

Asia Submarine-cable Express (ASE) – Tseung Kwan O

Baseline Coral Monitoring Survey Report

28 September 2012

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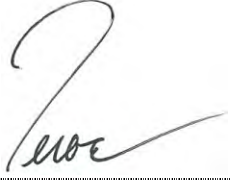
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Baseline Coral Monitoring Survey Report

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Client: NTT Com Asia Ltd		GMS No: 0171870			
Summary: This report presents the monitoring requirements, methodologies and results of the baseline coral monitoring survey at Cape Collinson, Tai Long Pai and Tung Lung Chau in accordance with the EM&A Manual.		Date: 28 September 2012			
		Approved by:  Terence Fong Project Director			
0	Baseline Coral Monitoring Survey Report	CLau	JTam	TFONG	28 Sep 12
Revision	Description	By	Checked	Approved	Date
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Asia Submarine-cable Express (ASE) - Tseung Kwan O
Environmental Certification Sheet
EP-433/2011

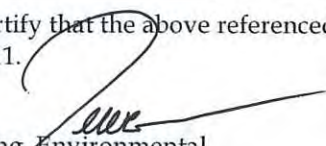
Reference Document/Plan

Document/ Plan to be Certified/ Verified:	Baseline Coral Monitoring Survey Report
Date of Report:	28 September 2012
Date prepared by ET:	ERM-Hong Kong Ltd
Date received by IEC:	Ecosystem Ltd

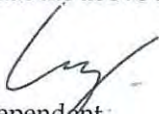
Reference EM&A Manual/ EP Requirement

EM&A Manual Requirement:	Section 4
<i>Content:</i>	<i>Coral Communities</i>
4.1 "Baseline Survey will be conducted within one month before jetting works for the cable installation commenced. The objective of the Baseline Survey is to identify suitable coral monitoring locations and to collect baseline monitoring data of corals at those locations for comparison with data collected during the Post Project Survey. "	
4.2 "The Baseline Monitoring Survey Report should be submitted within two weeks after the completion of the baseline monitoring and the report should include the following details: Brief project background information; Monitoring results together with the information including monitoring methodology, parameters monitored, monitoring locations (and depth), monitoring date, time, frequency and duration; and Comments and conclusions. "	
EP Condition:	Condition No. 2.3
<i>Content:</i>	<i>Coral Communities</i>
To protect the coral communities at Cape Collinson and Tai Long Pai, the Permit Holder shall confirm the identified coral communities will be more than 180m away from the cable alignment and in any case the IEC of the EM&A Programme shall certify in writing adequate buffer to the identified coral communities are maintained during the cable laying works. The conditions of the identified coral communities will also be verified by coral inspections immediate prior to and after the cable laying works.	

ET Certification

I hereby certify that the above referenced document/ plan complies with the above referenced condition of EP-433/2011.	
 Terence Fong, Environmental Team Leader:	Date: 28 September 2012

IEC Verification

I hereby verify that the above referenced document/ plan complies with the above referenced condition of EP-433/2011.	
 Vincent Lai, Independent Environmental Checker:	Date: 28 September 2012

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1 INTRODUCTION

1.1 BACKGROUND

NTT Com Asia (NTTCA) proposes to install a telecommunication cable (Asia Submarine-cable Express (ASE) cable) of approximately 7,200 km in length, connecting Japan and Singapore with branches to the Philippines, Hong Kong SAR (HKSAR) and Malaysia. NTTCA is responsible for securing the approval to land the ASE cable in Tseung Kwan O, Hong Kong SAR (HKSAR). The proposed landing site will be at a new Beach Manhole (BMH) and ultimately connect with a Data Centre in Tseung Kwan O (TKO) Industrial Estate which is scheduled for completion in 2012. It should be noted that Tseung Kwan O is currently the landing site for a number of submarine cables. From Tseung Kwan O, the cable will extend eastward approaching the Tathong Channel. Near to Cape Collinson, the cable is approximately parallel to the Tathong Channel until north of Waglan Island where the cable travels eastward to the boundary of HKSAR waters where it enters the South China Sea. The total length of cable in Hong Kong SAR waters is approximately 33.5 km. A map of the proposed cable route is presented in *Figure 1.1*.

A *Project Profile (PP-452/2011)* which includes an assessment of the potential environmental impacts associated with the installation of the submarine telecommunications cable system 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 Environmental Protection Department, subsequently issued an *Environmental Permit (EP- 433/2011)*.

In accordance with the *EM&A Manual*, Baseline Coral Survey should be conducted within one month before jetting works for the cable installation commenced. The objective of the Baseline Coral Survey is to identify suitable coral monitoring locations and to collect baseline monitoring data of corals at those locations for comparison with data collected during the Post Project Survey. 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 Baseline Coral Monitoring Survey Report should be submitted within two weeks after the completion of the baseline monitoring

1.2 PURPOSE OF THIS REPORT

This Baseline Coral Monitoring Survey Report ("the Report") is prepared by ERM-Hong Kong, Limited (ERM) on behalf of NTT Com Asia (NTTCA) to present the methodology and findings of the Baseline Coral Survey for the Project in accordance with requirements of the *EM&A Manual*.

