## E1 INTRODUCTION

The original marine ecological field survey programme for the Cross Bay Link EIA study was conducted in 2009. The original surveys included dive survey along the eastern Junk Bay coastline and the Cross Bay Link alignment for corals and any other marine species of conservation concern, benthic infauna survey for soft substrate seabed along and near the CBL alignment, intertidal survey along the western coastline of Junk Bay, and fish survey in the coastal waters.

Ecological Verification Survey was requested for the Cross Bay Link EIA in January 2013. The verification survey consisted of two parts, i.e. verification dive survey and verification intertidal survey.

Although fish surveys and marine grab samplings were previously carried out in 2009, verification fish survey or verification marine benthic survey was not considered necessary as the magnitude of predicted impacts to subtidal habitats have found to be insignificant.

This Appendix presents the scope of the ecological verification survey, methodology and the findings of the verification survey.

# E2 METHODOLOGY

Verification ecological dive survey was proposed for the Project, focusing on the artificial seawalls where the bridge landing point is located.

## *E2.1 Verification Dive Survey*

Dive surveys for corals and other hard substrate marine organisms were previously conducted in 2009. The dive surveys focused on artificial coastlines in and near the Project site. Reconnaissance dives were first conducted along the bridge alignment and along the coastline near the bridge landing point, to verify whether corals (including all hard corals, octocorals and black corals) and other marine organisms with conservation importance are present within the areas potentially subject to direct impacts. Further to the reconnaissance dives, semi-quantitative Rapid Ecological Assessment (REA) survey was also conducted at selected locations with coral colonies and agreed by AFCD.

For the present verification dive survey, as the CBL alignment has not been changed significantly since the last survey and assessment, verification dive survey was undertaken at the previous REA survey locations. REA surveys were performed following the same method at the same locations adopted in the 2009 survey. The REA survey was performed along 100m underwater transects parallel to the coastlines. The benthic cover, taxon abundance and ecological attributes of the transects were recorded in a 2m wide swathe, 1m either side of the transects (subject to the underwater visibility), following the REA technique. Photographs of each REA location and underwater photos along the transects and of the surveyed areas were taken during the verification dive surveys.

The locations of the ecological verification survey of CBL are shown in Figure E1.



Figure E1 Survey Locations for Ecological Verification Survey of CBL

## E2.2 Verification Intertidal Survey

Verification Intertidal survey was proposed for the Project, focusing on the coastlines of eastern shore of Junk Bay where direct impacts from the Project are anticipated.

Quantitative intertidal survey for epifauna communities were previously conducted in 2009 on the eastern shore of Junk Bay where direct impacts from the Project are

anticipated as well as nearby coastlines, during both wet and dry seasons. In addition to the quantitative surveys, walk-through surveys were also conducted along the transect during or after the quantitative sampling event, to help assess whether the sampling exercise has collected representative data (e.g. the number and type of species encountered) and whether the sampling effort is deemed adequate.

For the present verification intertidal survey, as the CBL alignment has not been changed significantly since the last survey and assessment, quantitative transect survey would not be needed. Qualitative walk-through survey was adopted to verify whether the site condition has changed since the 2009 survey. Verification intertidal survey was conducted during suitable ebbing tides.

The coastline of the eastern shore of Junk Bay, mainly the locations where the previously transect surveys were performed, were surveyed to record the species present and their occurrence. Photographs of the recorded species as well as the site conditions were taken.

## E3 RESULTS

#### E3.1 Results of Dive Verification Survey

Dive verification survey was conducted in January 2013 at the coastline of eastern Junk Bay, at the vertical seawall facing south (facing the Junk Bay opening), and the section of sloping seawalls to the south of the vertical seawalls and facing west (where the original REA transect survey were performed) (**Figure E1**).

The weather was sunny. The sea was windy and the visibility was relative low (approximately 1.0 m or less).

REA transects of 100m length were laid, one in each location and following the coordinates of the original REA transects. The minimum and maximum depth covered, the major bottom substrate type and the underwater visibility were summarised in **Table E1** below.

