APPENDIX 5.8 Subtidal Survey Results for Kai Tak Barging Point

METHODOLOGY

Dive Survey - Rapid Ecological Assessment (REA)

Rapid Ecological Assessment (REA) surveys were conducted along four transects (KT1 to KT4) at the coast of the proposed dredging area/ barging point at the Kai Tak Airport (Fig. 1.1). Substrate type along each transect was recorded at 1m intervals. The benthic cover, taxon abundance, and ecological attributes along the transect were recorded in a swathe of 2m wide, 1m either side of the transect. All field data were collected by marine ecologists using SCUBA dive.

Transects KT1, KT2 and KT3 were 100m transects at depth ~1.5 to 2m depth as hard substrates were limited at shallow water and connected to muddy seabed at ~3m; and KT4 were composed of two 50m transects at two depths, 1.5m and 3.5m, as the Lion Rock is a vertical bedrock with circumference of ~50m and connected to muddy seabed at ~4.5m. The locations of the REA transects were recorded on site using GPS (Garmin GPS 60CS). Pictures of representative taxa along the transects were taken during the surveys and shown in Appendices I to V.

Two types of information will be recorded:

(1) Cover of the major benthic groups;

(2) Inventory of sessile benthic taxa.

These were performed according to Tier I and Tier II levels of information.

Tier I: Categorization of ecological (benthic cover) and environmental variables.

To describe the benthic cover, six substrate and seven ecological attributes (Table 1.1a) were assigned. Each attribute was given a rank, from 0 to 6 (Table 1.1b) based on the overall cover along the survey area.

Tier II: Taxonomic inventories to define types of benthic communities.

An inventory of benthic taxa was compiled during each swim. Taxa were identified either *in situ* or with the aid of photos to confirm identification afterward.

Hard corals (Order Scleractinia) – to genus and species level where possible;
Soft corals (Subclass Octocorallia) – to genus level where possible;
Other benthos (such as sponges zoanthids, bryozoans, macroalgae etc) – to genus level where possible or phylum with growth form;

Each taxon in the inventory will be given a rank (0 to 5) on the basis of its abundance in the community at the site (Table A5.8.1). These broad categories rank the taxa in terms of the relative abundance of individuals, rather than the contribution to benthic cover, at each site.

Table A5.8.1. *Categories of a) benthic attributes, b) ordinal ranks of percentage cover of substrate, and (c) ordinal ranks of taxa abundance.*

a) Benthic attributes		**b) Percentage Cover**		**c) Taxon abundance**	
Substrate	Ecological	Rank	Percentage Cover	Rank	Abundance
Bedrock	Hard Corals	0	Not recorded	0	Absent
Boulders (diameter >50cm)	Dead Coral Skeleton	1	1-5%	1	Sparse
Cobbles (diameter < 50cm)	Soft Corals	2	6-10%	2	Uncommon
Dead coral skeletons	Sea anemone beds	3	11-30%	3	Common
Sand with gravel	Encrusting Algae	4	31-50%	4	Abundant
Mud & Silt	Coralline Algae	5	51-75%	5	Dominant
	Erect Macroalgae	6	76-100%		