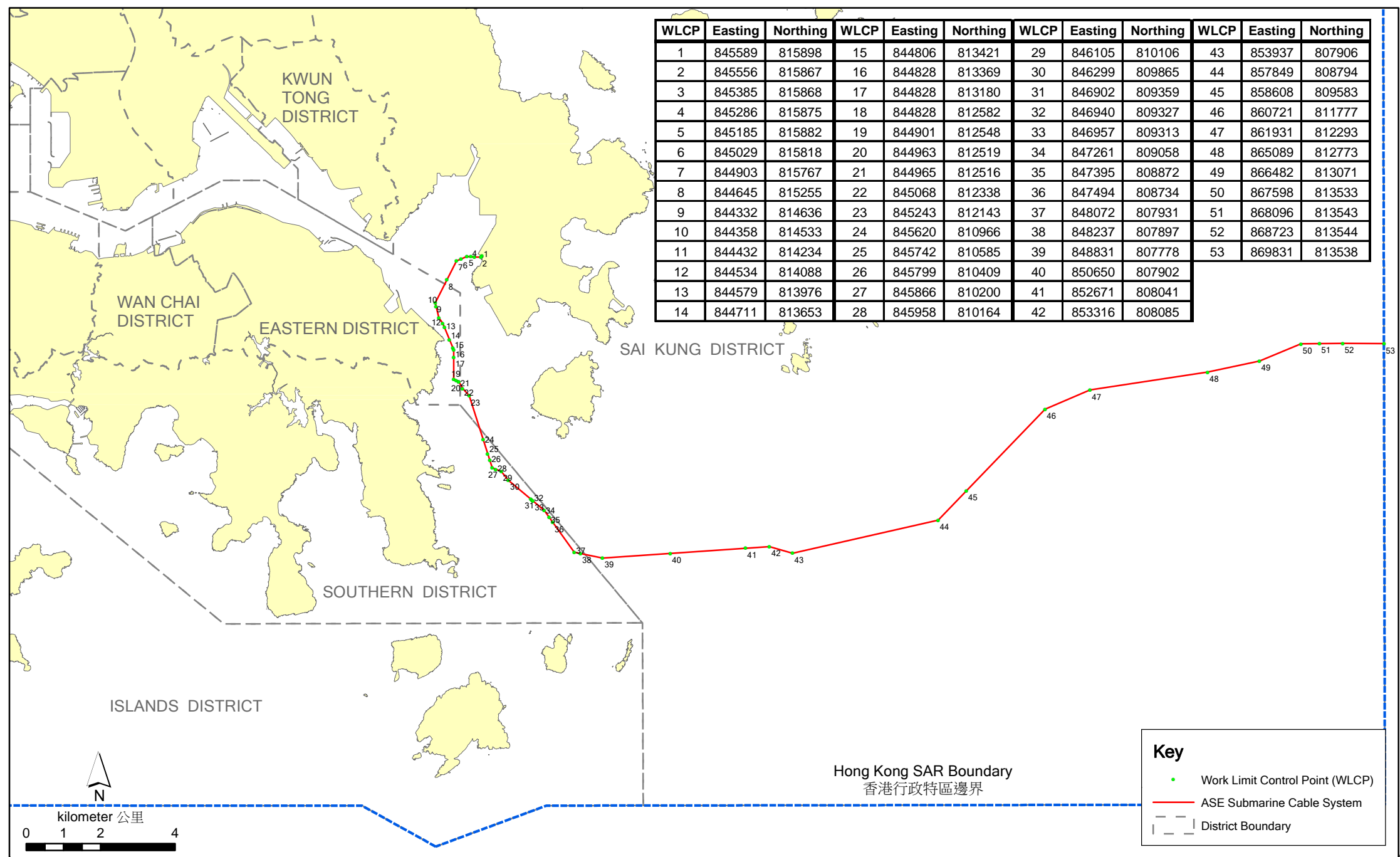


Figure 1.1

Proposed ASE Submarine Cable System (Layout Plan)

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Date: 17/09/2012

Key

- Work Limit Control Point (WLCP)
- ASE Submarine Cable System
- District Boundary

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STRUCTURE OF THE REPORT

The remainder of the report is structured as follows:

Section 2: Baseline Coral Monitoring Methodology

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

Section 3: Baseline Coral Monitoring Results

Summarize the baseline coral monitoring results together with the information including monitoring methodology, parameters monitored, monitoring locations and depth, monitoring date, time, frequency and duration in accordance with the *EM&A Manual*.

Section 4: Conclusion

Conclude findings from the Baseline Coral Survey of the Project.

2 *BASELINE CORAL MONITORING METHODOLOGY*

2.1 *MONITORING LOCATIONS*

Baseline coral monitoring was undertaken at Cape Collinson and Tai Long Pai (Monitoring Station), and a Control Station at Tung Lung Chau which is located more than 2 km from the cable alignment. The monitoring locations of marine ecological survey 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.

2.2 *METHODOLOGY*

Subtidal dive surveys were undertaken at subtidal hard bottom habitats within and in close proximity to the Project Area with a key focus along the proposed cable route where hard substrata were noted from the geophysical survey. The Baseline Coral Survey comprised the following three components:

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

Each of these surveys is described further in the following sections.

Qualitative Spot Dive Survey

The qualitative spot dive survey was undertaken as part of the Baseline Survey only to identify suitable coral monitoring locations at Cape Collinson, Tai Long Pai and Tung Lung Chau (survey areas refer to *Figure 2.1*). During the survey, spot dive reconnaissance checks were conducted within the designated Monitoring and Control Stations by SCUBA to collect qualitative information including coral composition, abundance and distribution. Based on the information collected, locations within which significant coral habitats/identified coral communities (defined as locations within relatively higher coral abundance and species/ genus number for the purpose of this coral monitoring programme) were selected for the subsequent REA survey and coral colony monitoring during the Baseline and Post Project Coral

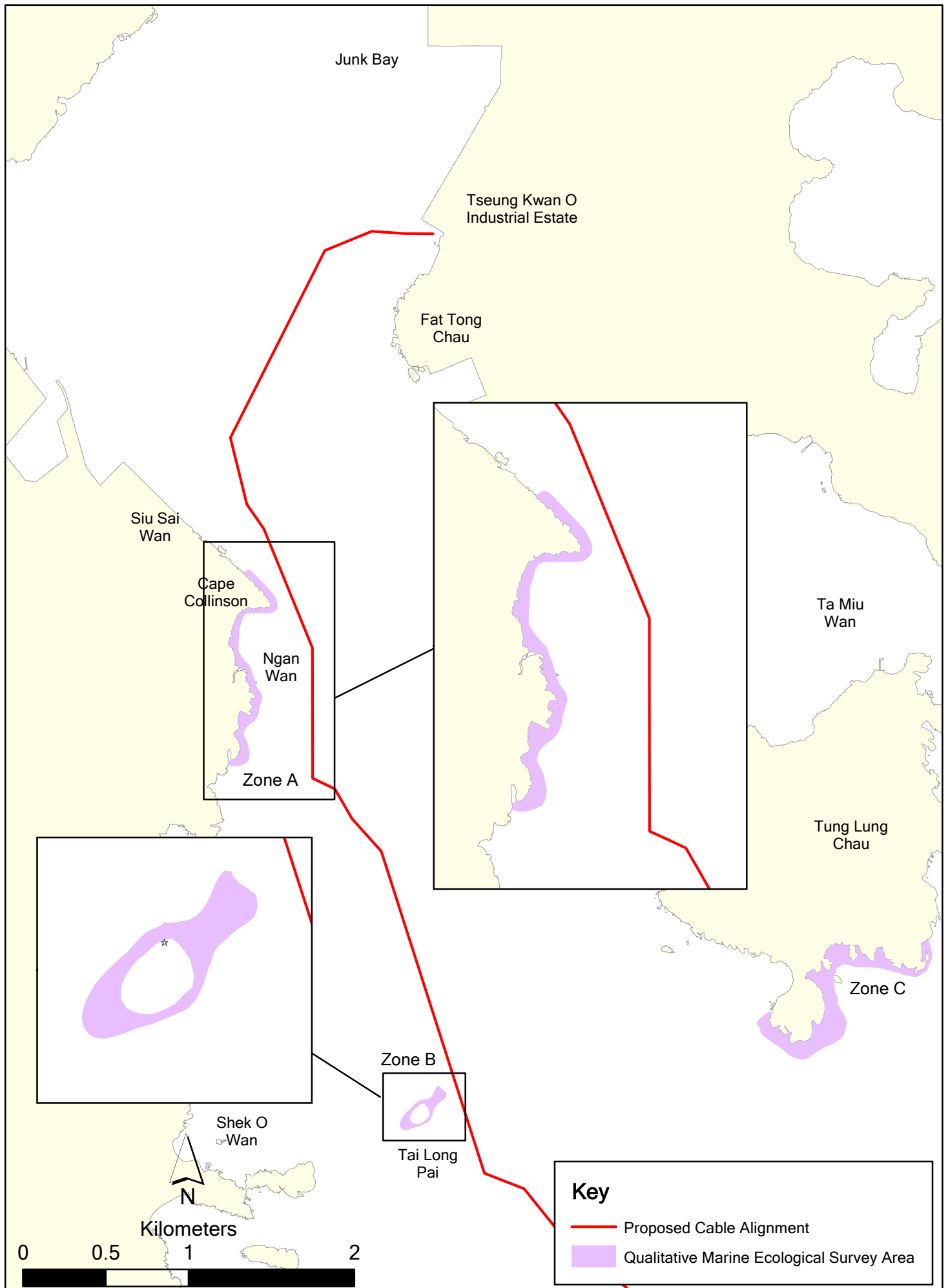


Figure 2.1

Locations of Marine Ecological Survey

Surveys. The depth range (shallow and deep) to be monitored were also finalized based on observed coral distribution.

Rapid Ecological Assessment (REA) Survey Method

A standardised semi-quantitative Rapid Ecological Assessment (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 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 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 ⁽¹⁾ for marine environment of Hong Kong ⁽²⁾.

A series of REA surveys were be conducted by qualified coral ecologists 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 (ie hard corals, octocorals and black corals) and with all hard coral colonies identified to species level while octocorals and black corals recorded to genus level. 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); and
- 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. 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 would

(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.

encompass 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, five ecological and seven substratum attributes were assigned to one of seven standard ranked (ordinal) categories (Table 2.1 and 2.2).

