Third Runway Dive Survey Report

INTRODUCTION

Information on subtidal epibenthic communities on hard substrates in particular corals (including stony corals, black corals and octocorals) in the Project Area and the North Lantau waters is provided by several recent studies as well as field survey programmes under the present EIA study.

PROTECTION/CONSERVATION STATUS

Established coral communities of any size are regarded as important habitat types in Hong Kong as defined in Annex 8 of EIAO-TM.

Stony corals, together with Blue Corals, Orange Pipe Corals, Black Corals, Fire Corals, and Lace Corals, are protected in Hong Kong by the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586), with restrictions on Import, export and possession of those corals, no matter dead or living.

All marine organisms, including corals, in Marine Parks and Marine Reserve are also protected under Marine Parks Ordinance (Cap. 476).

LITERATURE REVIEW

Coral communities in Hong Kong exhibit strong gradients in distribution, species diversity and abundance.

Stony corals (may also be referred as hard corals, hermatypic corals) are members of scleractinians and contribute for the majority of coral reef building. They are more vulnerable to water quality such as low salinity and high suspended solid and prefer clear oceanic water. Their geographical distribution in Hong Kong as well as local distribution in particular areas are both affected by the extent of river/stream discharges which usually bring in suspended solid and reduce the salinity of the water.

In general, stony coral coverage and diversity decrease from east to west, toward the influence of the Pearl River (Scott 1984). The estuarine environment of the western

Hong Kong waters was thought unsuitable for the existence of stony corals (Scott 1984). A later study demonstrated that water quality, particularly elevated freshwater and suspended sediment levels which are characteristic of estuarine environment, prevent substantial hard coral growth (Hodgson and Yau 1997).

Octocorals, including soft corals and gorgonians, occur worldwide, in different latitude zones (tropical to polar areas), different water depth, and different water temperatures. But they are dominant in the waters of Indo-west Pacific, and are also one of the most important members occupying space in coral reef benthic communities following the reef building scleractinian corals.

Black corals belong to Order Antipatharia, could also be found in all oceans and usually inhabit deep water. Black coral is listed in Appendix II of the Convention on International Trade in Endangered Species (CITES).

General conditions of North Lantau waters

The North Lantau waters are within the estuarine western waters. In contrast to the oceanic eastern waters, the abundance and diversity of hard corals are low in western Hong Kong waters (in particular north-western waters which are closer to Pearl River Estuary). North Lantau waters are thus characterised by domination of gorgonian and soft corals. Soft corals, sea pens and gorgonian corals (sea fans) were reported to be present throughout the north-western waters.

AFCD commissioned a study with intensive underwater surveys in 2001-2002 to survey corals at 240 sites covering about 70 km of coastline in the territorial waters (AFCD 2004). Though hard corals could still be found in the western Hong Kong waters, they mainly occurred in southern Lantau waters (Tong Fuk, Soko Islands) and eastern Lantau waters (Cheung Chau, Hei Ling Chau), with only sparse colonies or low-coverage communities, composed of extremely tolerant and hardy species.

The coverage of corals in this region is very low (less than 5%, and usually < 1%, the lowest compared with other regions in Hong Kong). The “near-total or complete absence” of reef-building hard corals was considered attributable to the high turbidity and low salinity.

Previous EIA studies

A dive survey targeting on corals was conducted in 2003 along the coastline from Sham Wat to Kei Tau Kok (to the east of Tung Chung near Tai Ho) during the Ecological Baseline Survey for HZMB EIA (ARUP 2009). No hermatypic hard coral was found at any of the 27 dive sites. Although ahermatypic cup corals were recorded, they were concentrated in sites to the west of the airport island. The only widespread and common coral recorded in the survey was one species of gorgonians *Echinomuricea* sp. which was found both to the east and to the west of the airport island, but not inside the airport channel either.

