

SUBTIDAL SURVEY AT KONG SIN WAN

Background information

As part of the Agreement No. CE 25/2002 Drainage Improvement in Northern Hong Kong Island – Hong Kong West Drainage Tunnel, an Environmental Impact Assessment are being conducted according to EIA Study Brief No. ESB-070/2001.

The project mainly involves a drainage tunnel running from Tai Hang near Causeway Bay to Kong Sin Wan (Cyberport) and a number of intakes scattering through the tunnel alignment. The outfall of the tunnel would be located on the coastline at Cyberport and some subtidal areas would be disturbed for the outfall construction. Freshwater input to Cyberport will also be brought by the future drainage tunnel. Direct and indirect impacts from both construction and operation stages of the project will be assessed in the EIA study.

To collect ecological information for assessment of direct ecological impacts on marine ecology, a subtidal field survey was proposed.

Objectives

The main objective of the subtidal survey was to identify marine ecological constraints for the construction and operation of the proposed drainage tunnel outfall at Kong Sin Wan (Cyberport), Hong Kong Island.

To fulfill this objective, dive survey was conducted at the outfall locations and also in the vicinity to identify the locations, quantify the abundance of any marine species of conservation concern, and take video transect, video clips and underwater photographs at and in the vicinity of the proposed drainage tunnel outfall. The location of the Study Area is as shown in Figure 1.

The main tasks of this survey were:

A) to record the species, the abundance, the distribution, the locations and the sizes, of (1) the marine benthic assemblages, (2) any coral colonies (hard and soft), (3) any other species of conservation concern or of high ecological value; and

B) to record the type of substrate, seabed profile, and type of marine communities, within the Study Area.

Methodology

The fieldwork was taken place in on 13 March 2004. A single transect (P Transect hereafter) with scale was deployed starting from the low watermark at the outfall location, perpendicular to the coast (approximately 225 SW, surveyors shall verify on site), and toward the open sea. The exact location of the starting point of the P transect was recorded with a portable Global Positioning System (GPS). The P transect extended for 35 m while reaching the depth of - 10m C.D.

Besides the transect survey, bounce dives were also conducted in the vicinity. Due to no observed pattern of marine biota distribution found in the REA along the P transect and the poor visibility, a total of 12 Bounce dive points were selected, parallel with the coastline and evenly distributed within the width of the Study Area, at -3m CD and -5m CD. (6 Bounce dive points at each depth). The

locations of each bounce dive were also recorded by GPS. Visual reconnaissance and video clips were made of the area of each bounce dive point, by adopting a circular path.

Information concerning the physical nature of the Study Area, e.g. the degree of exposure of the site to wave action, the nature of the substrate type and the topographic profile of the site, was recorded during the survey.

The benthic cover, taxon abundance, and ecological attributes of the transect and the bounce dive points were recorded in a swathe of 4m wide, 2m either side of the P transect and the swim paths at each bounce dive point, following the **Rapid Ecological Assessment (REA)** technique as stipulated in the Study Brief.

Under the REA technique, five ecological and seven substratum attributes were assessed on site and by reviewing video footages. Each of the attributes (**Table 1**) were assigned to one of the seven standard ranked categories (from zero to six, representing percentage cover from none to over 76%)(**Table 2**).

Table 1
Ecological and Substratum attributes used in REA

Ecological attributes
Hard coral
Dead standing corals
Soft corals
Sea anemone beds
Macroalgae
Substratum
Hard substrate
Continuous pavement
Bedrock/boulders/sand
Rubble
Cobbles
Sand with gravel
Mud

Table 2
Ranking of Ecological and substratum attributes

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

Any coral colony (hard and soft) and any flora or fauna of conservation importance encountered along the transect or at bounce dive points would be identified to species level and counted. The locations and sizes of colonies/percentage cover would also be recorded. Should corals be found in the transect survey or the subsequent bounce dives, the species composition, location, size, ecological value, associated substrate and translocation feasibility of each of the coral species found were provided.

Video footages and underwater photographs were taken on the single P transect and bounce dive points. Photographs of representative coral species, if any, located in the surveyed areas would be taken using an underwater camera.