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

Ecological	Substratum
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*

Rank	Percentage Cover (%)
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 were 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 ^(a)
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:

- (A) 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).
- (B) 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 was taken for each REA transect. All field data were checked upon completion of each REA transect and a dive survey proforma sheet was 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 will also be conducted during the Post-Project Survey to identify any evidence of sediment stress to corals before and after cable installation works. At each coral monitoring 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 corals 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 should also be 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 Monitoring. 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.

The Baseline Coral Survey was conducted over two days on 24 and 25 September 2012. The weather condition was mainly cloudy with sunny intervals, with moderate (Force 4) to fresh (Force 5) east to northeasterly winds. Slight to moderate swell was present in the sea on the two survey days. The visibility was moderate and generally ranged between 1.5 to 3.0 m.

3.1.1 *Results of Qualitative Spot Dive Checks*

Zone A - Cape Collinson

Results of qualitative dive survey at Cape Collinson (Zone A) confirmed that the seabed was composed of hard bottom substrates which were mainly bedrocks and large boulders. Generally, cover of hard corals was less than 5% in the shallow water (from -2 to -5m CD) with 8 hermatypic hard coral species recorded. The estimated cover of hard coral was lower in the deep water (from -5 to -15m CD) than the shallow water region. Octocoral assemblage was also observed at low estimated cover of 5-10% in both shallow and deep water regions with a total of 6 species recorded (*Table 3.1*).

Similar abiotic composition was found along the entire Zone A. At the south of Cape Collinson and northern part of Ngan Wan, more hard coral species and larger hard coral colonies were found although the estimated coral cover and number of octocoral species recorded was similar to other areas in Zone A. As such, the northern part of Ngan Wan was considered as significant coral habitats/identified coral communities and was selected as the area for the REA survey and coral colony monitoring (*Figure 3.1*).

Zone B – Tai Long Pai

Results of qualitative dive survey at Tai Long Pai (Zone B) confirmed that the seabed was composed of hard bottom substrates which were mainly bedrocks. Coverage and abundance of hard corals was very low (less than 5%) with 7 hermatypic hard coral species and 1 ahermatypic coral species being recorded. Hermatypic hard coral was only found in the southwestern part of Tai Long Pai. A total of 7 octocoral species and 2 black coral species were recorded along the shoreline of Tai Long Pai with an estimated cover of 5-10% in shallow water and 11 to 30% in deep water.

The cover and diversity of octocoral were similar within the shoreline of Zone B while hard corals were only recorded at the southwestern part of Tai Long Pai. As such, REA survey and coral colony monitoring were undertaken at that area which is considered as significant coral habitat/identified coral communities (*Figure 3.1*). REA survey and coral colony monitoring were also undertaken at the southeastern region which is closer to the proposed cable route.

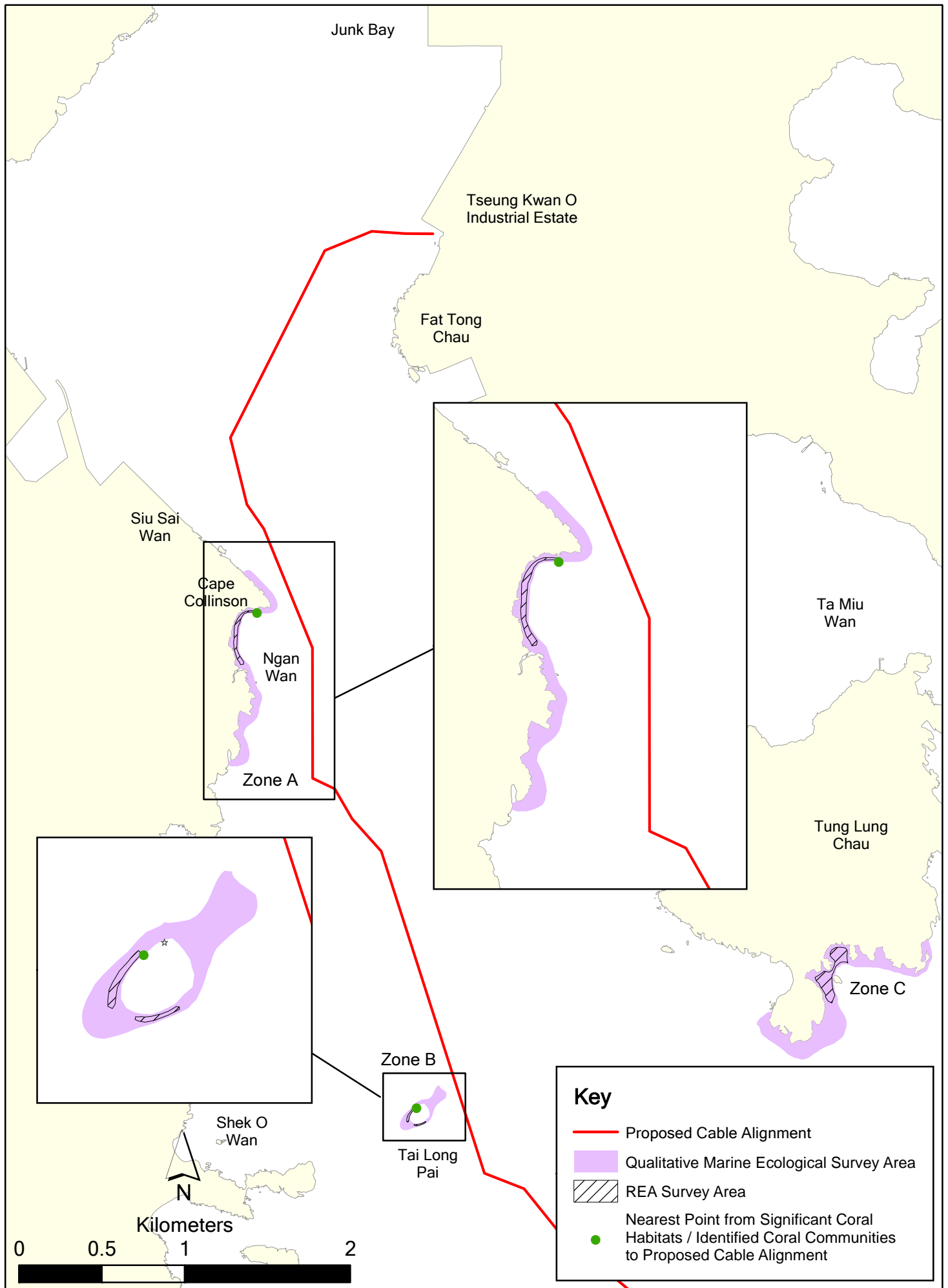


Figure 3.1

Locations of Major Coral Community

Zone C – Tung Lung Chau

Results of qualitative dive survey at Tung Lung Chau (Zone C) confirmed that the seabed was composed mainly of bedrock and large boulders. Nine hermatypic hard coral species, one ahermatypic hard coral species and several octocorals species (ie *Euplexaura* sp., *Dendronephthya* sp.) were recorded at the sheltered area east of the Tung Lung Chau headland. The estimated covers of hard coral and octocoral were lower than 10%. The coral assemblage in this area is considered similar and being comparable to the biotic assemblages in Impact Monitoring Sites at Zone A and Zone B and were thus selected as the Control Site for the REA survey and coral colony monitoring. On the eastern part of Zone C, only some encrusting hard coral colonies were recorded but no octocorals could be observed.

The coordinates 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), and the distance from the nearest point to the proposed cable alignment is presented in *Table 3.2*.