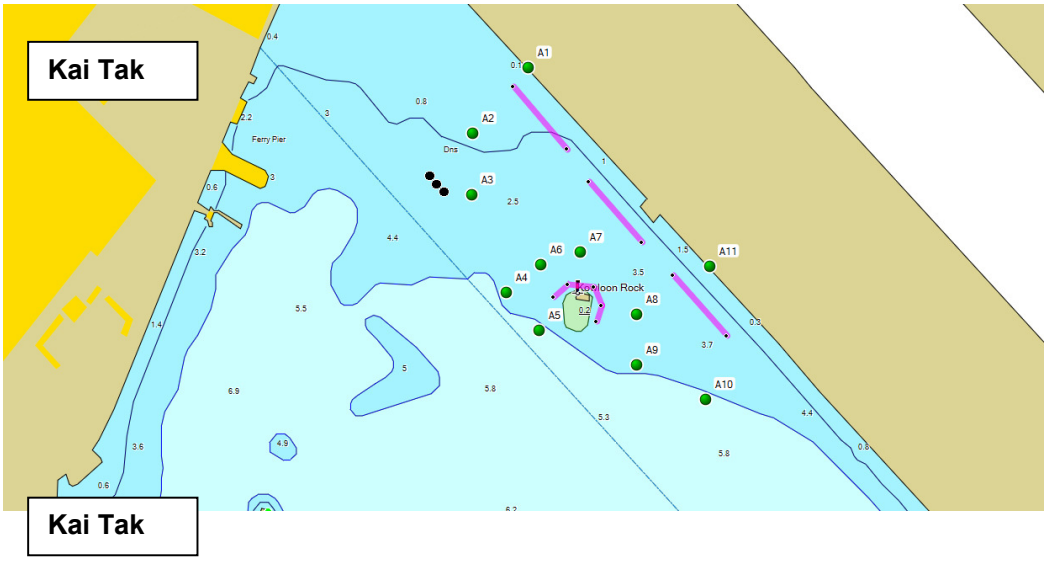

Fig. A5.8.1. *Map showing the Dive Survey Locations. The four REA transects are indicated by purple lines and green dots A1 – A11 indicate the proposed dredging/ barging area.*

RESULTS

Dive Surveys - Rapid Ecological Assessment (REA)

The dive surveys along the coast of Kai Tak Airport were conducted on 9 and 10 October 2010. A total of four REA transects (KT1 to KT4) were surveyed.

The locations of the REA transects are shown in Fig. A5.8.1, and survey conditions in Table A5.8.2. Records of the taxonomic inventories are presented in Table A5.8.2.

Table A5.8.2. *Location and Physical attributes of REA Transects at Kai Tak Aiport.*

Location	REA Transects	GPS Coordinates of Starting Point	Depth (m)	Visibility (m)	Substrate type	Presence of Hard Corals?	Presence of Soft Corals?
Kai Tak Airport	KT1	N 22°19.126' E 114°11.890'	1.5 – 2.5	0.5 - 1	Artificial Boulders	Yes	No
	KT2	N 22°19.083' E 114°11.934'	1.5 – 2.5	0.5 - 1	Artificial Boulders	Yes	No
	KT3	E 114°11.992'	1.5 – 2.5	0.5 - 1	Artificial Boulders	Yes	No
	KT4	N 22°18.987' E 114°11.924'	1.5 – 4.5	0.5 - 1	Natural Bedrock	No	No

Transects KT1, KT2 and KT3 were artificial shores, the percentage cover of substrate types were similar and mainly composed of big boulders with diameter >50cm (76%, 84% and 100%, respectively; Table A5.8.3). The slope of the boulder substrates extended to a distance of ~5 to 6m offshore, and dropped to the depth of ~3m. Muddy seabed was found at depth >3m. The hard substrates were generally covered by sediments.

Rock oysters, barnacles and sponges were the dominant sessile taxa with percentages of 50 to 61%, 7 to 23% and 5 to 15% along all these transects (Table A5.8.3). Low abundance of other sessile taxa including sponges, tunicates, bryozoans and sea anemones and hard corals were observed.

Only one hard coral species, namely *Oulastrea crispata*, was found along these transects. In general, low abundance of *O. crispata* was found along transects KT1 (<1%), KT2 (<1%) and KT3 (9%).

A total of 17 hard colonies were found along transects KT1, KT2 and KT3. One hard coral colony was found in KT1, 5 colonies were found in KT2, and 11 colonies were found in KT3 (Table A5.8.3.

No soft coral colony was found along transects KT1 to KT3.

REA Transect KT4

Transect KT4 were composed of two 50m transects at two depths around the Lion Rock, which was a natural bedrock substrate (i.e. 100% cover of bedrock substrate). Muddy seabed was found at depth >4.5m.

At shallow water (1.5m), the hard substrate was mainly covered by barnacles (80%), sponges (6%), tunicates (4%), and green mussels (4%), whilst a well mixture of sponges (24%), bryozoans (22%), barnacles (18%) and green mussels (16%) was found at deeper water (3.5m) (Table A5.8.3).