Benthic cover/ecological attributes of the seabed were filmed at approximately 40cm above the substrate and at a constant speed (in compliance with standard protocols for coral surveys, i.e. no more than 10 metres per minute). The video footages thus recorded a 40cm swath of seabed. The video camera was held perpendicular to the substrate to minimise parallex error and to keep the substrate in focus.

Results of Dive Survey

Video clips were available from the P transect and all 12 bounce dive points. Photographs of the seabed composition in the surveyed areas were taken.

The survey was performed on the 13 March 2004. The weather was sunny and the sea was calm. The visibility was poor which was not uncommon for Hong Kong, particularly poor below the depth over 2m, where visibility was approximately 0.5 m.

Though a small headland just to the west provides a very limited sheltering effect, the outfall location is basically facing to the East Lamma Channel.

The entire coastline in Cyberport had been converted to artificial seawalls. The outfall location is located at the western end of the coastline. This section of coastline had also been converted to artificial recently to facilitate a haul road for a road improvement project. Immediately east of the outfall location is a section of large boulder seawall for the sewage treatment plant which has been being operated for a few years (**Photo 1**).

P transect started at the coastline (22.26146N, 114.12734E) and extended 35 m toward the sea at 220 SW direction till reaching -10m C.D.. Along P transect the seabed composition was identified and conditions were noted as shown in the table below.

Table 3
The profile of P Transect

Distance (m)	0	5	10	15	20	25	30	35
Depth (m C.D.)	0	-3	-4	-5	-6	-7	-8	-10
Substratum	Artificial boulders	Muddy sandy	Muddy sandy	Muddy sandy with boulders	Muddy sandy with boulders	Muddy sandy with boulders	Large boulders	Large boulders

The seabed could be divided into four section according to the substrate. From 0m to 4m along the transect, the substrate was artificial boulders. From 4m to 15m, the substrate was mainly muddy sandy bottom with only occasional boulders. From 15m to 25m, it was abundant boulders on muddy sandy bottom. The rest of the transect was laid on large sized boulders and rocks. Visibility was relatively better (about 0.7 m) in the first 5m of the transect where was close to the sea surface, and was poor (about 0.5m) for the rest of the transect.

Five ecological and seven substratum attributes were assessed on site and by reviewing video footages. Each of the attributes (**Table 4**) was assigned to one of the seven standard ranked categories (from zero to six, representing percentage cover from none to over 76%).

Table 4
REA Ecological and Substratum attributes of P Transect

Ecological attributes	Rank
Hard coral	0
Dead standing corals	0
Soft corals	0
Sea anemone beds	0
Macroalgae	0
Substratum	
Hard substrate	3
Continuous pavement	0
Bedrock/boulders/sand	3
Rubble	0
Cobbles	0
Sand with gravel	1
Mud	4

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

Neither hard nor soft corals were recorded along the transect. Except some barnacles on the surfaces of the boulders and several demersal fishes, there was no marine organisms encountered along P Transect.

All 12 bounce dive points were covered boulders on muddy sandy substrate (**Table 5**). There were also no colonies of hard or soft corals, and any other marine organisms, recorded on all bounce dive points.

Table 5
REA Ecological and Substratum attributes of Bounce Dive Points

	1	2	3	4	5	6	7	8	9	10	11	12
Ecological attributes												
Hard coral	0	0	0	0	0	0	0	0	0	0	0	0
Dead standing corals	0	0	0	0	0	0	0	0	0	0	0	0
Soft corals	0	0	0	0	0	0	0	0	0	0	0	0
Sea anemone beds	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
Substratum												
Hard substrate	0	0	0	0	0	0	0	0	0	0	0	0
Continuous pavement	0	0	0	0	0	0	0	0	0	0	0	0
Bedrock/boulders/sand	3	4	2	2	2	3	4	5	4	4	5	5
Rubble	0	0	0	0	0	0	0	0	0	0	0	0
Cobbles	0	0	0	0	0	0	0	0	0	0	0	0
Sand with gravel	1	1	1	0	1	0	1	1	0	0	0	0
Mud	4	4	4	5	4	4	4	4	5	5	5	5

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

The sea bottom profile covered by P Transect was basically in a rather steep slope which reached -10m C.D. in just 35m distance. The gradient of the sea bottom was especially greater at the starting and the ending sections of the transect.