Table 3.1 Coral Species Recorded at the Qualitative Spot-Check Zone A, B & C

Taxon	Family	Species		
Zone A - Cape Collinson (Impact Site)				
Hard Coral Species	Acroporidae	<i>Montipora mollis</i>		
	Coscinaraea	<i>Coscinaraea</i> n sp.		
	Dendrophyllidae	<i>Turbinaria peltata</i>		
	Faviidae		<i>Plesiastrea versipora</i>	
			<i>Favia rotumana</i>	
			<i>Goniopora stutchburyi</i>	
	Poritidae	<i>Porites lobata</i>		
	Octocoral Species	Siderastreidae	<i>Psammocora superficialis</i>	
		Plexauridae		<i>Menella</i> sp.
				<i>Paraplexaura</i> sp.
			<i>Echinomuricea</i> sp.	
			<i>Ellisella</i> sp.	
Ellisellidea		<i>Ellisella</i> sp.		
Alcyoniidae	<i>Simularia</i> sp.			
Nephtheidae	<i>Dendronephthya</i> sp.			
Zone B – Tai Long Pai (Impact Site)				
Hard Coral Species	Acroporidae	<i>Montipora mollis</i>		
	Faviidae		<i>Cyphastrea chalcidicum</i>	
			<i>Favites abdita</i>	
			<i>Plesiastrea versipora</i>	
	Poritidae		<i>Goniopora stutchburyi</i>	
			<i>Porites lobata</i>	
	Siderastreidae	<i>Psammocora superficialis</i>		
Ahermatypic Coral Species	Dendrophyllidae	<i>Tubastrea/Dendrophyllia</i> sp.		
Octocoral Species	Plexauridae		<i>Echinomuricea</i> sp.	
			<i>Euplexaura</i> sp.	
			<i>Paraplexaura</i> sp.	
			<i>Menella</i> sp.	
	Acanthogorgiidae	<i>Anthogorgia</i> sp.		
	Nephtheidae	<i>Dendronephthya</i> sp.		

Taxon	Family	Species
Black Coral Species	Elliseillidae	<i>Verrucella</i> sp.
	Antipathidae	<i>Antipathes curvata</i>
		<i>Cirrhopathes</i> sp.
Zone C – Tung Lung Chau (Control Site)		
Hard Coral Species	Acroporidae	<i>Montipora mollis</i>
		<i>Montipora peltiformis</i>
	Faviidae	<i>Cyphastrea seralia</i>
		<i>Cyphastrea chalcidicum</i>
		<i>Leptastrea pruinosa</i>
		<i>Plesiastrea versipora</i>
Poritidae	<i>Porites lobata</i>	
	<i>Goniopora stutchburyi</i>	
Ahermatypic Coral Species	Siderastreidae	<i>Psammocora superficialis</i>
Octocoral Species	Dendrophyllidae	<i>Tubastrea/Dendrophyllia</i> sp.
	Nephtheidae	<i>Dendrophthya</i> sp.

Table 3.2 *Coordinates of the Significant Coral Habitats/ Identified Coral Communities and the Distances from their Nearest Points to the Proposed Cable Alignment*

Significant Coral Habitat/ Identified Coral Community	Easting	Northing	Distance from Proposed Cable Alignment (m)
South of Cape Collinson and North of Ngan Wan	844492.67	813577.80	~230
Southwestern Tai Long Pai	845454.83	810593.43	~270

3.1.2 Results of REA Survey

The seabed compositions along each transect of Zone A to C were shown in Tables 3.3 - 3.5. Locations of REA survey are presented in Figure 3.1.

Zone A – Cape Collinson

The seabed at the REA survey area of Zone A was predominately composed of bedrocks in shallow depth region (2-5 m CD) while at deep depth region (6-10m CD) the seabed was also mainly composed of bedrocks and boulders. However, the deep depth region of Transect 1 was mainly composed of sand and small boulders.

Cover of hard corals was less than 5% in shallow depth region (2-6 m CD), with only five hard coral species (*Oulastrea crispata*, *Goniopora crispata*, *Psammocora superficialis*, *Cyphastrea chalcidicum* and *Plesiastrea versipora*) being recorded. A relatively more diverse and abundant octocoral community was found at deep depth region beyond -5 m CD. Ten species of octocorals (*Paraplexaura* sp., *Echinomuricea*, *Viminella* sp., *Ellisella* sp., *Menella* sp., *Euplexaura* sp., *Muricella* sp., *Sinularia* sp., *Dendronephthya* sp. and *Scleronephthya gracillicum*) and two species of black corals (*Antipathes curvata* and *Cirrhopathes* sp.) were recorded during REA survey. *Echinomuricea* sp., *Dendronephthya* sp. and *Scleronephthya gracillicum* were the dominant octocoral species found in the region. All coral species recorded are common and have a widespread distribution throughout Hong Kong's nearshore waters.

Zone B – Tai Long Pai

Two areas were selected around Tai Long Pai for REA survey (one located on the southeastern side, one on the southwestern side). The seabed was predominately composed of bedrocks in both shallow and deep depth zones.

Three hermatypic hard coral species (*Goniopora stutchburyi*, *Cyphastrea chalcidicum* and *Psammocora superficialis*) were recorded in shallow depth zone along the transect located on the southwestern side of Tai Long Pai. One ahermatypic hard coral species (*Tubastrea/Dendrophyllia* sp.) were recorded in shallow depth zone of the whole Zone B. A relatively more diverse and abundant octocoral community were recorded in deep depth zone in the entire Zone B. Seven species of octocorals (*Menella* sp., *Euplexaura* sp., *Paraplexaura* sp., *Echinomuricea* sp., *Anthogorgia* sp., *Verrucella* sp. and *Dendronephthya* sp.) were recorded in relatively higher abundance while *Dendronephthya* sp. was the dominant species. Two species of black corals, *Antipathes curvata* and *Cirrhopathes* sp., were recorded. Crinoids and starfish are commonly found.

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.

Hard coral community was recorded in shallow depth zone (2-6 mCD) with 8 hermatypic hard coral species (*Goniopora stutchburyi*, *Psammocora superficialis*, *Cyphastrea chalcidicum*, *Plesiastrea versipora*, *Porites lobata*, *Montipora mollis*, *Montipora peltiformis* and *Favites chinensis*) and one species of ahermatypic hard coral species (*Tubastrea/Dendrophyllia* sp.) recorded. Relatively low diversity and abundance of octocorals (*Acanthogorgia* sp., *Euplexaura* sp., *Dendronephthya* sp. and *Scleronephthya gracillicum*) were observed in deep depth zone (beyond -6 m CD). All coral species recorded are common and have a widespread distribution throughout Hong Kong's nearshore waters.

