nephtheidae	<i>Dendronephthya</i>	-	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Plexauridae	<i>Echinomuricea</i>	-	N/A	26	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Ellisellidae	<i>Dichotella</i>	<i>gemmacea</i>	N/A	25	6	N/A	N/A	N/A	N/A	N/A	5	N/A
12	Nephtheidae	<i>Dendronephthya</i>	-	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Plexauridae	<i>Euplexaura</i>	-	N/A	28	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Plexauridae	<i>Euplexaura</i>	-	N/A	24	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Nephtheidae	<i>Dendronephthya</i>	-	19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3.6 Results of Coral Colony Monitoring in Zone B (Tai Long Pai) during the Baseline Coral Survey

Coral No.	Family	Genus	Species	Max. diameter (cm)	Max. height (cm)	Max. width (cm)	Sediment cover (%)	Sediment color	Sediment Texture	Sediment thickness (cm)	Bleached area (%)	Partial mortality	Physical damage to colonies
<b>Hard Corals</b>													
1	Poritidae	<i>Porites</i>	-	29	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
2	Poritidae	<i>Porites</i>	-	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	9	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Dendrophyllidae	<i>Dendrophyllia</i>	-	11	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
5	Dendrophyllidae	<i>Dendrophyllia</i>	-	5	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
6	Dendrophyllidae	<i>Dendrophyllia</i>	-	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Dendrophyllidae	<i>Dendrophyllia</i>	-	4	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
8	Dendrophyllidae	<i>Dendrophyllia</i>	-	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Dendrophyllidae	<i>Dendrophyllia</i>	-	8	N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A
10	Dendrophyllidae	<i>Dendrophyllia</i>	-	5	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
11	Dendrophyllidae	<i>Dendrophyllia</i>	-	10	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
12	Dendrophyllidae	<i>Dendrophyllia</i>	-	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	15	N/A	N/A	N/A	Light yellow	Fine	<1mm	N/A	N/A	N/A
14	Poritidae	<i>Porites</i>	-	8	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
15	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	43	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
<b>Octocorals/Black Corals</b>													
1	Nephtheidae	<i>Dendronephthya</i>	-	11	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
2	Nephtheidae	<i>Dendronephthya</i>	-	14	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
3	Nephtheidae	<i>Dendronephthya</i>	-	13	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Nephtheidae	<i>Scleronephthya</i>	<i>gracillicum</i>	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Nephtheidae	<i>Scleronephthya</i>	<i>gracillicum</i>	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Nephtheidae	<i>Scleronephthya</i>	<i>gracillicum</i>	36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Plexauridae	<i>Bebryce</i>	-	N/A	26	15	N/A	Light yellow	Fine	<1mm	N/A	N/A	N/A
8	Acanthogorgiidae	<i>Anthogorgia</i>	-		9	10	1	N/A	N/A	N/A	N/A	N/A	N/A
9	Nephtheidae	<i>Scleronephthya</i>	<i>gracillicum</i>	35	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
10	Nephtheidae	<i>Scleronephthya</i>	<i>gracillicum</i>	28	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
11	Alcyoniidae	<i>Cladiella</i>	-	7	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
12	Plexauridae	<i>Euplexaura</i>	-	N/A	11	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Plexauridae	<i>Echinomuricea</i>	-	N/A	31	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Nephtheidae	<i>Dendronephthya</i>	-	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Nephtheidae	<i>Dendronephthya</i>	-	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3.7 Results of Coral Colony Monitoring in Zone B (Tai Long Pai) during the Post Project Coral Survey

Coral No.	Family	Genus	Species	Max. diameter (cm)	Max. height (cm)	Max. width (cm)	Sediment cover (%)	Sediment color	Sediment Texture	Sediment thickness (cm)	Bleached area (%)	Partial mortality	Physical damage to colonies
<b>Hard Corals</b>													
1	Dendrophyllidae	<i>Dendrophyllia</i>	-	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Dendrophyllidae	<i>Dendrophyllia</i>	-	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Dendrophyllidae	<i>Dendrophyllia</i>	-	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Dendrophyllidae	<i>Dendrophyllia</i>	-	10	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
5	Dendrophyllidae	<i>Dendrophyllia</i>	-	7	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
6	Dendrophyllidae	<i>Dendrophyllia</i>	-	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Dendrophyllidae	<i>Dendrophyllia</i>	-	5	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
8	Dendrophyllidae	<i>Dendrophyllia</i>	-	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Dendrophyllidae	<i>Dendrophyllia</i>	-	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Dendrophyllidae	<i>Dendrophyllia</i>	-	9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Dendrophyllidae	<i>Dendrophyllia</i>	-	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Dendrophyllidae	<i>Dendrophyllia</i>	-	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Dendrophyllidae	<i>Dendrophyllia</i>	-	7	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
14	Dendrophyllidae	<i>Dendrophyllia</i>	-	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Dendrophyllidae	<i>Dendrophyllia</i>	-	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Octocorals/Black Corals</b>													
1	Nephtheidae	<i>Dendronephthya</i>	-	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Nephtheidae	<i>Dendronephthya</i>	-	11	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
3	Nephtheidae	<i>Dendronephthya</i>	-	11	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Nephtheidae	<i>Scleronephthya</i>	<i>gracillicum</i>	18	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
5	Nephtheidae	<i>Dendronephthya</i>	-	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Plexauridae	<i>Echinomuricea</i>	-	N/A	18	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Nephtheidae	<i>Dendronephthya</i>	-	24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Plexauridae	<i>Paraplexaura</i>	-	N/A	25	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Plexauridae	<i>Echinomuricea</i>	-	N/A	20	9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Plexauridae	<i>Echinomuricea</i>	-	N/A	17	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Plexauridae	<i>Echinomuricea</i>	-	N/A	16	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Plexauridae	<i>Echinomuricea</i>	-	N/A	30	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Nephtheidae	<i>Dendronephthya</i>	-	22	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
14	Plexauridae	<i>Echinomuricea</i>	-	N/A	25	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Nephtheidae	<i>Dendronephthya</i>	-	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3.8 Results of Coral Colony Monitoring in Zone C (Tung Lung Chau) during the Baseline Coral Survey

Coral No.	Family	Genus	Species	Max. diameter (cm)	Max. height (cm)	Max. width (cm)	Sediment cover (%)	Sediment color	Sediment Texture	Sediment thickness (cm)	Bleached area (%)	Partial mortality	Physical damage to colonies
<b>Hard Corals</b>													
1	Poritidae	<i>Porites</i>	-	45	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
2	Poritidae	<i>Porites</i>	-	24	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
3	Poritidae	<i>Porites</i>	-	16	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
4	Poritidae	<i>Porites</i>	-	8	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
5	Dendrophyllidae	<i>Dendrophyllia</i>	-	27	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
6	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	40	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
7	Poritidae	<i>Goniopora</i>	<i>stuchburyi</i>	18	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
8	Merulinidae	<i>Dipsastraea</i>	<i>speciosa</i>	32	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
9	Merulinidae	<i>Cyphastrea</i>	<i>chalcidicum</i>	20	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
10	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	45	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
11	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	20	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
12	Merulinidae	<i>Cyphastrea</i>	<i>serailia</i>	9	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
13	Merulinidae	<i>Cyphastrea</i>	<i>serailia</i>	60	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
14	Acroporidae	<i>Acropora</i>	<i>valida</i>	17	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
15	Merulinidae	<i>Platygyra</i>	<i>acuta</i>	17	N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A
<b>Octocorals/Black Corals</b>													
1	Plexauridae	<i>Menella</i>	-	N/A	52	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Nephtheidae	<i>Dendronephthya</i>	-	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Nephtheidae	<i>Dendronephthya</i>	-	27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Alcyoniidae	<i>Cladiella</i>	-	36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Alcyoniidae	<i>Cladiella</i>	-	26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Alcyoniidae	<i>Cladiella</i>	-	52	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
7	Plexauridae	<i>Paraplexaura</i>	-	N/A	30	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Nephtheidae	<i>Dendronephthya</i>	-	15	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
9	Alcyoniidae	<i>Lobophytum</i>	-	44	N/A	N/A	N/A	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Alcyoniidae	<i>Lobophytum</i>	-	34	N/A	N/A	N/A	Light yellow	Fine	<1mm	N/A	N/A	N/A
11	Alcyoniidae	<i>Sinularia</i>	<i>brassica</i>	45	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
12	Alcyoniidae	<i>Sinularia</i>	<i>brassica</i>	35	N/A	N/A	N/A	Light yellow	Fine	<1mm	N/A	N/A	N/A
13	Alcyoniidae	<i>Lobophytum</i>	-	40	N/A	N/A	N/A	Light yellow	Fine	<1mm	N/A	N/A	N/A
14	Alcyoniidae	<i>Lobophytum</i>	-	40	N/A	N/A	N/A	Light yellow	Fine	<1mm	N/A	N/A	N/A
15	Nephtheidae	<i>Dendronephthya</i>	-	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 3.9 Results of Coral Colony Monitoring in Zone C (Tung Lung Chau) during the Post Project Coral Survey**