The species composition at the dive sites on the southeast coast of Airport Island consisted of gorgonian soft corals and ahermatypic cup corals, and their coverage were found all below 5%. The gorgonian soft corals near Airport Island suffered high levels of partial mortality. The findings are consistent with that recorded in western water during the AFCD study.

Dive surveys were conducted at seven dive survey sites from Sham Wat throughout the Airport Channel to Tung Chung New Town in 2008 during the Ecological Verification Survey for HZMB EIA (ARUP 2009). The results revealed that no coral was found within the Channel while the diversity and abundance of hard and soft corals outside the Airport channel were low. Most hard substrates were dominated by barnacles, mussels and rock oysters. At the western shore of Sha Lo Wan headland, the subtidal hard substrate extends less than 10 m from the shore.

Only one genus of ahermatypic cup coral *Balanophyllia* sp. (Dendrophylliidae) and one genus of octocoral, *Echinomuricea* sp. (Plexauridae) were recorded from two and four of those seven survey sites, respectively. Both the hard and soft corals were only present outside the Airport Channel. No coral was found within the Channel. There was no other taxa of high conservation importance recorded in the seven survey sites.

In Hong Kong context, the low salinity and murky water at the western Hong Kong limit the development of hard corals to a few thriving species such as ahermatypic cup corals, *Oulastrea crispata*, *Plesiastrea versipora* and selected *Favia* species. At north and northwest Lantau, only *Oulastrea crispata* and ahermatypic cup corals have been reported. The low diversity and low abundance of corals reported in these previous surveys are typical for the western Hong Kong waters.

During the Marine Supplementary Survey for the HZMB EIA study (ARUP 2009), eight locations along the southeast shore of airport island were investigated by spot dive and two of them were further surveyed with REA technique.

In the HKBCF EIA survey programme (ARUP 2009), dive surveys were conducted at 7 locations along the northeast shore of airport island and nine locations within the HKBCF reclamation site, with two shore locations where direct impacts are anticipated further studied by REA technique.

Only two out of the eight dive locations in the MSS study had records of gorgonian coral Echinomuricea sp., and both sites (D1 and D8) are sloping boulder seawalls. The percentage cover of the gorgonian recorded was less than 1% and the gorgonians were of fair condition.

The seabed within the HKBCF reclamation site was quite homogeneous, of all muddy seabeds, lacking the hard bottom substrate required for coral colonization and thus was not a habitat for corals. The sediment was very fine and no demersal fauna was sighted. As no hard substrate in these locations, no coral (both hard and soft) was found in the seabed within the reclamation site.

The only hard bottom substrate in the area was the artificial seawalls which laid along the Airport Island shoreline, to the west of the HKBCF reclamation site. No hermatypic hard corals were found, but sparsely distributed small-sized gorgonian colonies (*Echinomuricea* sp.) were found at all seawall bounce dive points.

The hard substrate seabed along North Lantau coastlines were also surveyed during the dive survey of TMCLKL EIA study (AECOM 2009). Low coverage of populations of soft coral *Guaiagorgia* sp. (< 10%) and ahermatypic cup coral *Paracyathus rotundatus* (< 5%) were found along the seawalls. Partial mortality (about 20%) of the population of *Guaiagorgia* sp. was recorded during the REA survey at this coastline. Other organisms recorded were common in Hong Kong, such as sponges, barnacles, oysters, coralline algae. No taxa of high conservation importance were recorded.

SURVEY METHODOLOGY

The dive survey covered areas including the proposed land formation footprint within HKIAAA in Area 3 along the northern coast of existing airport island, and rocky shore at the potential pipeline diversion landing point within Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP) where direct impact may be received. Other potential coral sites that may receive indirect impact were also covered, which included the rocky shore at the Brothers and artificial seawalls at the western and northeastern coasts of the existing airport island. The artificial seawalls at Tung Chung Pier and North Lantau Highway near Tai Ho were selected as the reference sites for the northern coast of the airport island. The natural shorelines between Tai O to Yan O were selected as reference sites for the proposed pipeline landing point at Sha Chau, to gather baseline information for future impact assessment process.