Table 3.3 Description of the Seabed Recorded along Each Transect in REA

Transect	Depth (-m CD)	Description
Zone A - Cape Collinson (Monitoring Site)		
Transect 1		
Shallow	~5	The seabed was composed of rubbles and small boulders. The hard coral cover was low (< 5%) with 4 hard coral species <i>Oulastrea crispata</i> , <i>Goniopora stutchburyi</i> , <i>Psammocora superficialis</i> and <i>Cyphastrea chalcidicum</i> recorded. The octocoral cover was low (< 5%) with four species (<i>Paraplexaura</i> sp., <i>Echinomuricea</i> sp., <i>Viminella</i> sp. and <i>Ellisella</i> sp.) recorded.
Deep	~9	The seabed was mainly composed of sand (~50%). No hard coral colonies were found. The octocoral cover was low (< 6-10%) with gorgonians growing on sand. Seven species of octocorals (<i>Echinomuricea</i> sp., <i>Paraplexaura</i> sp., <i>Menella</i> sp., <i>Euplexaura</i> sp., <i>Muricella</i> sp., <i>Sinularia</i> sp. and <i>Dendronephthya</i> sp.) were recorded.
Transect 2		
Shallow	~5	The seabed was mainly composed of bedrocks (~60%). The hard coral cover was low (< 5%) with 2 hard coral species <i>Oulastrea crispata</i> and <i>Psammocora superficialis</i> recorded. The octocoral cover was low (< 5%) with 6 species (<i>Dendronephthya</i> sp., <i>Ellisella</i> sp., <i>Echinomuricea</i> sp., <i>Euplexaura</i> sp., <i>Paraplexaura</i> sp. and <i>Menella</i> sp.) recorded.
Deep	~8-9	The seabed was mainly composed of bedrocks (~50%). No hard coral colonies were found. The octocoral cover was low (< 6-10%) with 4 species (<i>Dendronephthya</i> sp., <i>Paraplexaura</i> sp., <i>Echinomuricea</i> sp. and <i>Euplexaura</i> sp.) recorded.
Transect 3		
Shallow	~5	The seabed was mainly composed of bedrocks (~60%). The hard coral cover was about 5% with 3 hard coral species <i>Oulastrea crispata</i> , <i>Goniopora stutchburyi</i> and <i>Plesiastrea versipora</i> recorded. The octocoral cover was low (< 5%) with 6 species (<i>Dendronephthya</i> sp., <i>Scleronephthya gracillicum</i> , <i>Ellisella</i> sp., <i>Echinomuricea</i> sp., <i>Viminella</i> sp., <i>Paraplexaura</i> sp. and <i>Menella</i> sp.) recorded.
Deep	~9	The seabed was mainly composed of bedrocks (~60%). No hard coral species was found. The octocoral cover was about 6-10% with 6 species (<i>Paraplexaura</i> sp., <i>Echinomuricea</i> sp., <i>Euplexaura</i> sp., <i>Anthogorgia</i> sp., <i>Dendronephthya</i> sp. and <i>Scleronephthya gracillicum</i>) recorded.
Zone B – Tai Long Pai (Monitoring Site)		
Transect 1		
Shallow	~2-5	The seabed was mainly composed of bedrocks (> 80%). No hermatypic hard coral species was recorded while 1 species of ahermatypic hard coral (<i>Tubastrea/Dendrophyllia</i> sp.) was recorded. The octocoral cover was about 5% with 4 species (<i>Dendronephthya</i> sp., <i>Menella</i> sp., <i>Euplexaura</i> sp., <i>Paraplexaura</i> sp.) recorded.
Deep	~5-15	The seabed was mainly composed of bedrocks (> 80%). No hard coral species was recorded. The octocoral cover was about 11-30% with 7 species (<i>Dendronephthya</i> sp., <i>Menella</i> sp., <i>Euplexaura</i> sp., <i>Paraplexaura</i> sp., <i>Anthogorgia</i> sp., <i>Verrucella</i> sp. and <i>Echinomuricea</i> sp.) recorded. Black coral colonies, <i>Antipathes curvata</i> and <i>Cirrhopathes</i> sp. were observed.
Transect 2		
Shallow	~2-5	The seabed was mainly composed of bedrocks (> 80%). The hard coral cover was extremely low (< 5%) with 3 species <i>Goniopora stutchburyi</i> , <i>Cyphastrea chalcidicum</i> and <i>Psammocora superficialis</i> recorded. Colonies of ahermatypic hard coral <i>Tubastrea/Dendrophyllia</i> sp. were found. The octocoral cover was about 5% with 3 species (<i>Euplexaura</i> sp., <i>Paraplexaura</i> sp. and <i>Echinomuricea</i> sp.) recorded.

Transect	Depth (-m CD)	Description
Deep	~5-15	The seabed was mainly composed of bedrocks (> 80%). No hard coral species were recorded. The octocoral cover was about 11-30% with 7 species (<i>Dendronephthya</i> sp., <i>Menella</i> sp., <i>Euplexaura</i> sp., <i>Paraplexaura</i> sp., <i>Anthogorgia</i> sp., <i>Verrucella</i> sp. and <i>Echinomuricea</i> sp.) recorded. Black coral colonies, <i>Antipathes curvata</i> and <i>Cirripathes</i> sp. were observed.
Zone C – Tung Lung Chau (Control Site)		
Transect 1		
Shallow	~5	The seabed was mainly composed of bedrocks (~80%). The hard coral cover was low (< 5%) with 6 hermatypic hard coral species <i>Goniopora stutchburyi</i> , <i>Psammocora superficialis</i> , <i>Cyphastrea chalcidicum</i> , <i>Plesiastrea versipora</i> , <i>Porites lobata</i> and <i>Montipora mollis</i> recorded. One species of ahermatypic hard coral <i>Tubastrea/Dendrophyllia</i> sp. was recorded. The octocoral cover was very low (< 5%) with <i>Dendronephthya</i> sp. and <i>Scleronephthya gracillicum</i> recorded.
Deep	~10	The seabed was mainly composed of bedrocks (~60%). The hard coral cover was low (<5%). The octocoral cover was low (< 10%) with <i>Euplexaura</i> sp., <i>Dendronephthya</i> sp. and <i>Scleronephthya gracillicum</i> recorded.
Transect 2		
Shallow	~5	The seabed was mainly composed of bedrocks (~40%). The hard coral cover was low (< 5%) with 6 species <i>Montipora peltiformis</i> , <i>Porties lobata</i> , <i>Cyphastrea chalcidicum</i> , <i>Favites chinensis</i> , <i>Goniopora stutchburyi</i> and <i>Plesiastrea versipora</i> recorded. The octocoral cover was very low (< 5%) with only a few small colonies of <i>Dendronephthya</i> sp. recorded.
Deep	~8	The seabed was mainly composed of bedrocks (~80%). The hard coral cover was low (< 5%) with 3 species <i>Plesiastrea versipora</i> , <i>Porites lobata</i> and <i>Psammocora superficialis</i> recorded. The octocoral cover was low (< 10%) with <i>Acanthogorgia</i> sp., <i>Euplexaura</i> sp., <i>Dendronephthya</i> sp. and <i>Scleronephthya gracillicum</i> recorded.
Transect 3		
Shallow	5	The seabed was mainly composed of bedrocks and small boulders. The hard coral cover was low (< 5%) with 4 species <i>Porites lobata</i> , <i>Goniopora stutchburyi</i> , <i>Plesiastrea versipora</i> and <i>Cyphastrea chalcidicum</i> recorded. The octocoral cover was very low (< 5%) with <i>Echinomuricea</i> sp. recorded.
Deep	~9	The seabed was mainly composed of bedrocks (50%). The hard coral cover was low (< 5%) with 4 species <i>Montipora peltiformis</i> , <i>Goniopora stutchburyi</i> , <i>Cyphastrea chalcidicum</i> and <i>Psammocora superficialis</i> recorded. The octocoral cover was low (< 10%) with <i>Euplexaura</i> sp., <i>Dendronephthya</i> sp. and <i>Scleronephthya gracillicum</i> recorded.

Table 3.4 Seabed Attributes along the Semi-Quantitative Survey Transects

Zone	A			B			C									
Depth ^(a)	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3
Seabed attributes ^(b)																
Bedrock	0	5	4	1	5	5	6	6	6	6	6	4	4	5	6	4
Boulders – large	3	2	3	2	3	3	1	2	3	3	0	3	3	2	2	2
Boulders – small	3	2	3	3	3	2	1	1	2	2	0	3	3	2	0	3
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	2	0	2
Sand	2	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
Silt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ecological attributes ^(b)																
Hard coral	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	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	2	2	2
Black coral	0	0	0	0	0	0	0	0	1	1	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; m = mid 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 3.5 Seabed Attributes along the Semi-Quantitative Survey Transects

Type	Taxon/ Family	Species	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C		
			Depth ^(a)	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3	
Hard Coral	Acroporidae	<i>Montipora peltiformis</i>												2				2		
		<i>Montipora mollis</i>											3							
	Siderastreidae	<i>Psammocora superficialis</i>	1	1						1				2				2	2	
	Dendrophyllidae	<i>Turbinaria peltata</i>																		
		<i>Tubastrea/</i>																		
		<i>Dendrophyllia sp.</i>				1				3	3									
	Faviidae	<i>Cyphastrea chalcidicum</i>	1								1			2	2	2				1
		<i>Favites chinensis</i>													1					
		<i>Oulastrea crispata</i>	3	1	2															
		<i>Plesiastrea versipora</i>			1									2	2	2				
Poritidae	<i>Goniopora stutchburyi</i>	2		1									2	2	2			2	1	
	<i>Porites lobata</i>												2	1	2			2		
Octocoral	Acanthogorgiidae	<i>Acanthogorgia sp.</i>																1		
		<i>Anthogorgia sp.</i>																		
		<i>Muricella sp.</i>							1											
Alcyoniidae	<i>Sinularia sp.</i>							1												