Coral No.	Family	Genus	Species	Max. diameter (cm)	Max. height (cm)	Max. width (cm)	Sediment cover (%)	Sediment color	Sediment Texture	Sediment thickness (cm)	Bleached area (%)	Partial mortality	Physical damage to colonies
<b>Hard Corals</b>													
1	Poritidae	<i>Porites</i>	-	20	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
2	Poritidae	<i>Porites</i>	-	20	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
3	Poritidae	<i>Porites</i>	-	21	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Acroporidae	<i>Montipora</i>	<i>venosa</i>	31	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
6	Poritidae	<i>Porites</i>	-	41	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
7	Merulinidae	<i>Dipsastraea</i>	<i>speciosa</i>	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Merulinidae	<i>Leptastrea</i>	<i>pruinosa</i>	22	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
9	Poritidae	<i>Goniopora</i>	<i>stuchburyi</i>	13	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Merulinidae	<i>Plesiastrea</i>	<i>versipora</i>	9	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
11	Siderastreidae	<i>Coscinaraea</i>	-	20	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
12	Merulinidae	<i>Favites</i>	<i>chinensis</i>	48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Merulinidae	<i>Dipsastraea</i>	<i>maritima</i>	12	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
14	Poritidae	<i>Goniopora</i>	<i>stuchburyi</i>	23	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
15	Merulinidae	<i>Platygyra</i>	<i>carnosus</i>	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Octocorals/Black Corals</b>													
1	Alcyoniidae	<i>Sinularia</i>	<i>brassica</i>	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Alcyoniidae	<i>Sinularia</i>	<i>brassica</i>	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Alcyoniidae	<i>Lobophytum</i>	-	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Alcyoniidae	<i>Lobophytum</i>	-	19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Alcyoniidae	<i>Sinularia</i>	<i>brassica</i>	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Plexauridae	<i>Paraplexaura</i>	-	N/A	27	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Nephtheidae	<i>Dendronephthya</i>	-	22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Nephtheidae	<i>Scleronephthya</i>	<i>gracillicum</i>	42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Alcyoniidae	<i>Cladiella</i>	-	67	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Nephtheidae	<i>Dendronephthya</i>	-	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Nephtheidae	<i>Dendronephthya</i>	-	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Nephtheidae	<i>Dendronephthya</i>	-	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Plexauridae	<i>Paraplexaura</i>	-	N/A	34	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Nephtheidae	<i>Dendronephthya</i>	-	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Nephtheidae	<i>Dendronephthya</i>	-	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

In accordance with the *EM&A Manual*, Post Project Coral Survey was undertaken on 20 and 21 June 2016 at three designated monitoring zones (ie including two Monitoring stations at Cape Collinson and Tai Long Pai, and one Control station at Tung Lung Chau) within one month after completion of the marine installation works in order to determine any detectable changes in coral conditions and health status which may be caused by the installation of the submarine cable. REA surveys and Coral Colony Monitoring were conducted for the Post Project Coral Survey and the methodology adopted is the same as that for the Baseline Coral Survey undertaken before the cable installation works. The employment of the same methodology allows for direct comparison of coral conditions and health status before and after the cable installation works and hence, determines any detectable changes in coral assemblages concerned which may be caused by the Project.

Comparison of REA survey data indicated that the conditions of the coral assemblages were similar before and after cable installation works, with similar cover and composition of major abiotic and biotic attributes between the Baseline and Post Project Coral Surveys at the three monitoring stations. In addition, results of Coral Colony Monitoring showed that the conditions of coral colonies were similar between the Baseline and Post Project Coral Surveys. Sediment covers recorded on the identified coral colonies at all three monitoring stations were similar, ranged between 0 to 5%, during both the Baseline and Post Project Coral Surveys. The selected coral colonies did not exhibit any sign of bleaching, partial mortality or physical damage during both Baseline and Post Project Coral Surveys.


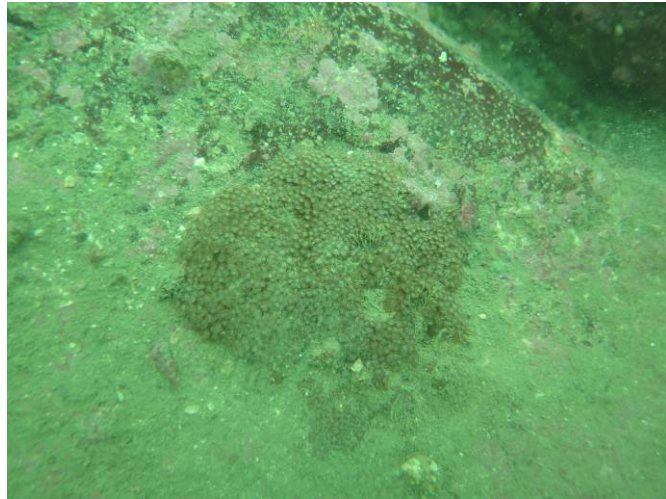




Overall, there did not appear to be any unacceptable impacts to corals as a result of the cable installation works.

Annex A

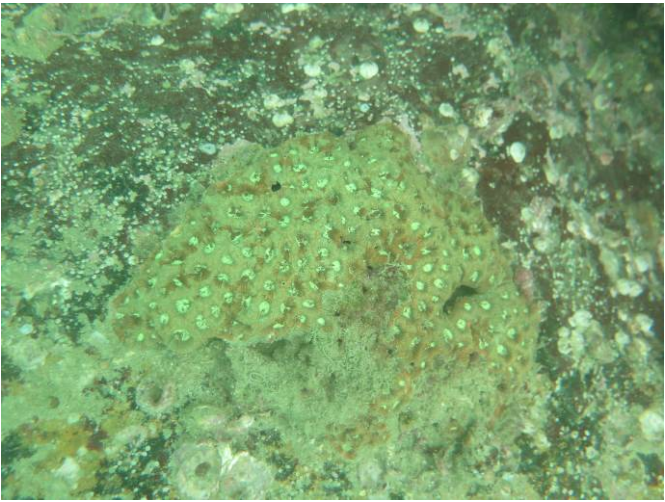
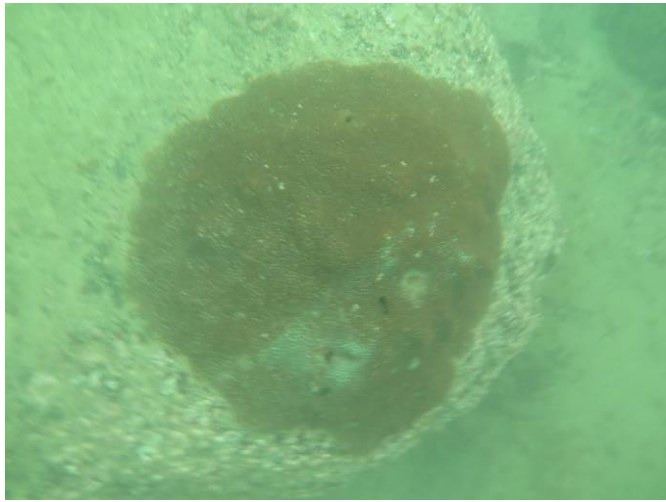




Photographic Results of  
Identified Coral Colonies in  
Zone A, B & C



*Annex A1 Photographic Records of Identified Hard Coral Colonies at Impact Monitoring Site (Zone A - Cape Collinson) during the Baseline Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



<p align="center"><b>Colony No. 7</b></p>	<p align="center"><b>Colony No. 8</b></p>	<p align="center"><b>Colony No. 9</b></p>
		
<p align="center"><b>Colony No. 10</b></p>	<p align="center"><b>Colony No. 11</b></p>	<p align="center"><b>Colony No. 12</b></p>
		