A total of 16 coral survey points for hard bottom coral (six within Project footprint and one at the proposed pipeline landing point at SCLKCMP, three in adjacent areas and 6 at reference sites) and 19 coral survey points for soft bottom coral (Nine within Project footprint, four along proposed submarine pipelines and cables diversion alignments and in adjacent areas, two within the SCLKCMP with four other sites to the west and east of the airport island as reference sites) were covered. The survey locations were based on the existing available information on seabed feature and subject to confirmation and refinement based on the latest geophysical survey to be conducted in December 2012 for the planning of soft bottom coral survey points. It should be noted that there was no coral survey point on the eastern coast of HKIA due to the safety consideration of diving activities in area with heavy marine traffic induced by the marine work of the Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities (HKBCF) and the existing high-speed vessels travelling routes to and from the Mainland and SkyPier as presented in **Drawing No. MCL/P132/EIA/13-008**.

Spot-check Dive Survey

Spot-check dive survey was conducted at both hard bottom and soft bottom sub-tidal habitats to identify locations with coral communities for later Rapid Ecological Assessment.

The spot-check dive survey was conducted by swimming in a search pattern along pre-determined area at a density that was sufficient to cover any major coral areas and to assess the type of benthos existing in the proposed survey area, recording any presence of hard corals (order Scleractinia), octocorals (sub-class Octocorallia), and black corals (order Antipatharia). Information including estimated number of colonies, number of species, coral cover, and partial mortality (if any) was recorded during the actual dive.

The following data were also recorded during the survey:

- Temperature, time and date
- Location (GPS);
- Depth range;
- Visibility;
- Substratum type (i.e. hard substratum seabed, intertidal rocky area); and
- Other invertebrates present.

Any special features encountered in the coral areas, such as non-typical reef structures, unusual coral species associations, unique or peculiar assemblages of the local incipient reef formations, and reefs that are almost completely dominated by one particular species, were recorded.

Representative photographs of any important ecological habitat, coral species and other ecological features were taken.

Rapid Ecological Assessment Survey

With reference to the data collected during the spot-check dive survey, Rapid Ecological Assessment (REA) surveys were carried out at locations where coral communities are identified. Transects of 100 m in length were laid following the contour of the seabed at areas where corals were recorded during the spot-check dives. As the water depths along the proposed survey area are shallow (around 5-6 m deep), the entire seawall area along the REA transects was surveyed.

The REA survey was conducted underwater in a two-tier approach to assess the sub-littoral substrata and benthic organisms in an area:

- Tier I assessed the relative coverage of major benthic groups and substrata.
- Tier II provided an inventory of sedentary/ sessile benthic taxa, which would be

ranked in terms of their abundance at the survey site.

The taxon categories were ranked in terms of relative abundance of individuals, rather than the contribution to benthic cover along each transect. The ranks would be made by visual assessments of abundance, rather than quantitative counts of each taxon.

The benthic coverage, taxon abundance, and ecological attributes of the transects were be recorded in a swath of about 2 m wide, with about 1 m on either side of the transects.

Representative photographs of any important ecological features and corals were taken.

The coral survey was conducted once as coral is sessile that has minimal seasonal variation.

SURVEY RESULTS

Dive survey was conducted between 2012-2013 at 16 Dive Survey Locations (D1 to D 16, see **Drawing No. MCL/P132/EIA/13-008**) in North Lantau waters, including locations along the coastlines of Airport Island (i.e. D1 to D8, and D16), along the North Lantau coastline from Tai O to Yam O (i.e. D10 at Tai O, D11 inside Airport Channel near Sha Lo Wan, D12 at Tung Chung New Town waterfront, D13 at seawall near Tai Ho and MTR depot, and D14 at Yam O), and islands in North Lantau waters (i.e. D9 at the coastline of Sha Chau, and D15 at the coastline of the Brothers).