No hard or soft coral colony was found along transect KT4.

Table A5.8.3. REA Survey - Ecological and Substrate Attributes, and Taxonomic Inventories.

Rank	**Kai Tak Airport**				
Substrate attributes (0 – 6)	**KT1**	**KT2**	**KT3**	**KT4 (1.5m)**	**KT4 (3.5m)**
Bedrock	0	0	0	6	6
Boulder (diameter >50cm)	6	6	6	0	0
Cobble (diameter<50cm)	3	3	0	0	0
Rubble (dead corals)	0	0	0	0	0
Sand with gravel	0	0	0	0	0
Mud & Silt	2	0	0	0	0

Ecological attributes (0 – 5)	**Kai Tak Airport**				
	KT1	**KT2**	**KT3**	**KT4 (1.5m)**	**KT4 (3.5m)**
Hard Corals					
Faviidae *Oulastrea crispata*	1	1	1	0	0
Other benthos					
Sponges	1	2	2	2	3
Bryozoans	1	1	1	0	3
Tunicates	0	0	1	1	3
Anemone	1	1	2	0	0
Rock Oysters	5	5	5	1	0
Mussels (e.g. *Perna viridis*)	0	0	0	1	3
Barnacles	3	3	2	6	3
Tube worms	1	1	1	1	1
Number of hard coral species	1	1	1	0	0
Number of soft coral species	0	0	0	0	0

Coral community

Among the 4 REA transects, low abundance of hard coral was found in KT 1 to KT3 and no hard corals was found in KT4. No soft coral or gorgonian was found in KT1 to KT4.

Only one species of hard coral, *Oulastrea crispata* (Family Faviidae) was observed in the surveys. This species is characterized by its encrusting growth form and small size of only a few centimeters across. *O. crispata* mainly grows on rocky substrates in turbid water with high sedimentation, which is usually unfavorable habitat for most hard coral species (Veron 2000).

A total of 17 colonies of *O. crispata* was found in the surveys in transects KT1 to KT3 (TableA5.8.4). Size of the colonies ranged from 4 to 24cm^2. Higher number of colonies was recorded in KT3 than the other transects. Along all transects, the recorded colonies were generally in normal status and show low level of sedimentation (2 to 20%), bleaching (0%) and mortality (0%) (Table A5.8.4).

All colonies were associated with large boulders of diameter ~50 to 150cm, and therefore, translocation (if necessary) may not be possible.

Table A5.8.4. *Hard Coral Colonies, Size, Percentage Area of Sedimentation, Bleaching and Partial Mortality in the 4 Survey Transects.*

Kai Tak							
No.	**Species**	**Transect**	**Location on Transect (m)**	**Area (cm^2)**	**% Sedimentation**	**% Bleaching**	**% Mortality**
Hard Coral							
1	*Oulastrea crispata*	KT1	11.2	4	8	0	0
2	*Oulastrea crispata*	KT1	27.2	9	5	0	0
3	*Oulastrea crispata*	KT1	27.4	24	4	0	0
4	*Oulastrea crispata*	KT1	32.4	4	8	0	0
5	*Oulastrea crispata*	KT1	32.7	6	20	0	0
6	*Oulastrea crispata*	KT2	8.9	9	5	0	0
7	*Oulastrea crispata*	KT3	6.0	8	5	0	0
8	*Oulastrea crispata*	KT3	16.4	8	5	0	0
9	*Oulastrea crispata*	KT3	56.4	4	2	0	0
10	*Oulastrea crispata*	KT3	56.5	5	5	0	0
11	*Oulastrea crispata*	KT3	56.7	15	5	0	0
12	*Oulastrea crispata*	KT3	56.8	20	6	0	0
13	*Oulastrea crispata*	KT3	56.9	14	8	0	0
14	*Oulastrea crispata*	KT3	79.4	6	5	0	0
15	*Oulastrea crispata*	KT3	79.8	8	2	0	0
16	*Oulastrea crispata*	KT3	88.2	15	4	0	0
17	*Oulastrea crispata*	KT3	88.6	20	5	0	0

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