**Colony No. 13**



**Colony No. 14**

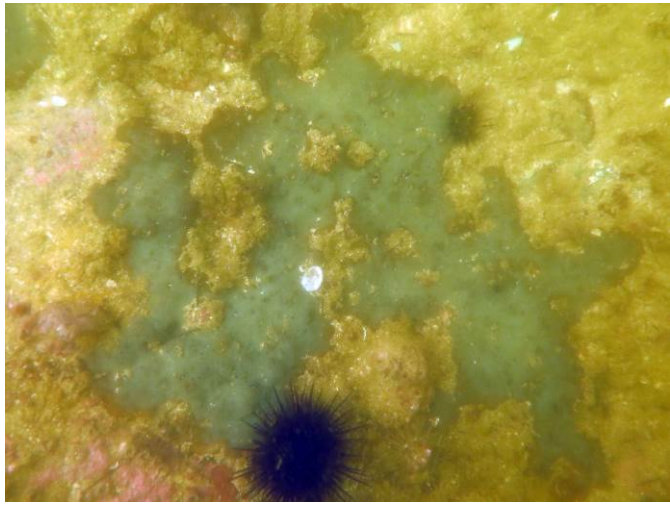

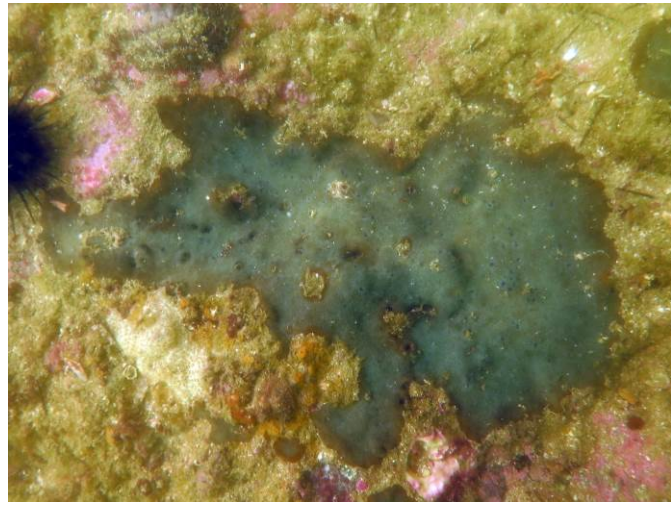


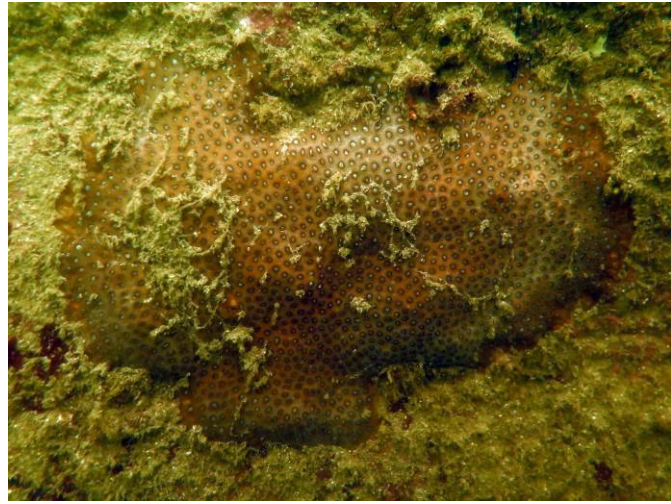


**Colony No. 15**

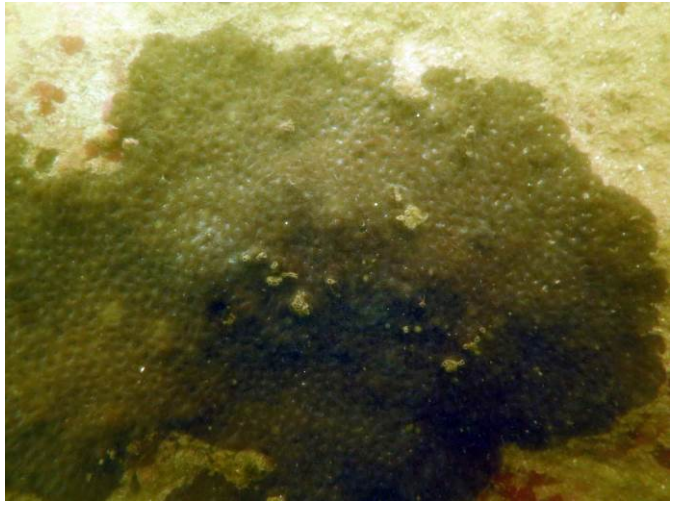
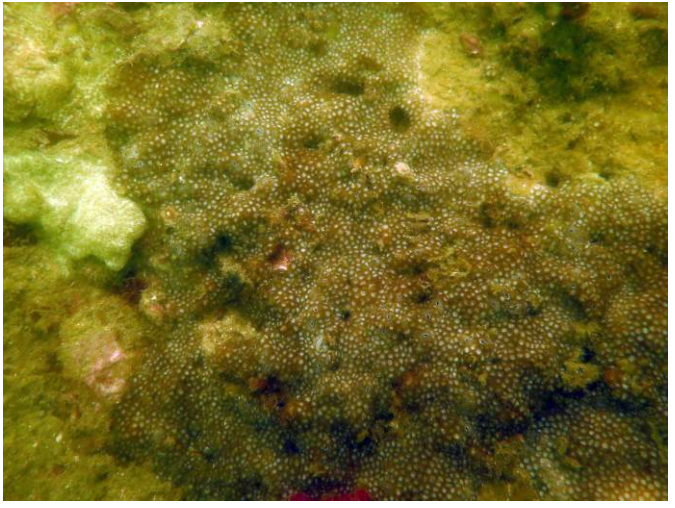
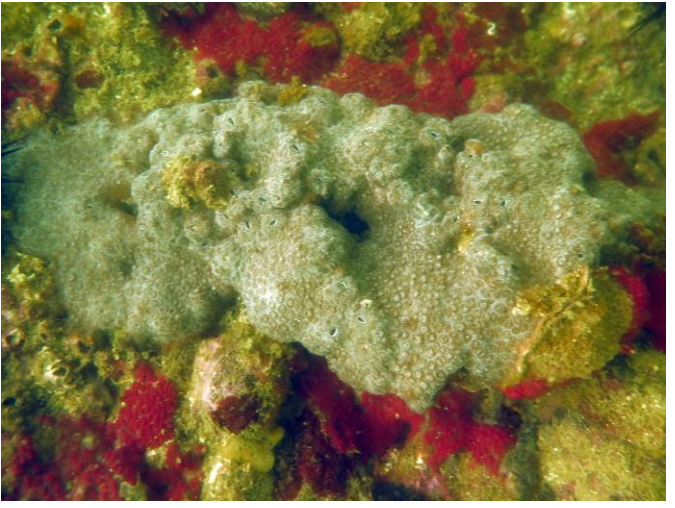
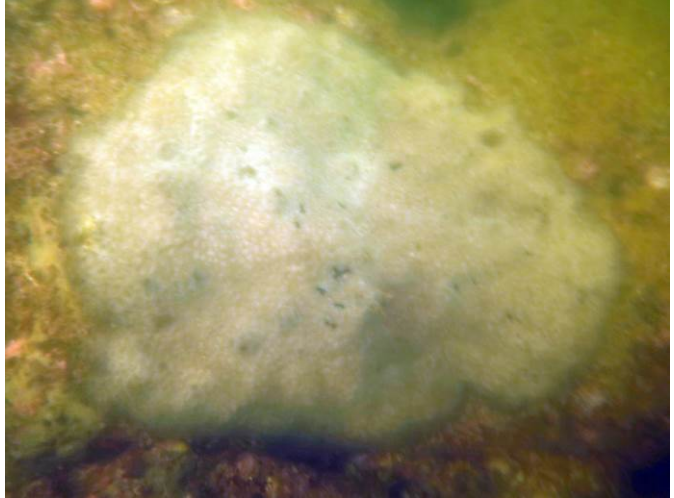






*Annex A2 Photographic Records of Identified Hard Coral Colonies at Impact Monitoring Site (Zone A - Cape Collinson) during the Post Project Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