As discussed above, the seabed consisted almost entirely of muddy sandy substrate with almost no organisms present.

The dive surveys at P transects and the 12 bounce dive points reported that no corals were present in the area.

Only two individuals of Sea urchin *Diadema setosum* were recorded within the area but outside the P transect and all 12 bounce dive points. *Diadema setosum* is widespread and common in shallow marine areas in the waters of Hong Kong.

A dive survey was conducted in 1994 at the nearby headland (Station 86 of the Underwater Dive Survey for CED) (CED 1995). The conservation value of Station 86 was considered as low due to the low diversity and abundance of marine organisms recorded. The seabed was muddy habitat beyond 6 m in depth. Only two species of sea urchins, barnacles, gastropods and bryozoa were recorded at the shallower waters. Other than these organisms, there were only a few sea whips, Cardinalfish and rabbitfish were found at the site. The findings of this 1994 survey were basically similar with those from the present survey.

Ecological Value

Two individuals of Sea urchin *Diadema setosum* recorded in the present survey is a common species and have been recorded throughout coastal areas in Hong Kong waters. All benthic marine life recorded in the present survey, i.e. sea urchins and barnacles are common in Hong Kong waters and have no special conservation value.

From the information presented in the previous sections, it is clear that the areas covered by the dive survey cannot be considered as of high ecological value due to the absence of hard coral colony and the low abundance of other marine organisms. The ecological value should be ranked as low.









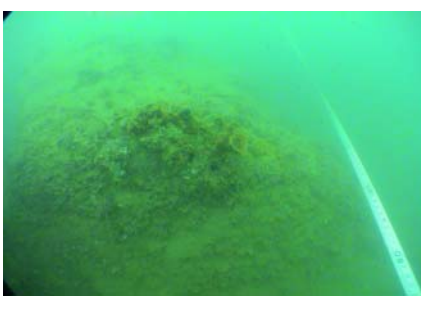

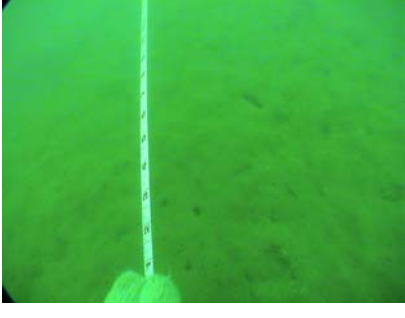
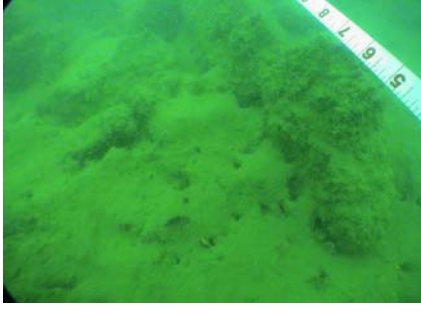
Table 6
Ecological evaluation of the Study Area

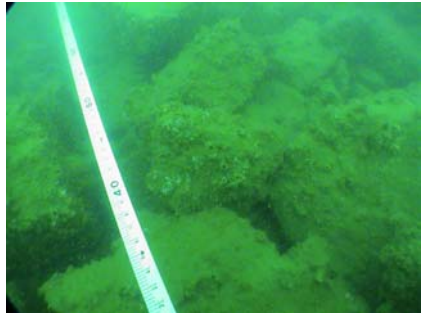
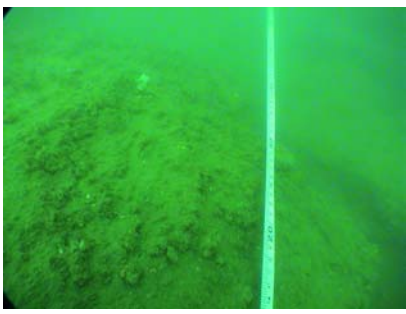
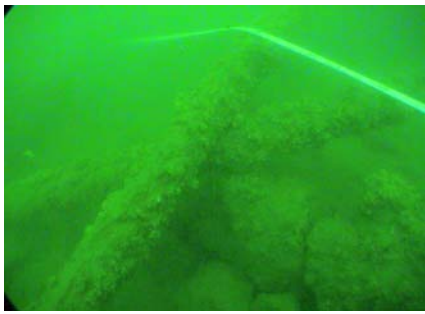