The survey locations on Airport Island covered the seawalls within Project Footprint and adjacent seawalls, while the remaining survey locations covered natural coastlines away from the Project footprint.

Dive survey locations on Airport Island

Dive Survey Locations D1 to D8 as well as D16 were all located on the seawalls of Airport Island, with D1 and D16 on the western coast of the island and the others on the northern coast. Among them, D2 to D7 fall within the proposed Third Runway land formation footprint, while remaining three (i.e. D1, D8 and D16) were outside.

The coastlines of airport island are mainly artificial seawalls, though some remnant natural coasts could still be found at the southeastern side of the island. Among the artificial seawalls on the airport island coastlines, sloping type seawalls are predominant, including all dive survey locations, though some sections of vertical seawalls could still be found (such as at Marine Cargo Terminal and SkyPier, and the barging point at the centre of the northern coast of the island). The sloping seawalls are composited of boulders of irregular shapes. The sloping artificial seawalls maintained a similar gradient in the intertidal zone as well as the subtidal zone, and extended till it met the seabed surface.

D1 was located at the breakwater just off shore to the Fire Station on western airport island coast, close to but outside the proposed third runway land formation footprint. The breakwater was also in the form of sloping seawalls, similar with other sloping seawalls on airport island.

D2, D3, D4, D5 and D6 were all on the same seawall at the northern coast of the airport island, and they falls within the proposed land formation footprint. Direct impacts were expected in these stations. There is a barging point in the middle of this section of seawall. D2, D3 and D4 were located to the west of this barging point, while D5 and D6 to the east.

At the eastern part of the northern coastline of airport island, the seawalls set back southward a bit. D7 and D8 were located on this section of setback seawalls. D7 was located close to the starting point where the setback starts while D8 was located close to the distal end of the setback section near the easternmost end of the northern coast. There was also a drain discharge point in between D7 and D8.

D7 is still within the proposed land formation footprint. D8 was the eastern most dive survey location on Airport Island and is outside the footprint of the proposed land formation.

D16 was one of the additional dive survey locations for the pipeline alignment. It is located on the seawall outside the aircraft maintenance facilities at the western end of airport island.

No hermatypic hard corals were found on Airport Island, but sparsely distributed small-sized gorgonian colonies were found at most seawall dive survey locations. A low coverage percentage of small-sized gorgonian colonies (i.e. *Guaiagorgia* sp.) was found on all stations on airport island except D16. *Guaiagorgia* sp. was previously recorded in the western Hong Kong waters by the territory-wide research study on octocorals (including soft corals and gorgonians) and black corals conducted by CUHK for AFCD (Put Jr. *et al*. 2010). This species was also previously reported by other EIA studies in North Lantau waters such as TMCLKL (AECOM 2009). This gorgonian is very common in Hong Kong western waters and not considered of special conservation importance. Furthermore, partially mortality was observed on many colonies of the gorgonian, demonstrating the conditions of the gorgonians.

On the boulders of the sloping seawalls, there was no hermatypic hard coral, but ahermatypic cup corals *Balanophyllia* sp. was found on the sloping seawalls, mainly at D8. *Balanophyllia* sp. is considered as species of conservation importance in this study. It was also previously reported by other EIA studies in North Lantau waters as well as on the eastern coast of airport island (see HKBCF EIA, ARUP 2009).

Other epifauna on the boulders were mainly sessile bivalves including Green mussel *Perna viridis* and Rock Oyster *Saccostrea* sp., and predatory snail *Thais* sp. These other fauna recorded were not of conservation importance.

Further seawards to the boulders at the seawalls, the nearby seabed was almost solely muddy substrates, without special records of epifauna species.

No gorgonian or ahermatypic cup coral was recorded in Dive Survey Location D16. There was also no other epifauna encountered during the dive survey. This location was thus of the lowest diversity among all the 16 dive survey locations.