Type	Taxon/ Family	Species	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	
		Depth ^(a)	S1	S2	S3	D1	D2	D3	S1	S2	D1	D2	S1	S2	S3	D1	D2	D3	
	Nephtheidae	<i>Dendronephthya</i> sp.		2	4	1	1	4				3	3				3		2
		<i>Scleronephythya</i> sp.			1												2		
	Plexauridae	<i>Astrogorgia</i> sp.																	
		<i>Echinogorgia</i> sp.																	
		<i>Echinomuricea</i> sp.	2	3	3	4	2	1			2	2							
		<i>Euplexaura</i> sp.		2	2			2			2	2				2	1	1	
		<i>Menella</i> sp.									2	2					1		
		<i>Paraplexaura</i> sp.	1	1	2	1	1	2			1					1			
	Ellisiidae	<i>Ellisella</i> sp.	1	1	1														
Black Coral	<i>Antipathidae</i>	<i>Antipathes</i> sp.										1							
		<i>Cirrhopathes</i> sp.										1							

3.1.3 *Results of Coral Colony Monitoring*

Coral Colony Monitoring was undertaken at Zone A, Zone B and Zone C. The monitoring area was the same as the REA survey area (*Figure 3.1*).

The following data were collected for the identified hard coral, soft coral, black coral and gorgonian colonies and summarized in *Table 3.6 to 3.8*:

- 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.

Photographic records of the identified coral colonies are shown in *Annex A*.

Due to the natural high sedimentation rate in the region, encrusting (ie *Oulastrea crispata* or *Psammocora superficialis*) and submassive (ie *Goniopora stutchburyi*, *Cyphastrea chalcidicum*) hermatypic hard corals were commonly found to be covered by sediments of less than 1 mm thickness during the Baseline Coral Survey. Octocorals, except for *Dendronephthya* sp. and *Scleronephthya gracillicum*, were generally free of sediments. The health conditions of hard corals and octocorals were found to be good with no bleaching or partial mortality recorded.

Coral Colony Monitoring will be undertaken in the Post Project Monitoring in which coral colonies with similar growth forms and size to those monitored during the Baseline Coral Survey will be selected and measured. The comparison of baseline and post Project data would allow for determination of any observable adverse impacts to the health conditions of coral colonies as a result to the cable laying works.

Table 3.6 Species, Size, Sediment Cover, Bleached Area, Partial Mortality and Physical Damage to the Identified Coral Colonies in Zone A (Cape Collinson)

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
Hard Corals													
1	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	15	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
2	Faviidae	<i>Oulastrea</i>	<i>crispata</i>	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Faviidae	<i>Oulastrea</i>	<i>crispata</i>	2	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Faviidae	<i>Oulastrea</i>	<i>crispata</i>	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Faviidae	<i>Oulastrea</i>	<i>crispata</i>	1	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
6	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	14	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
7	Faviidae	<i>Oulastrea</i>	<i>crispata</i>	2	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
8	Faviidae	<i>Oulastrea</i>	<i>crispata</i>	4	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
9	Siderastreidae	<i>Psammocora</i>	<i>superficialis</i>	15	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Faviidae	<i>Plesiastrea</i>	<i>versipora</i>	15	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
11	Faviidae	<i>Favia</i>	<i>rotumana</i>	33	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
12	Acroporidae	<i>Montipora</i>	<i>mollis</i>	12	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
13	Dendrophyllidae	<i>Turbinaria</i>	<i>peltata</i>	19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Dendrophyllidae	<i>Turbinaria</i>	<i>peltata</i>	18	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
15	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	40	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
Octocorals													
1	Plexauridae	<i>Paraplexaura</i>		N/A	10	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Plexauridae	<i>Echinomuricea</i>		N/A	26	22	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
3	Plexauridae	<i>Echinomuricea</i>		N/A	26	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Plexauridae	<i>Echinomuricea</i>		N/A	25	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Ellisellidae	<i>Viminella</i>		N/A	23	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Ellisellidae	<i>Ellisella</i>		N/A	16	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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
7	Nephtidae	<i>Dendronephthya</i>		12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Nephtidae	<i>Dendronephthya</i>		14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Nephtidae	<i>Dendronephthya</i>		7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Ellisellidae	<i>Ellisella</i>		N/A	11	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Plexauridae	<i>Echinomuricea</i>		N/A	13	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Nephtidae	<i>Scleronephthya</i>	<i>gracillicum</i>	12	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
13	Acanthogorgiidae	<i>Muricella</i>		N/A	20	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Alcyoniidae	<i>Sinularia</i>		14	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
15	Antipathidae	<i>Antipathes</i>	<i>curvata</i>	N/A	110	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3.7 Species, Size, Sediment Cover, Bleached Area, Partial Mortality and Physical Damage to the Identified Coral Colonies in Zone B (Tai Long Pai)

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
Hard Corals													
1	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	5	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
2	Siderastreidae	<i>Psammocora</i>	<i>superficialis</i>	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Siderastreidae	<i>Psammocora</i>	<i>superficialis</i>	11	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
4	Faviidae	<i>Cyphastrea</i>	<i>chalcidicum</i>	9	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
5	Faviidae	<i>Cyphastrea</i>	<i>chalcidicum</i>	9	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
6	Dendrophyllidae	<i>Dendrophyllia</i>	-	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Dendrophyllidae	<i>Dendrophyllia</i>	-	3.5	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
8	Dendrophyllidae	<i>Dendrophyllia</i>	-	3.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	5	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Faviidae	<i>Cyphastrea</i>	<i>chalcidicum</i>	10	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
11	Dendrophyllidae	<i>Dendrophyllia</i>	-	3.5	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
12	Faviidae	<i>Plesiastrea</i>	<i>versipora</i>	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Dendrophyllidae	<i>Dendrophyllia</i>	-	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	12	N/A	N/A	5	Light yellow	Fine	<1mm	N/A	N/A	N/A
15	Faviidae	<i>Cyphastrea</i>	<i>chalcidicum</i>	11	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
Octocorals													
1	Nephtheidae	<i>Dendronephthya</i>		18	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
2	Nephtheidae	<i>Dendronephthya</i>		43	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
3	Nephtheidae	<i>Dendronephthya</i>		34	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
4	Plexauridae	<i>Menella</i>		N/A	12	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Antipathidae	<i>Cirrihipathes</i>		87	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Plexauridae	<i>Euplexaura</i>		N/A	16	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Nephtheidae	<i>Dendronephthya</i>		27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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
8	Nephtidae	<i>Dendronephthya</i>		25	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
9	Nephtidae	<i>Dendronephthya</i>		27	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
10	Nephtidae	<i>Dendronephthya</i>		27	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
11	Nephtidae	<i>Dendronephthya</i>		25	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
12	Nephtidae	<i>Dendronephthya</i>		10	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	13	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Plexauridae	<i>Paraplexaura</i>		N/A	20	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Plexauridae	<i>Paraplexaura</i>		N/A	23	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3.8 Species, Size, Sediment Cover, Bleached Area, Partial Mortality and Physical Damage to the Identified Coral Colonies in Zone C (Tung Lung Chau)