Colony No. 7	Colony No. 8	Colony No. 9
		
Colony No. 10	Colony No. 11	Colony No. 12
		





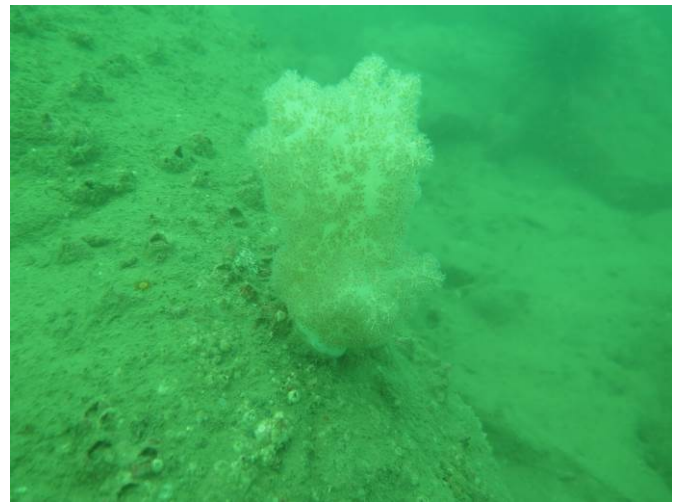
**Colony No. 13**

**Colony No. 14**







**Colony No. 15**



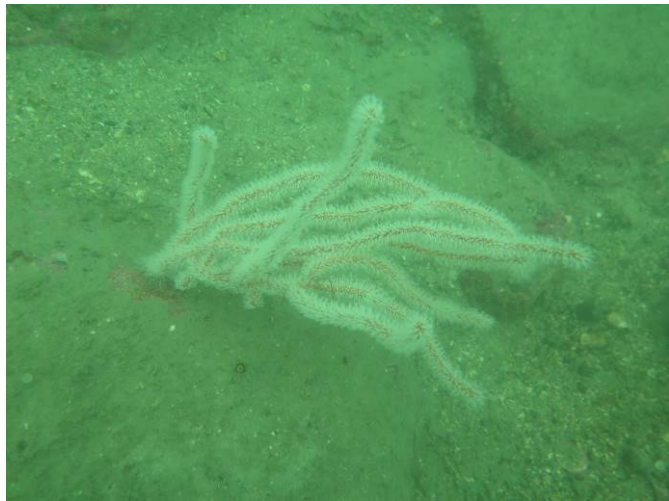
*Annex A3 Photographic Records of Identified Octocoral/Black Coral Colonies at Impact Monitoring Site (Zone A - Cape Collinson) during the Baseline Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



Colony No. 7	Colony No. 8	Colony No. 9
		
Colony No. 10	Colony No. 11	Colony No. 12
		

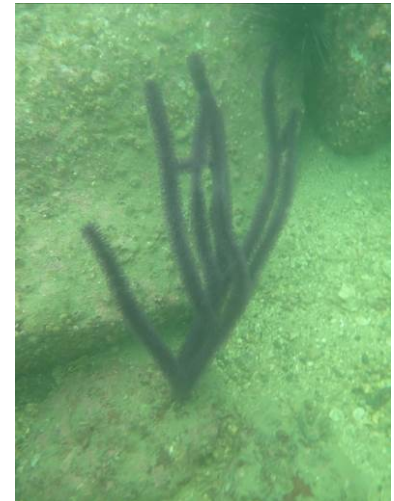
**Colony No. 13**



**Colony No. 14**



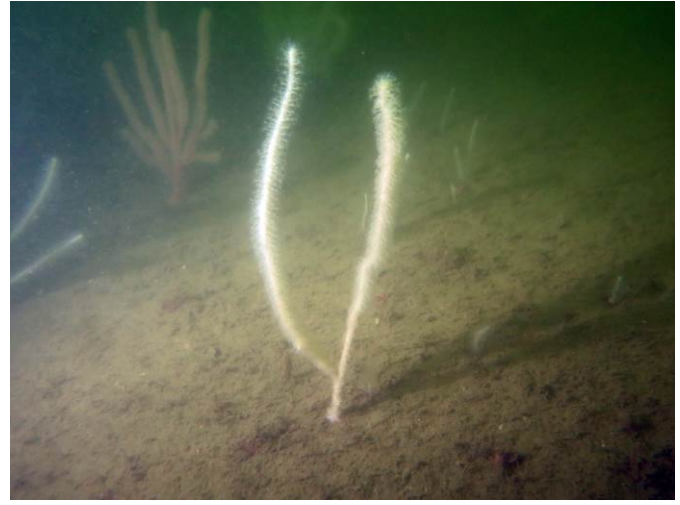

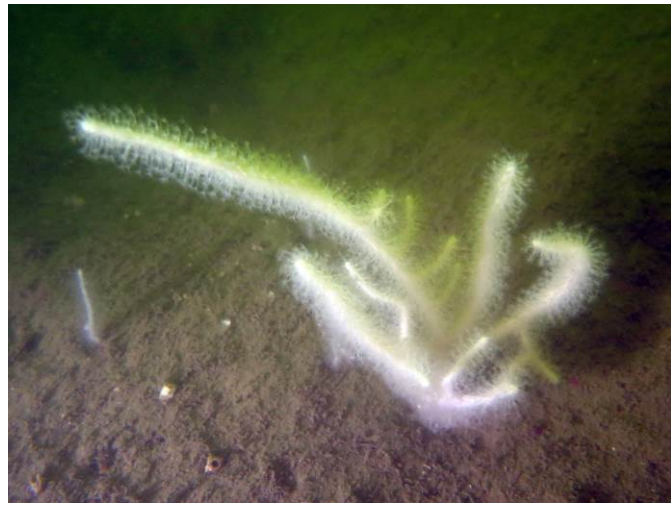



**Colony No. 15**

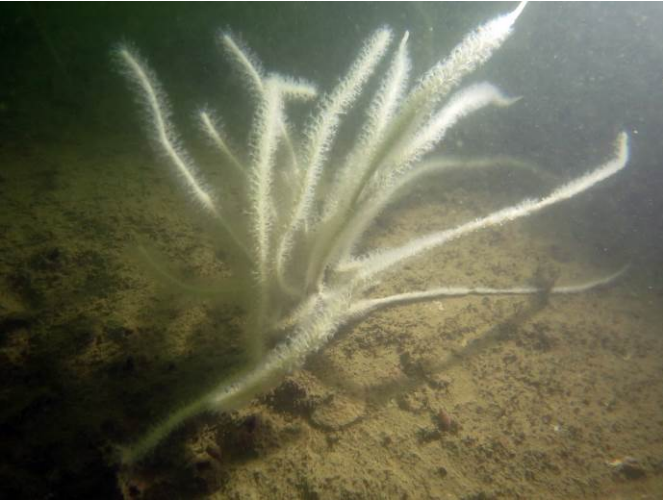



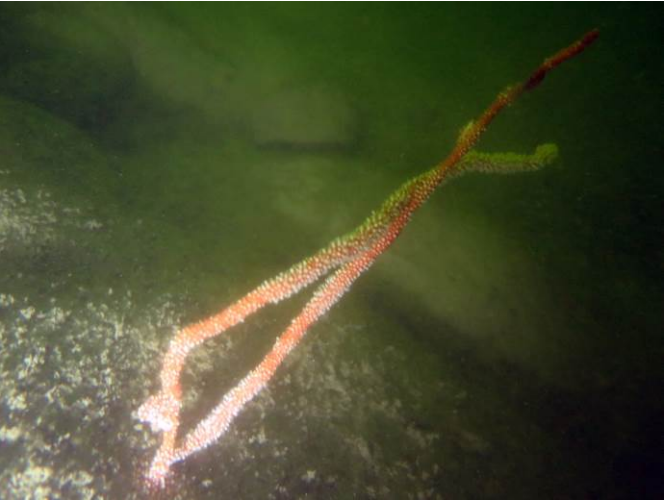





*Annex A4 Photographic Records of Identified Octocoral/Black Coral Colonies at Impact Monitoring Site (Zone A - Cape Collinson) during the Post Project Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		