Dive survey locations on North Lantau coastline

Dive survey location at Tai O (D10) was on natural coastline of bedrock substrates, to the west of a small scale sewage treatment plant. The bedrock extends to seabed, but there was very little

The dive survey location inside Airport Channel (D11) was near Sha Lo Wan. It is also a small embayment with shallow depth. No gorgonian or ahermatypic cup coral was recorded in this location. D11 together with D16 were the only two dive survey locations with no record of any coral species (neither gorgonians nor ahermatypic cup corals) among the 16 dive survey locations under the present study. For other epifauna, there were only rock oysters and barnacles encountered.

The waterfront of Tung Chung New Town contains both sloping seawalls and vertical seawalls. The station at Tung Chung (D12) was at sloping seawalls.

D13 was located on the sloping seawall of North Lantau coastline, in between the outfall of Tai Ho Wan and the MTR Siu Ho Wan Depot. It is to the east of the outlet of Tai Ho Wan. Freshwater input from Tai Ho Stream is discharged into the nearby waters through this only outlet of Tai Ho Wan with the open sea. Like airport island and Tung Chung, the boulders on the seawalls were also heavily covered by fine sediment.

On the seawalls in both D12 and D13, the same species of common gorgonian *Guaiagorgia* sp. and common ahermatypic cup coral *Balanophyllia* sp. were recorded. The coverage percentages of these two species were very low, less than 1%. The gorgonians were all of smaller sizes and scattered on the boulders, and partially mortality was also observed in many colonies, which indicated that these gorgonians were under stress. Other marine fauna species found during the survey were similar with those on airport island, including Green Mussel and Rock Oyster, and they were common and of no special conservation importance in Hong Kong.

D14 was located at the natural coastline of Yam O. Originally the dive survey location was set inside an embayment. It was however found that the originally selected dive survey location was too shallow for dive survey nor suitable for coral colonization. The location was thus shifted to the opening of the embayment. A relatively higher abundance of corals (mainly the common gorgonian *Guaiagorgia* sp.) was found during the spot check dive survey. Other than the gorgonian and the common ahermatypic cup coral *Balanophyllia* sp., one further coral species i.e. *Oulastrea crispate* was found in Yam O, but the coverage was much lower than the gorgonians. REA dive survey was conducted at in this location D14, the results of REA were shown in next section below.

Dive survey locations in islands within North Lantau waters

D9 was on the eastern coastline of northern Sha Chau Island, adjacent to the existing fuel receiving facilities. The dive survey location was a natural coast and the seabed there was covered by both bedrock substrate and boulders. A relatively higher abundance of the two coral species of common gorgonian *Guaiagorgia* sp. and common ahermatypic cup coral *Balanophyllia* sp. was found in this location, about 5-10% (mainly contributed by the gorgonians), and thus a REA survey was performed.

D15 was the western coastline of Tai Mo To of the Brothers. Though the terrestrial landscape has been heavily modified during the construction of the International airport, the coastline of the Brothers remain more or less natural.

The current flow at this dive survey location was strong and the survey had to be conducted during the transition period between flooding tide and ebb tide, when the tidal flow is lower.

REA Survey

REA dive surveys were conducted at D9 and D14, both located on natural coastline with relatively higher coral occurrence and also outside the proposed land formation footprint. To further investigate the epifauna fauna on the coastlines which have higher coral coverage in the area, a 100 m coastline was surveyed by REA in a horizontal transect pattern in each of the two sites. The results of REA were shown in Table 1 to Table 6 below.

REA Data for Site D9

Table 1 Ecological Attributes on D9 REA Transect

Ecological Attributes	**Rank**
Hard Coral	0.5
Dead Coral	0
Octocoral (Soft corals and gorgonians)	0.5
Anemone Beds	0
Dead Standing Corals	0
Other Benthos (sponges, zoanthids, ascidinas and bryozoans)	0.5
Macro-algae	0

* Rank of percentage cover: 0 = None recorded; 0.5 = 1-5%; 1 = 6-10%; 2 = 11-30 %; 3 = 31-50%; 4= 51-75 %; 5 = 76-100%.