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
Hard Corals													
1	Siderastreidae	<i>Psammocora</i>	<i>superficialis</i>	16	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
2	Siderastreidae	<i>Psammocora</i>	<i>superficialis</i>	21	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
3	Siderastreidae	<i>Montipora</i>	<i>venosa</i>	9	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
4	Siderastreidae	<i>Montipora</i>	<i>venosa</i>	18	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
5	Siderastreidae	<i>Montipora</i>	<i>venosa</i>	22	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
6	Siderastreidae	<i>Montipora</i>	<i>mollis</i>	10	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
7	Faviidae	<i>Plesiastrea</i>	<i>versipora</i>	24	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
8	Faviidae	<i>Plesiastrea</i>	<i>versipora</i>	4	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
9	Siderastreidae	<i>Psammocora</i>	<i>superficialis</i>	11.5	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
10	Siderastreidae	<i>Montipora</i>	<i>venosa</i>	9	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
11	Faviidae	<i>Plesiastrea</i>	<i>versipora</i>	18	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
12	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	13	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
13	Faviidae	<i>Plesiastrea</i>	<i>versipora</i>	6	N/A	N/A	1	Light yellow	Fine	1mm	N/A	N/A	N/A
14	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	11	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
15	Poritidae	<i>Goniopora</i>	<i>stutchburyi</i>	40	N/A	N/A	5	Light yellow	Fine	1mm	N/A	N/A	N/A
Octocorals													
1	Plexauridae	<i>Euplexaura</i>		40	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Nephtheidae	<i>Dendrophthya</i>		4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Nephtheidae	<i>Dendrophthya</i>		8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Nephtheidae	<i>Dendrophthya</i>		3.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Nephtheidae	<i>Dendrophthya</i>		3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Nephtheidae	<i>Dendrophthya</i>		5	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
7	Nephtheidae	<i>Dendrophthya</i>		3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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
8	Nephtidae	<i>Dendrophthya</i>		7	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
9	Nephtidae	<i>Dendrophthya</i>		5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Nephtidae	<i>Dendrophthya</i>		12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Nephtidae	<i>Dendrophthya</i>		12	N/A	N/A	1	Light yellow	Fine	<1mm	N/A	N/A	N/A
12	Nephtidae	<i>Dendrophthya</i>		8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Acanthogorgiidae	<i>Acanthogorgia</i>		N/A	9	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Nephtidae	<i>Scleronephthya</i>	<i>gracillicum</i>	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Nephtidae	<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

CONCLUSION

Baseline Coral Surveys have been undertaken on 24 and 25 September 2012 at three designated monitoring zones (including two Impact Monitoring stations at Cape Collinson and Tai Long Pai, and one Control station at Tung Lung Chau) in accordance with the *EM&A Manual*. During the baseline survey, qualitative spot dive survey was firstly undertaken to identify significant coral habitats/identified coral communities (defined as locations within relatively higher coral abundance and species/ genus number for the purpose of this coral monitoring programme). The significant coral habitats/identified coral communities were selected for the subsequent REA survey and Coral Colony Monitoring during the Baseline and Post Project Coral Surveys.

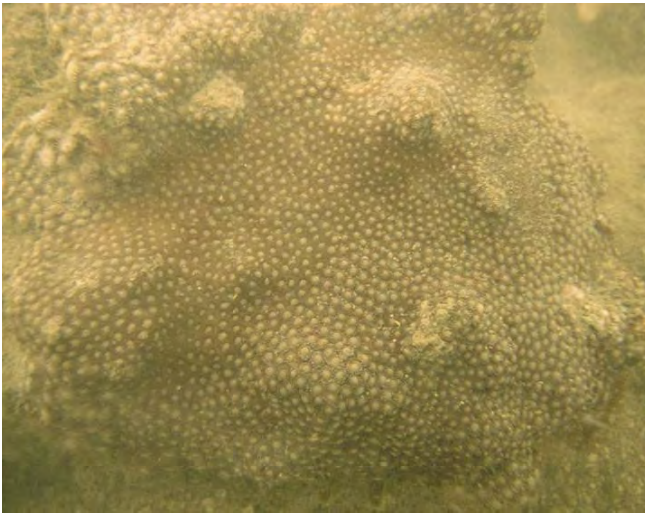


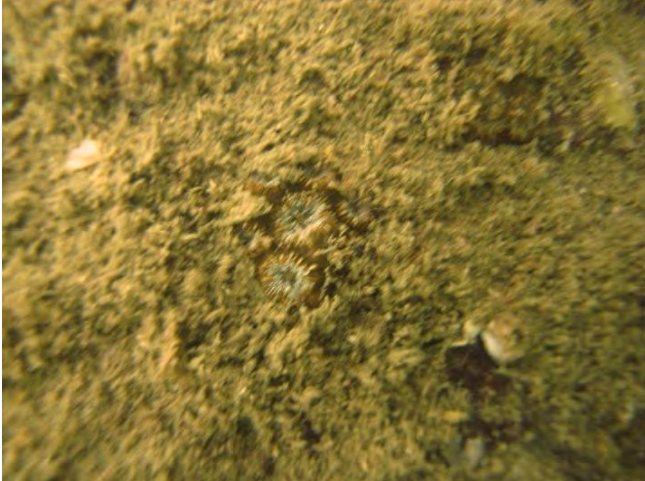
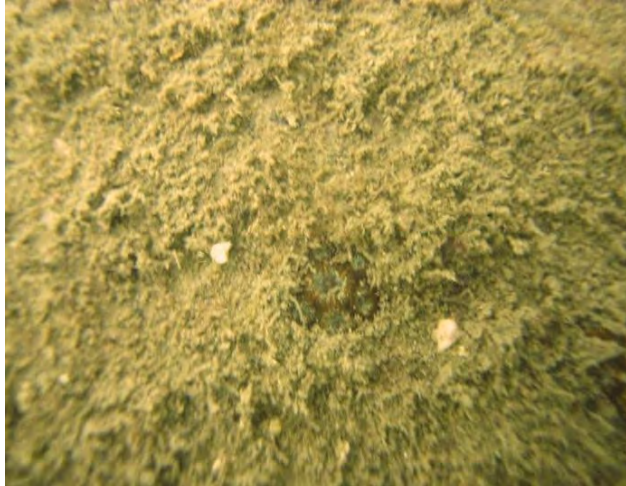
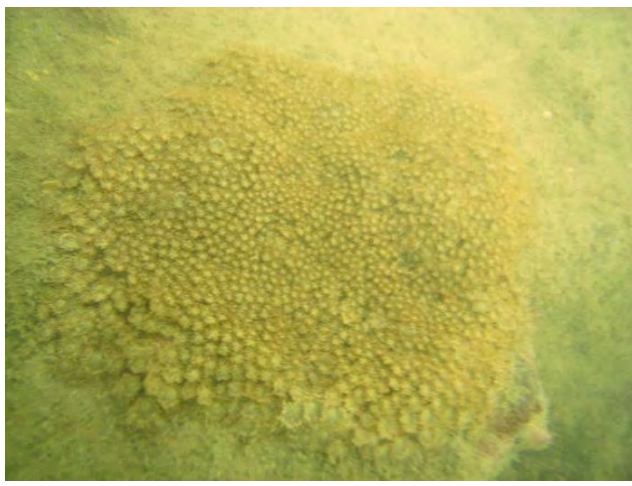
Findings of the qualitative spot dive survey revealed the existence of identified coral communities at the south of Cape Collinson and northern part of Ngan Wan (within Zone A) and southwestern part of Tai Long Pai (within Zone B).

Baseline REA surveys and Coral Colony Monitoring were then undertaken at these areas as well as the Control station at Tung Lung Chau. Data obtained from the baseline surveys will be used to compare with post Project monitoring data in order to determine any observable adverse impacts to corals as a result of the cable installation works.