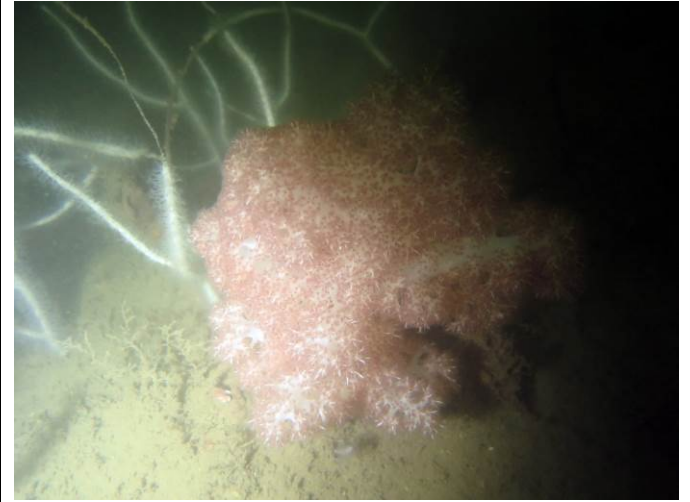


Colony No. 7	Colony No. 8	Colony No. 9
		
Colony No. 10	Colony No. 11	Colony No. 12
		

**Colony No. 13**







**Colony No. 14**

**Colony No. 15**





*Annex A5 Photographic Records of Identified Hard Coral Colonies at Impact Monitoring Site (Zone B - Tai Long Pai) during the Baseline Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



**Colony No. 7**



**Colony No. 8**



**Colony No. 9**



**Colony No. 10**






**Colony No. 11**



**Colony No. 12**













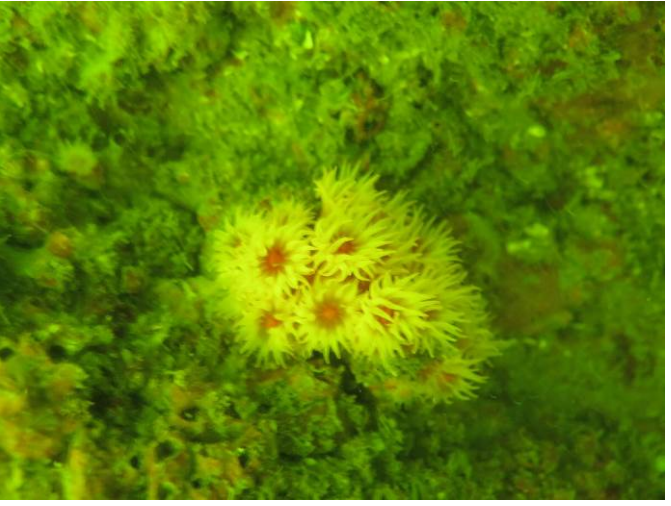



Colony No. 13	Colony No. 14	Colony No. 15
		



*Annex A6 Photographic Records of Identified Hard Coral Colonies at Impact Monitoring Site (Zone B – Tai Long Pai) during the Post Project Coral Survey*

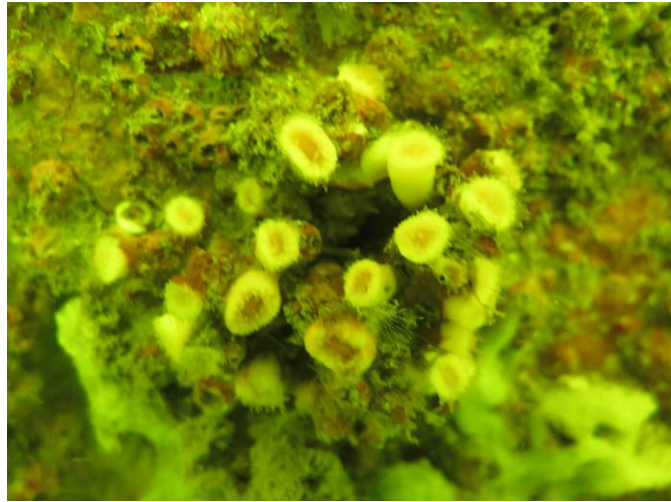
Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



Colony No. 7	Colony No. 8	Colony No. 9
		
Colony No. 10	Colony No. 11	Colony No. 12
		



**Colony No. 13**



**Colony No. 14**









**Colony No. 15**



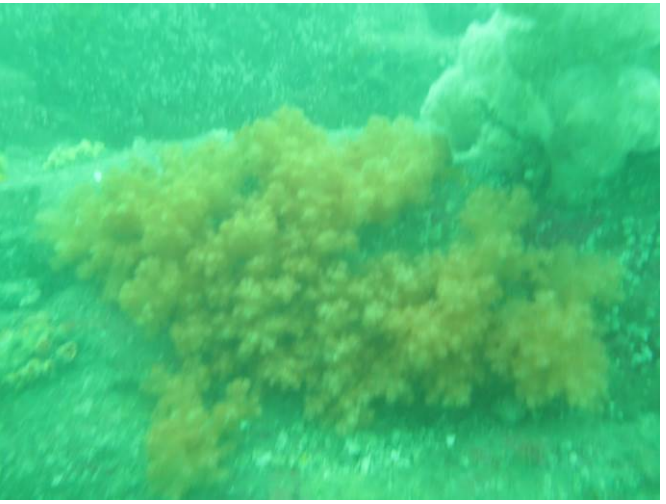







*Annex A7 Photographic Records of Identified Octocoral/Black Coral Colonies at Impact Monitoring Site (Zone B - Tai Long Pai) during the Baseline Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



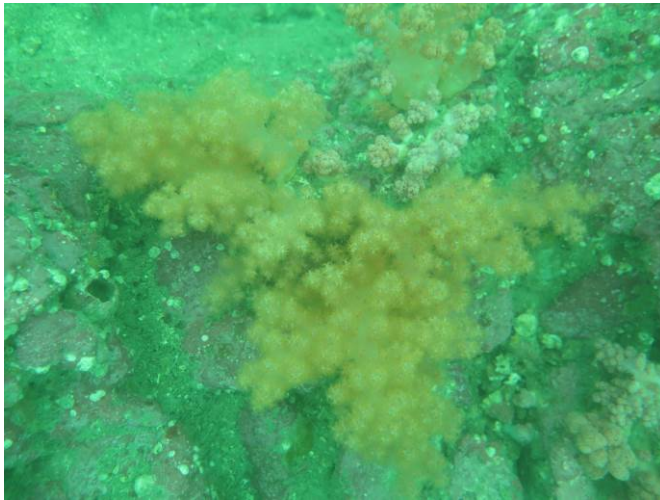
Colony No. 7	Colony No. 8	Colony No. 9
		
Colony No. 10	Colony No. 11	Colony No. 12
		



**Colony No. 13**



**Colony No. 14**



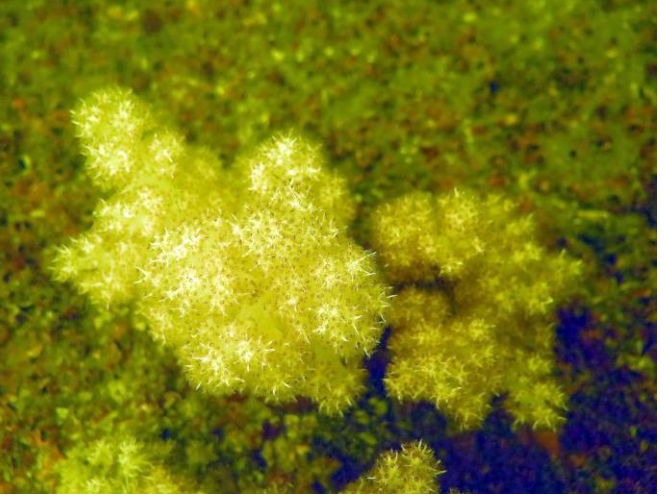





**Colony No. 15**











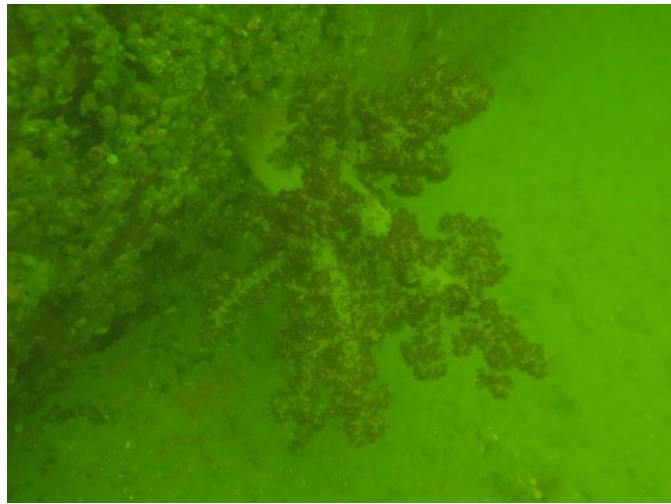
*Annex A8 Photographic Records of Identified Octocoral/Black Coral Colonies at Impact Monitoring Site (Zone B - Tai Long Pai) during the Post Project Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