Table 2 Substratum Attributes on D9 REA Transect

Hard Substrata	**Rank**
Bedrock/continuous pavement	2
Boulder Blocks (diam.>50cm)	4
Boulder Blocks (diam.<50cm)	1
Rubble	0
Other	0
Soft Substrata	**Rank**
Sand	1
Mud/Silt	0
Mud	0

* Rank of percentage cover: 0 = None recorded; 0.5 = 1-5%; 1 = 6-10%; 2 = 11-30 %; 3 = 31-50%; 4= 51-75 %; 5 = 76-100%.

Table 3 Ranks of Taxon Abundance along the D9 REA Transect

Benthic Taxa	Rank
Balanophyllia sp.	2
Guaiagorgia sp.	2
Sponges	3
Bryozoan	3

* Rank of Abundance: 0 = Absent; 1 = Rare; 2 = Uncommon; 3 = Common; 4= Abundant; 5 = Dominant.

REA Data for Site D14

Table 4 Ecological Attributes on D14 REA Transect

Ecological Attributes	Rank
Hard Coral	0.5
Dead Coral	0
Octocoral (Soft corals and gorgonians)	0.5
Anemone Beds	0
Dead Standing Corals	0
Other Benthos (sponges, zoanthids, ascidinas and bryozoans)	0.5
Macro-algae	0

* Rank of percentage cover: 0 = None recorded; 0.5 = 1-5%; 1 = 6-10%; 2 = 11-30 %; 3 = 31-50%; 4= 51-75 %; 5 = 76-100%.

Table 5 Substratum Attributes on D14 REA Transect

Hard Substrata	Rank
Bedrock/continuous pavement	4
Boulder Blocks (diam.>50cm)	2
Boulder Blocks (diam.<50cm)	2
Rubble	0
Other	0
Soft Substrata	**Rank**
Sand	1
Mud/Silt	0
Mud	0

* Rank of percentage cover: 0 = None recorded; 0.5 = 1-5%; 1 = 6-10%; 2 = 11-30 %; 3 = 31-50%; 4= 51-75 %; 5 = 76-100%.

Table 6 Ranks of Taxon Abundance along the D14 REA Transect

Benthic Taxa	Rank
Balanophyllia sp	1

Guaiagorgia sp.	2
Sponges	3
Bryozoan	3
Saccostrea cucullata	2
Perna viridis	2

* Rank of Abundance: 0 = Absent; 1 = Rare; 2 = Uncommon; 3 = Common; 4= Abundant; 5 = Dominant.

Reference

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Table 9 Substrates and coral species recorded at the 16 dive survey locations