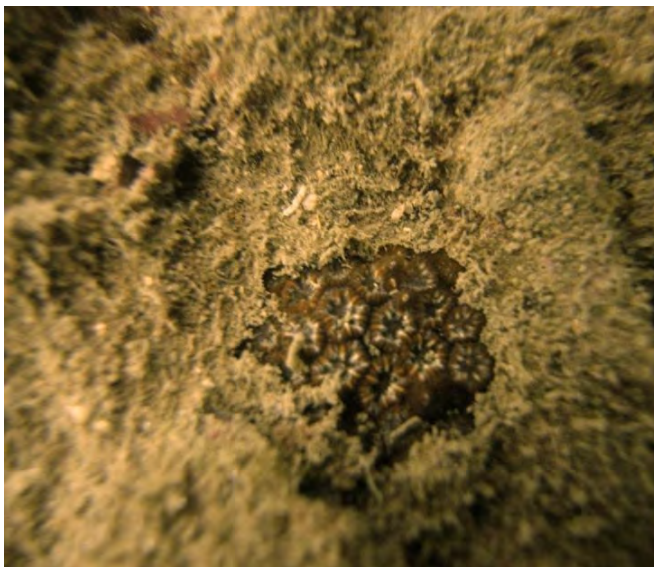
Annex A

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 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







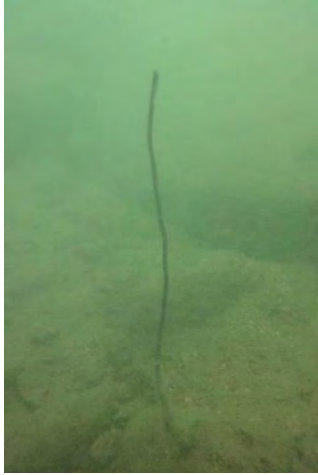

Colony No. 14



Colony No. 15



Annex A2 Photographic Records of Identified Octocoral Colonies at Impact Monitoring Site (Zone A – Cape Collinson) during the Baseline Coral Monitoring Survey

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

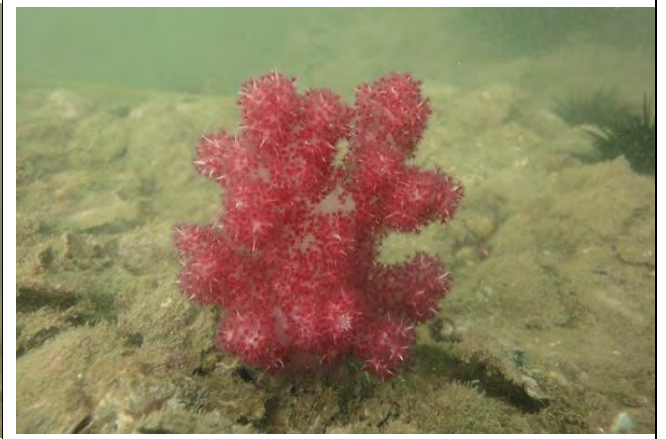
Colony No. 7



Colony No. 8



Colony No. 9



Colony No. 10



Colony No. 11



Colony No. 12



Colony No. 13



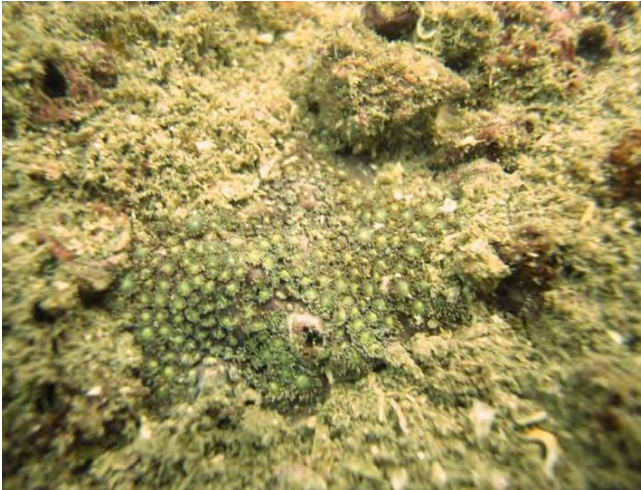





Colony No. 14



Colony No. 15



Annex A3 Photographic Records of Identified Hard Coral Colonies at Impact Monitoring Site (Zone B – Tai Long Pai) during the Baseline Coral Monitoring Survey

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

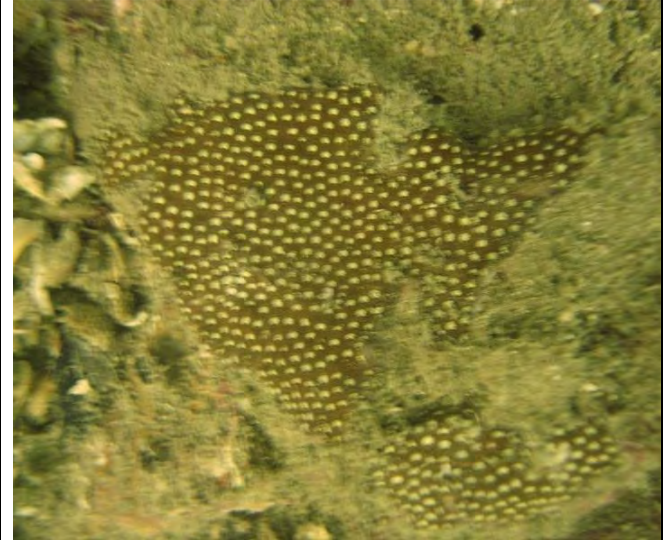
Colony No. 7



Colony No. 8



Colony No. 9



Colony No. 10



Colony No. 11



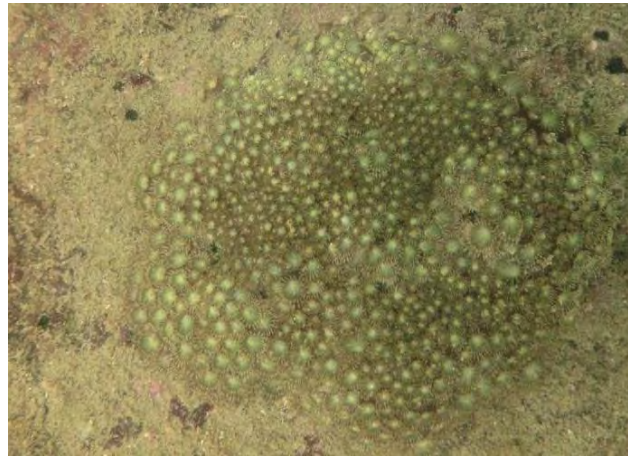
Colony No. 12



Colony No. 13









Colony No. 14



Colony No. 15



Annex A4 Photographic Records of Identified Octocoral Colonies at Impact Monitoring Site (Zone B – Tai Long Pai) 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 A5 Photographic Records of Identified Hard 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



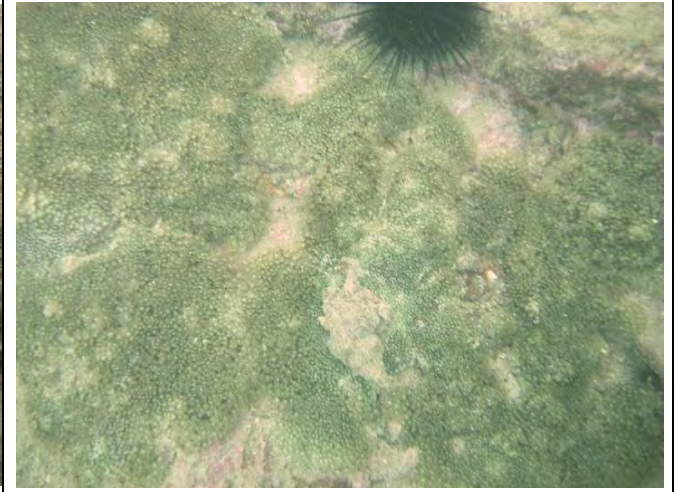
Colony No. 13









Colony No. 14



Colony No. 15



Annex A6 Photographic Records of Identified Octocoral 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



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