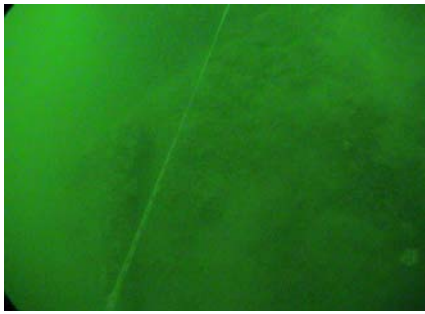

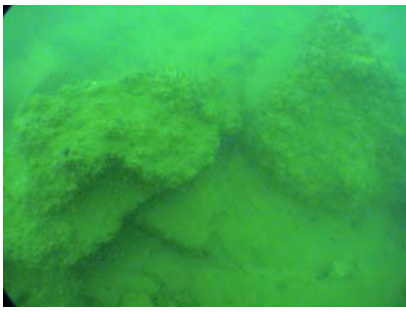


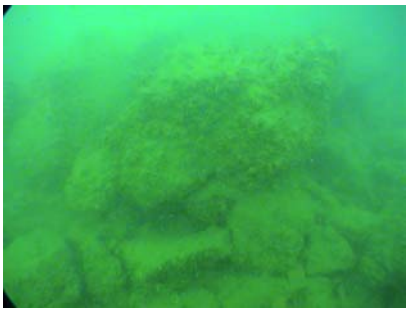
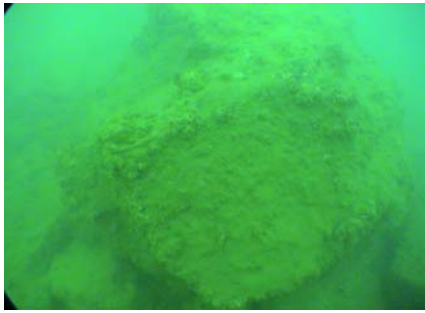
Criteria	Remarks
Naturalness	Man-made coastline. Sea bed basically natural
Size	Maximal 700 m ²
Diversity	Low diversity of marine organisms. Only 3 kinds of marine organisms recorded.
Rarity	None of the recorded organisms are rare
Re-creatability	Non-recreatable
Fragmentation	Moderately fragmented.
Ecological linkage	Not functionally linked to any highly valued habitat in close proximity in a significant way.
Potential value	Limited for marine organisms.
Nursery/breeding ground	No sign of being a nursery/breeding ground of any organisms.
Age	NA
Abundance/Richness of wildlife	Low for fauna.
Overall Ecological value	Low


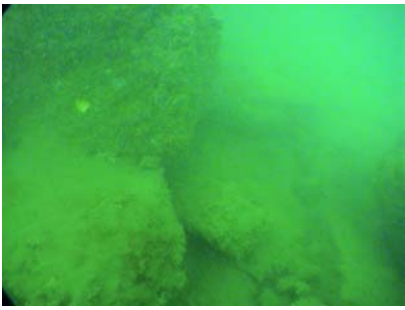
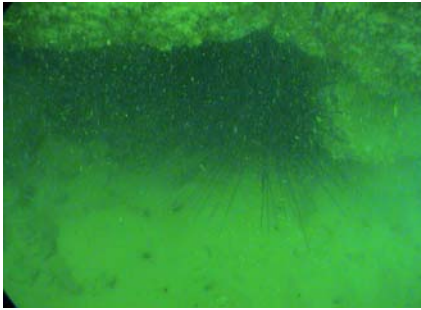
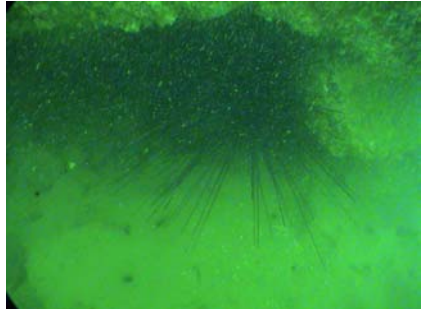
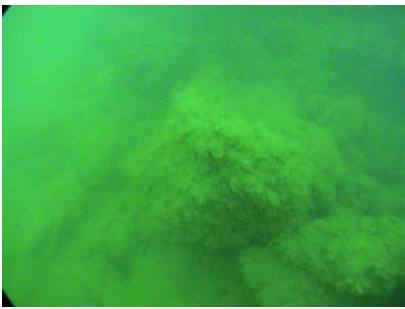
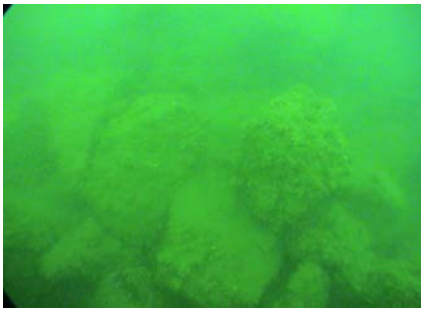
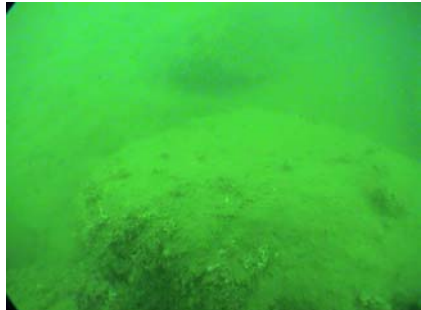