Colony No. 7	Colony No. 8	Colony No. 9
		
Colony No. 10	Colony No. 11	Colony No. 12
		

**Colony No. 13**



**Colony No. 14**



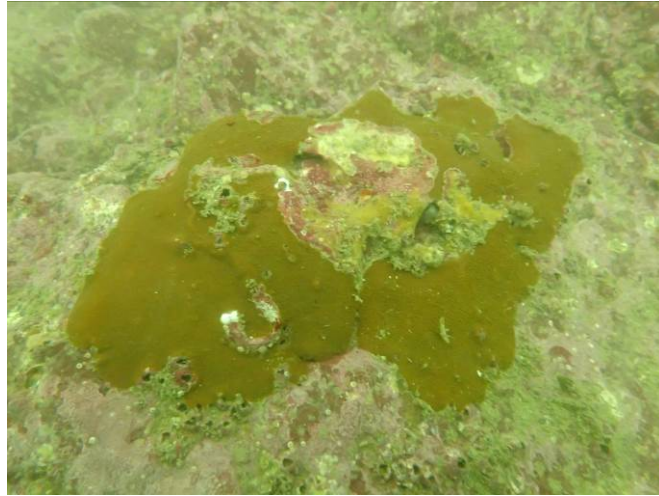





**Colony No. 15**



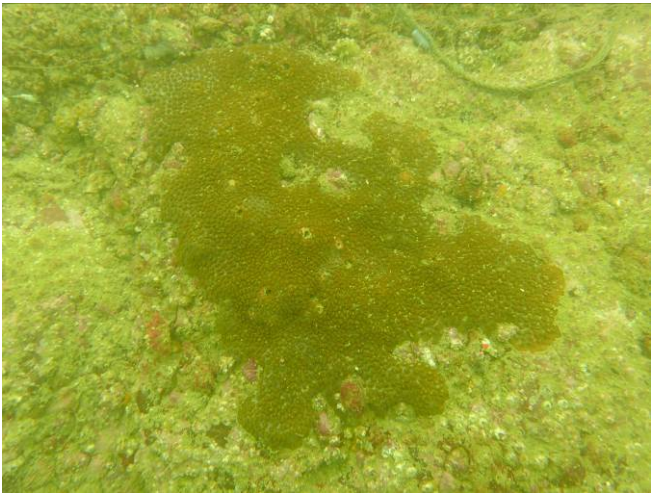
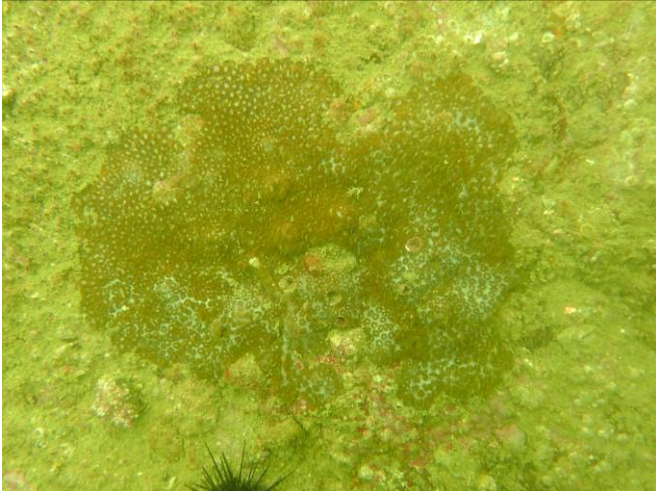
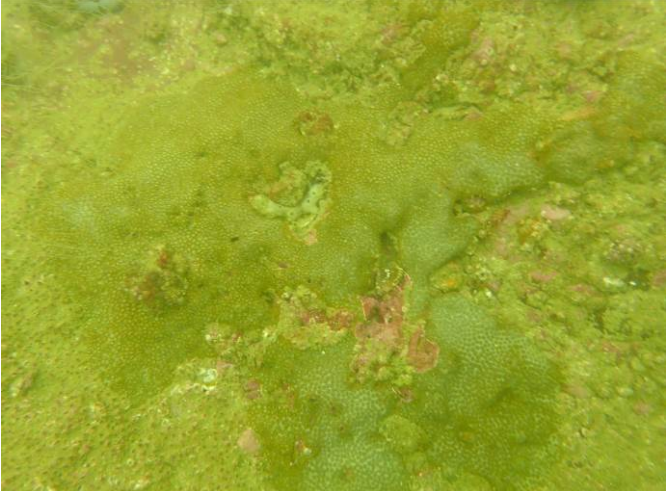





*Annex A9 Photographic Records of Identified Hard Coral Colonies at Control Monitoring Site (Zone C -Tung Lung Chau) during the Baseline Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