Transect	Location (GPS) (Starting Point)	Location (GPS) (End Point)	Min. Depth (m)	Max. Depth (m)	Bottom Substrate	Visibility (m)
1	E 114°16'00.11"	E 114°16'03.62"	6	7	Granite Blocks &	1
	N 22°17'30.37"	N 22°17'30.49"			Boulders	
2	E 114°16'15.11"	E 114°16'13.32"	5.5	7.5	Boulders	1
	N 22°17'23.31"	N 22°17'20.68"				

Table E1GPS of Transect Starting and Ending, Maximum Depth, BottomSubstrate and Bottom Visibility of the Verification Transects

The vertical seawall is the future landing point for CBL and is thus potentially subject to direct impact. The vertical seawalls were made of granite blocks. The two REA transects were generally laid down at the same locations as in the original 2009 dive survey at the eastern coastline of Junk Bay, which is basically exposed continuous seawalls. In subtidal area, the nearshore substrates were sandy/muddy substrate. The degree of exposure for all REA transects were more or less the same, i.e. semi-exposed to wave action.

Basically same as the results of the 2009 REA survey, only a small coverage of common hard coral *Oulastrea crispata* and a small coverage of isolated colonies of soft coral *Dendronephthya* sp. were recorded on the vertical seawalls. Both *Oulastrea crispata* and *Dendronephthya* sp. are very common in Hong Kong. *Oulastrea crispata* was recorded in many locations including urban areas (Kai Tak area, Wan Chi and Aberdeen). Moreover, the coverage (less than 1 %) as well as the sizes of the colonies (the hard corals mainly less than 20cm diameter while the soft corals mainly around 20-30 cm in height) for both hard corals and soft corals were small. Soft coral corals *Dendronephthya* sp. is not a protected species. This species is indeed common species in eastern Hong Kong waters and was previously recorded in other locations in Junk Bay (e.g. the western shore of Junk Bay).

For the sloping seawalls, again similar results as those reported in the 2009 REA survey were recorded. A small coverage (less than 1%) of hard coral *Oulastrea crispata* (common in Hong Kong) and *Porties lutea* (dominant in Hong Kong) was found. *Porties lutea* is a dominant hard coral species in Hong Kong. In the present verification survey, a third species of hard coral *Cyphastrea serailia* was recorded. This additional hard coral species is also a dominant hard coral species in Hong Kong and their coverage was also lower than 1% along the transect.

Only very limited other marine organisms were recorded during the verification

survey including Purple Sea urchin, Green Mussel, and Barnacle.

#### E3.2 Results of Intertidal Verification Survey

The general environment of the coastlines within the assessment area basically remained the same as recorded during the 2009 intertidal survey. The entire coastline was man-made seawalls and the coastline was basically semi-exposed to wave.

The vertical seawalls were mainly colonised by Rock Oyster *Saccostrea cucullata* at low tidal zone, other intertidal fauna were scarce on the seawall, while the sloping seawalls were also colonised by low abundance of intertidal fauna in the lower part of the seawall.

A total of 10 taxa were recorded during the verification intertidal survey. No intertidal flora (such as alga) was found. All recorded taxa were common intertidal organisms in Hong Kong. The most frequently recorded species included littorid snails *Echinolittorina malaccana* and *Echinolittorina radiata*, and Rock Oyster *Saccostrea cucullata*,. No species of conservation importance was found and none of the species are listed in the IUCN Red List (IUCN 2009).

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Common name	Scientific name	Commonness in Hong Kong				
Rock oyster	Saccostrea cucullata	Common				
Limpet	Cellana grata	Common				
Littorinid snail	Echinolittorina malaccana	Common				
Littorinid snail	Echinolittorina radiata	Common				
Snail	Nerita sp.	Common				
Snail	Monodonta labio	Common				
Dog whelk	Thais clavigera	Common				
Barnacle	Tetraclita squamosa	Common				
Barnacle	Balanus amphitrite	Common				
Isopod	Ligia exotica	Common				

 Table B1
 Summary of the macrofauna recorded in intertidal survey

## E4 DISCUSSION

The ecological verification survey confirmed that there was no obvious change in the ecological conditions of the coastline within the assessment area in both intertidal and subtidal zones. No major development at the water front was conducted in the last few years and thus the artificial seawalls were of same form and structure.

The coral coverage in the direct impact vertical seawall was the same at a very low level (less than 1%), while the intertidal fauna were very sparse and limited to the low intertidal zone.

Based on the survey results, the ecological baseline has not significantly changed since the 2009 survey, and thus the baseline condition and the assessment are still valid.

## **Photo Plate**