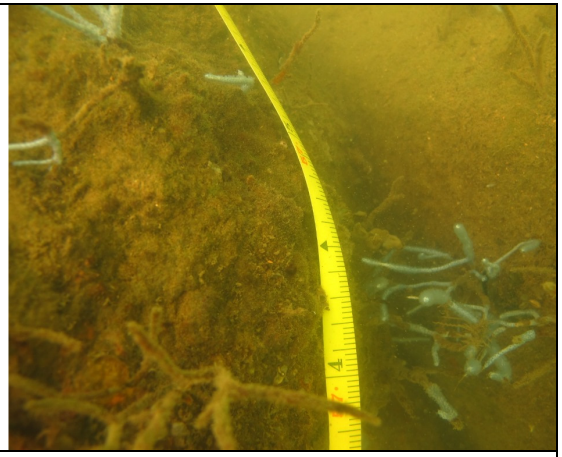
No.	D 1	D 2	D 3	D 4	D5	D 6	D 7	D 8	D 9	D10	D11	D12	D13	D14	D15	D16
Locations	**Airport Island**	**Airport Island**	**Airport Island**	**Airport Island**	**Airport Island**	**Airport Island**	**Airport Island**	**Airport Island**	**Sha Chau**	**Tai O**	**Airport Channel**	**Tung Chung**	**Tai Ho**	**Yam O**	**The Brothers**	**Airport Island**
Depth (m)	**6.5 m**	**7 m**	**6.5 m**	**6.5 m**	**7 m**	**6.5 m**	**7.5 m**	**7 m**	**7.8 m**	**3 m**	**2 m**	**6 m**	**7.5 m**	**4.5 m**	**3.5 m**	**6.8 m**
Substrate	Artificial seawall	Artificial seawall	Artificial seawall	Artificial seawall	Artificial seawall	Artificial seawall	Artificial seawall	Artificial seawall	Natural	Natural	Natural	Artificial seawall	Artificial seawall	Natural	Natural	Artificial seawall
Coral Species																
Guaiagorgia sp.	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**		**x**	**x**	**x**	**x**	
Balanophyllia sp.								**x**	**x**	**x**		**x**	**x**	**x**	**x**	
Oulastrea crispata														**x**		
Coral % Coverage	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	~5-10%	<1%	Nil	<1%	<1%	~5%	<1%	Nil
REA needed									Yes					Yes		
OTHER FAUNA SPECIES																
Sponges										**x**		**x**	**x**	**x**	**x**	
Rock oyster	**x**	**x**		**x**		**x**			**x**	**x**	**x**	**x**	**x**	**x**	**x**	
Chlorostoma sp.					**x**											
Thais sp.			**x**			**x**							**x**			
CRUSTACEANS																
Barnacles	**x**		**x**			**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	
Crab Varuna	**x**															
Crab Scylla															**x**	
Hermit crab *Clibanarius* sp.		**x**						**x**						**x**		
ECHINODERMS																
Sea Urchins *Temnopleurus* sp.			**x**										**x**			
Sea Urchins *Diadema* sp.														**x**	**x**	

No.	D 1	D 2	D 3	D 4	D5	D 6	D 7	D 8	D 9	D10	D11	D12	D13	D14	D15	D16
Locations	Airport Island	Airport Island	Airport Island	Airport Island	Airport Island	Airport Island	Airport Island	Airport Island	Sha Chau	Tai O	Airport Channel	Tung Chung	Tai Ho	Yam O	The Brothers	Airport Island
Depth (m)	6.5 m	7 m	6.5 m	6.5 m	7 m	6.5 m	7.5 m	7 m	7.8 m	3 m	2 m	6 m	7.5 m	4.5 m	3.5 m	6.8 m
Sea cucumber *Holothuria leucospilota*														x		
FISH																
Terapon jarbua				x						x						
Tridentiger trigonocephalus		x						x				x	x			
Glossogobius sp.				x												
Ambassis gymnocephalus					x					x		x				
Bathygobius sp.			x										x			
Grouper														x		
Scorpion fish														x		
Rabbit fish														x		
Moray eel														x		