Colony No. 7	Colony No. 8	Colony No. 9
		
Colony No. 10	Colony No. 11	Colony No. 12
		



**Colony No. 13**



**Colony No. 14**




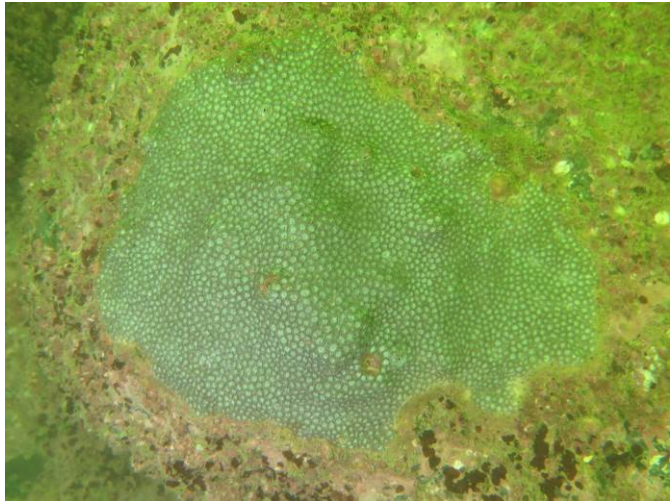

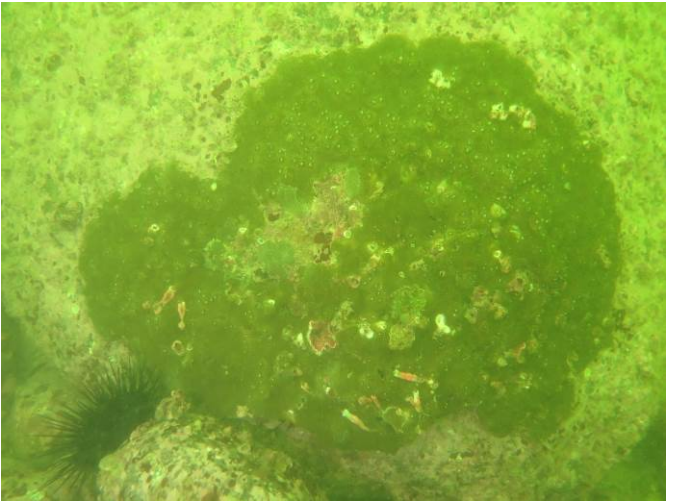


**Colony No. 15**

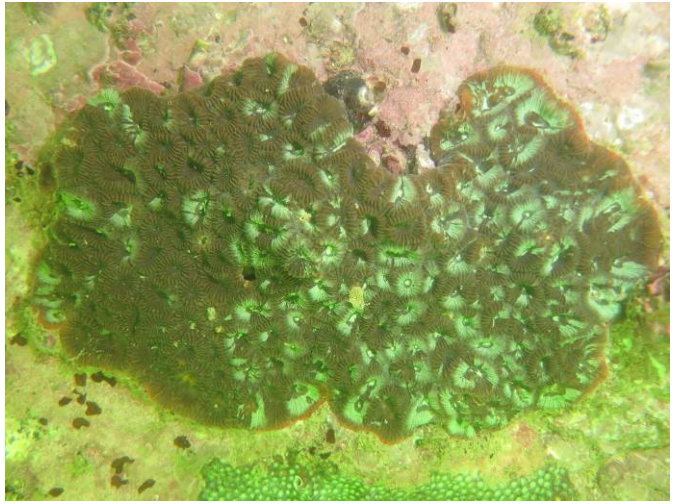

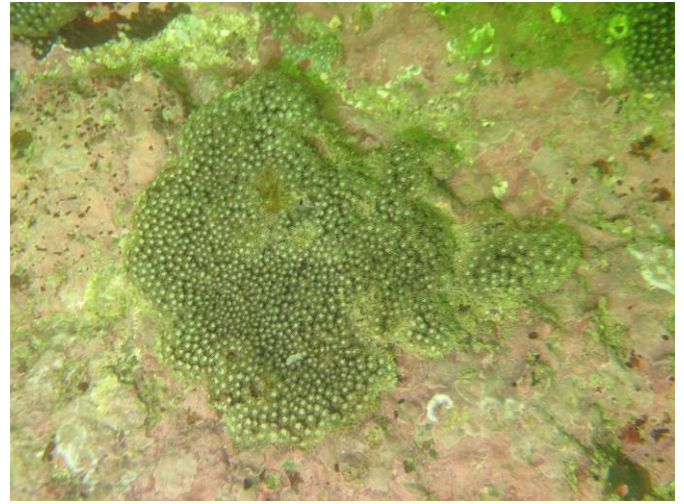

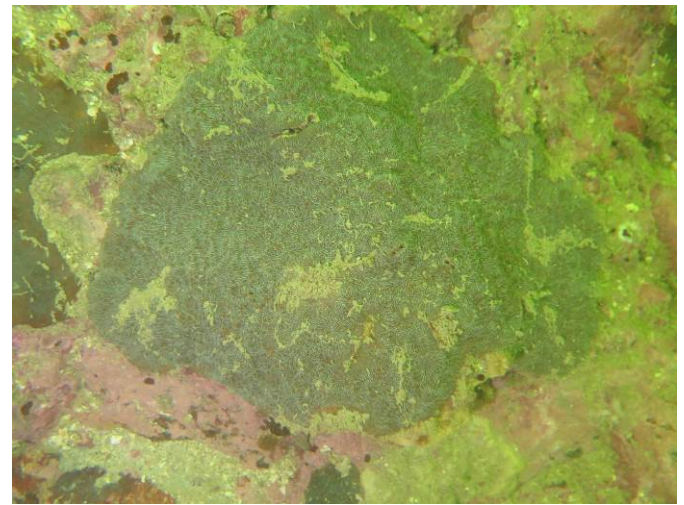








*Annex A10 Photographic Records of Identified Hard Coral Colonies at Control Monitoring Site (Zone C -Tung Lung Chau) during the Post Project Coral Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		





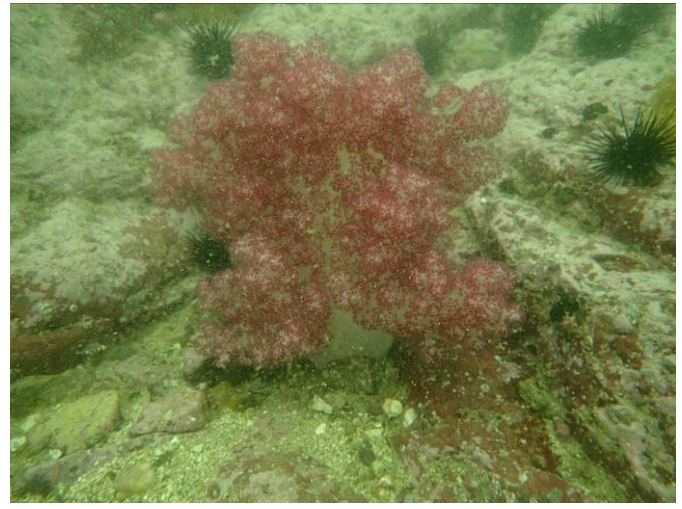
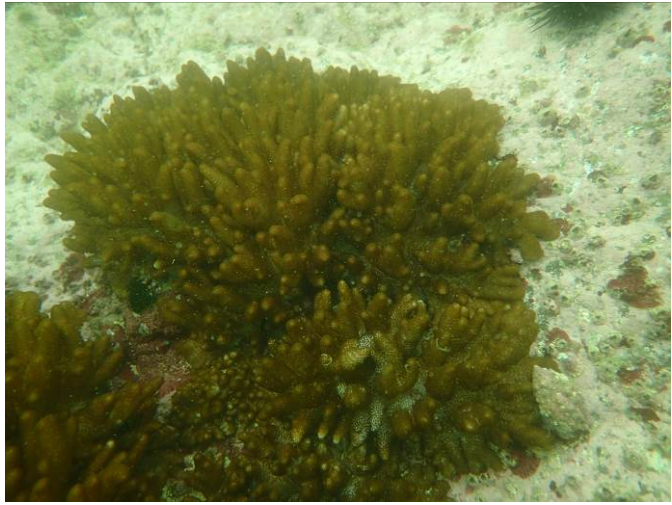

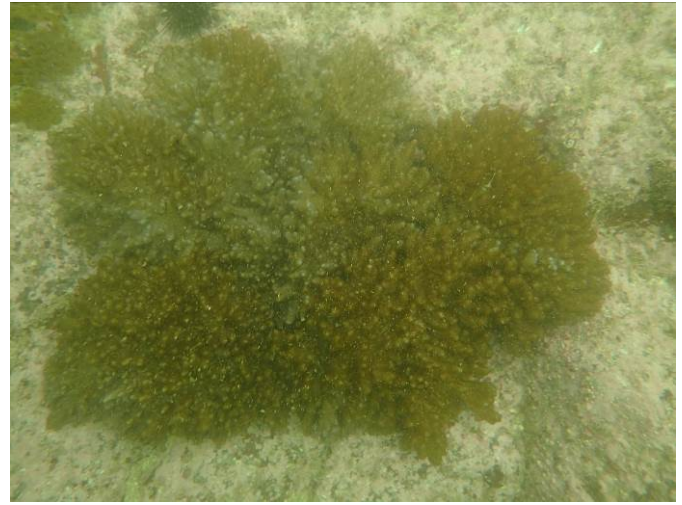
<p align="center"><b>Colony No. 7</b></p>	<p align="center"><b>Colony No. 8</b></p>	<p align="center"><b>Colony No. 9</b></p>
		
<p align="center"><b>Colony No. 10</b></p>	<p align="center"><b>Colony No. 11</b></p>	<p align="center"><b>Colony No. 12</b></p>
		



Colony No. 13	Colony No. 14	Colony No. 15
 A photograph of a green, patterned coral colony, likely a species of stony coral, showing a distinct, repeating geometric pattern of small, rounded structures. The colony is situated on a rocky substrate with some surrounding algae.	 A photograph of a dense, green, rounded coral colony, possibly a species of brain coral or a similar form, characterized by its compact, somewhat circular shape and fine, repetitive surface texture.	 A photograph of a large, green, patterned coral colony, similar to Colony No. 13, but with a more complex, interconnected pattern of rounded structures. It is surrounded by a layer of yellowish-green algae.



*Annex A11 Photographic Records of Identified Octocoral/ Black Coral Colonies at Control Monitoring Site (Zone C -Tung Lung Chau) during the Baseline Coral Monitoring Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