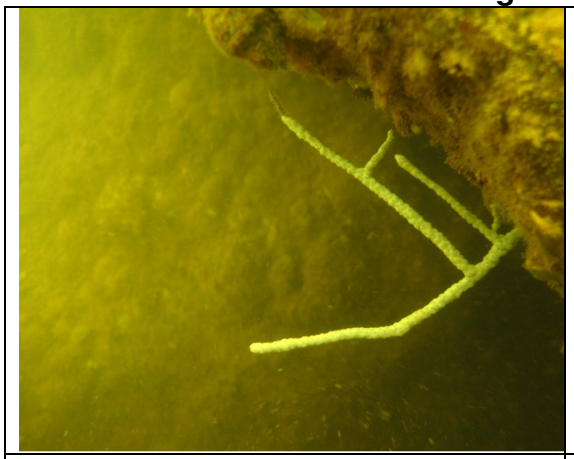
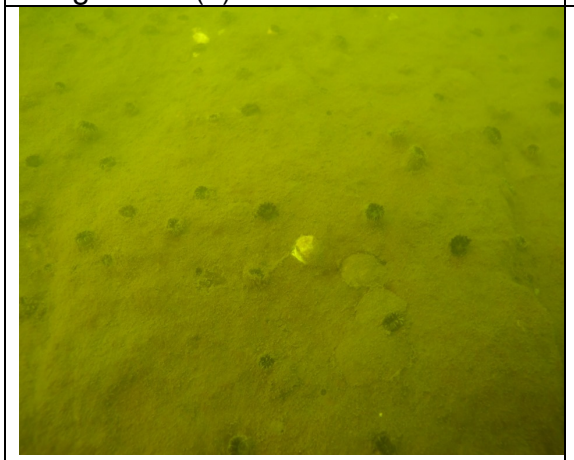
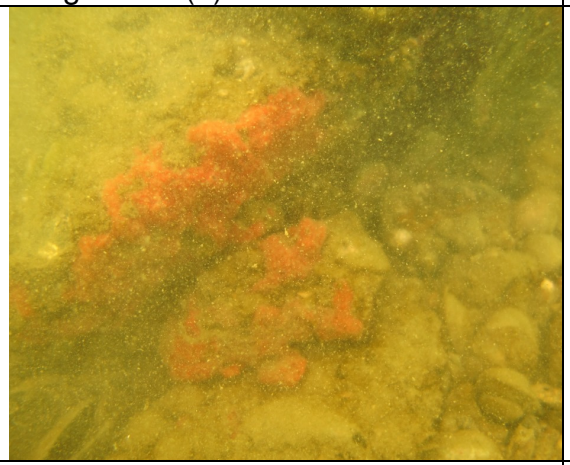
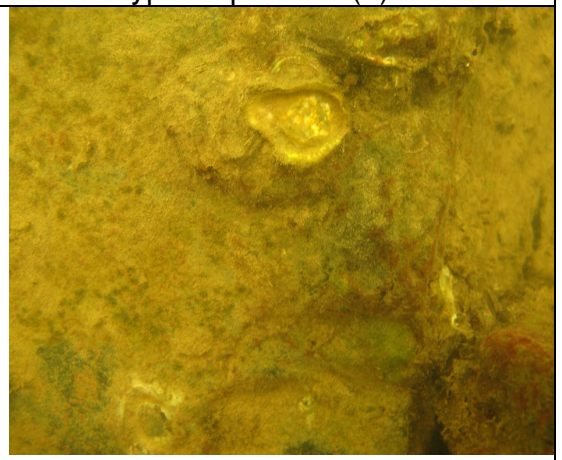
Photos of Dive Survey Locations

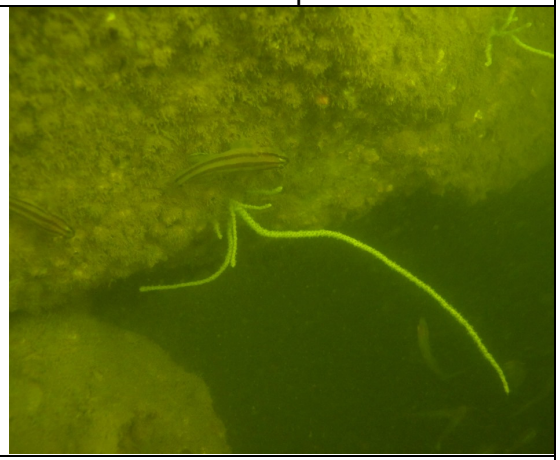
		
D1	D2 to D6	Barging Point at northern coast of Airport
		
D7	D8	D9

		
D10	D11	D12
		
D13	Original D14	Alternative D14

		
D15	D16	REA transect

Photos of fauna recorded during dive survey

		
Gorgonians (1)	Gorgonians (2)	Ahermatypic cup corals (1)
		
Ahermatypic cup corals (2)	Sponges	Rock oyster

		
Green mussel	Snail *Thais* sp.	Snail *Chlorostoma* sp.
		
Crab Varuna	Sea urchin *Temnopleurus* sp.	Fish *Tridentiger trigonocephalus*