**Colony No. 7**



**Colony No. 8**



**Colony No. 9**



**Colony No. 10**





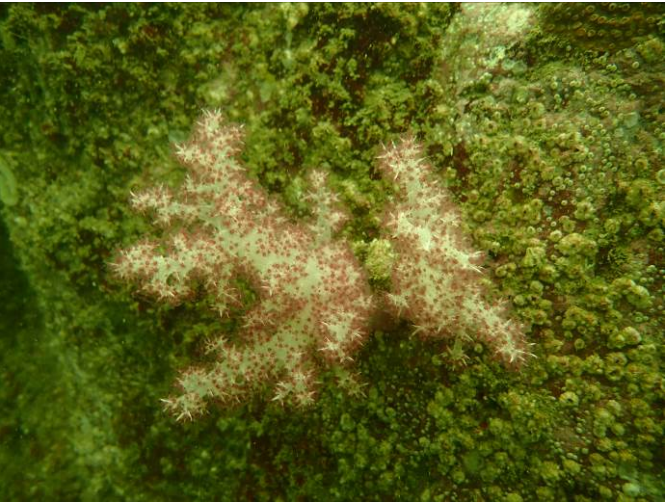
**Colony No. 11**



**Colony No. 12**

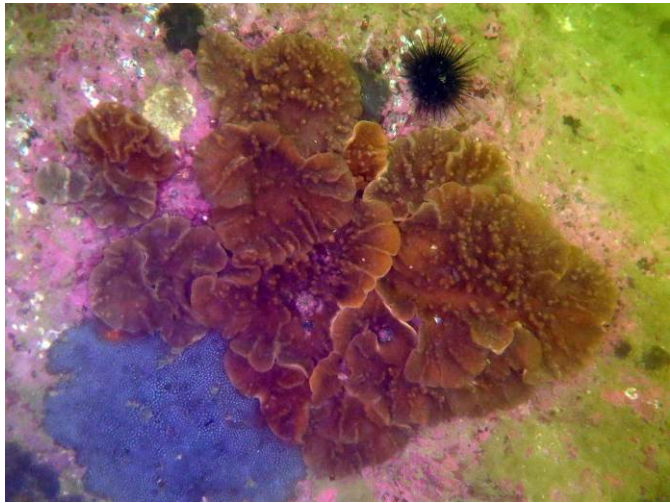
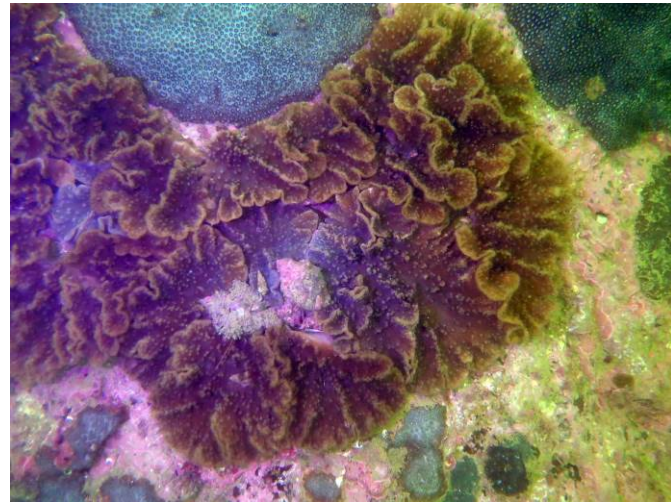
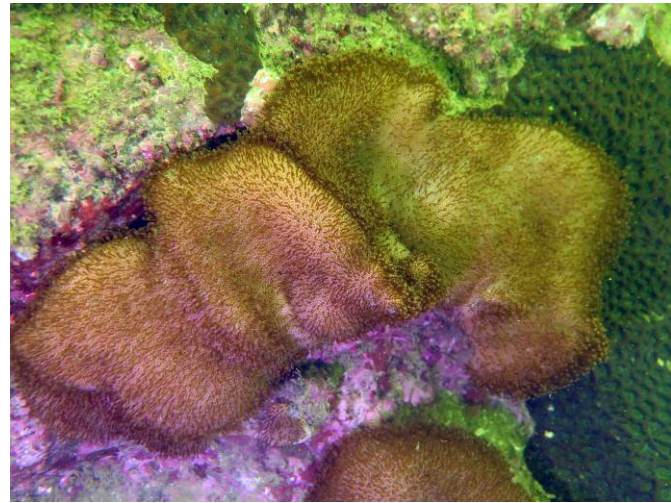

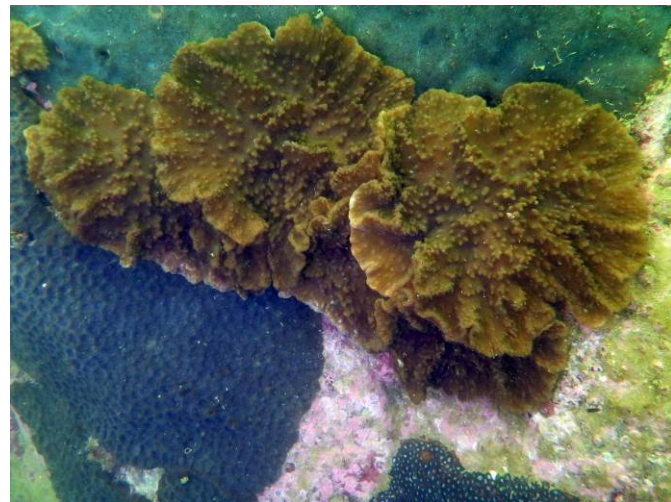





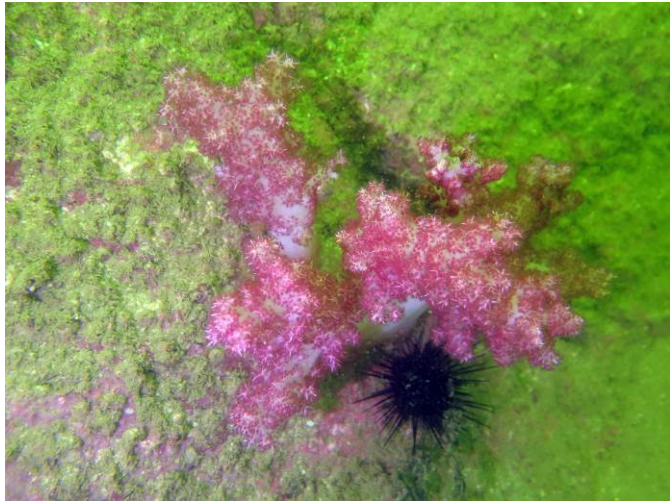
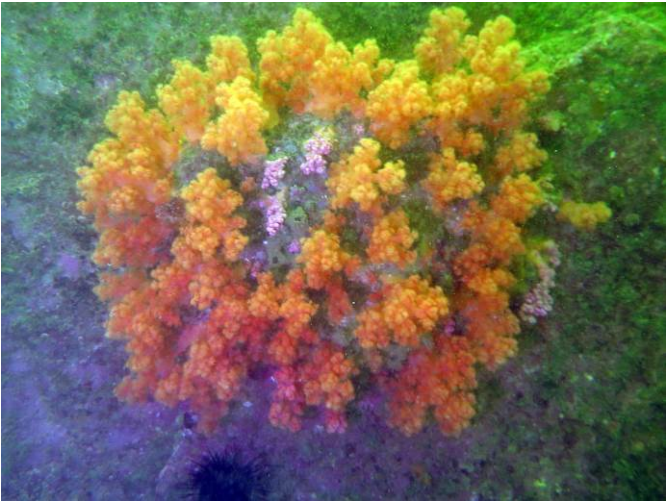
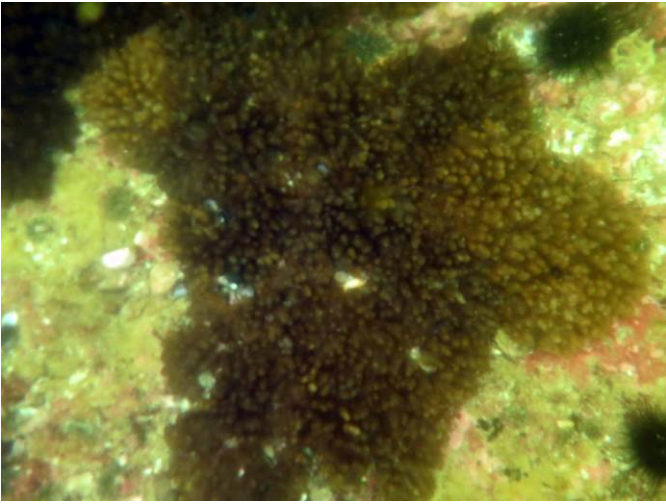



Colony No. 13	Colony No. 14	Colony No. 15
		



*Annex A12 Photographic Records of Identified Octocoral/ Black Coral Colonies at Control Monitoring Site (Zone C -Tung Lung Chau) during the Post Project Coral Monitoring Survey*

Colony No. 1	Colony No. 2	Colony No. 3
		
Colony No. 4	Colony No. 5	Colony No. 6
		



<p align="center"><b>Colony No. 7</b></p>	<p align="center"><b>Colony No. 8</b></p>	<p align="center"><b>Colony No. 9</b></p>
		
<p align="center"><b>Colony No. 10</b></p>	<p align="center"><b>Colony No. 11</b></p>	<p align="center"><b>Colony No. 12</b></p>
		



**Colony No. 13**



**Colony No. 14**



**Colony No. 15**



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