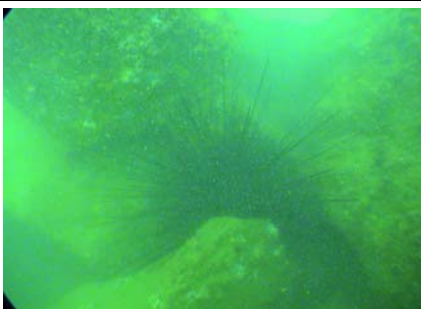
Conclusion

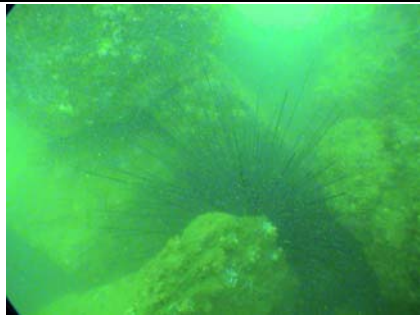
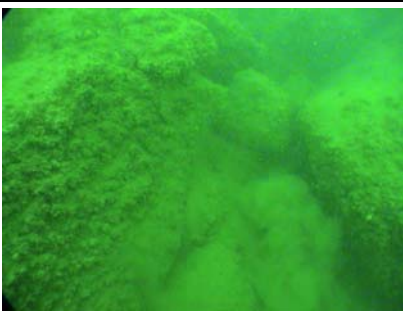


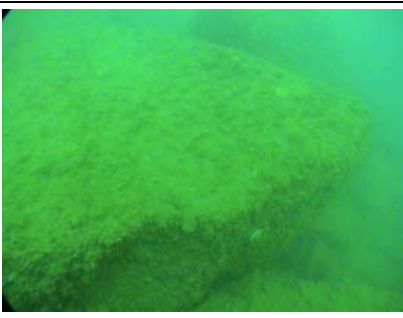
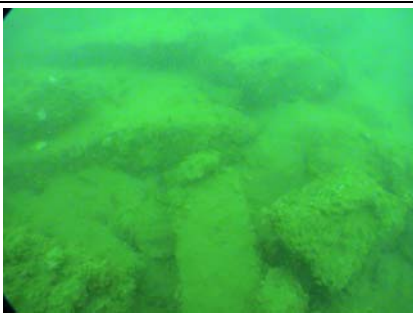




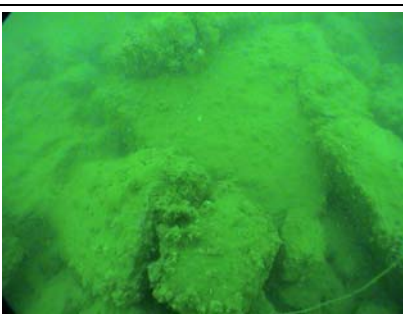
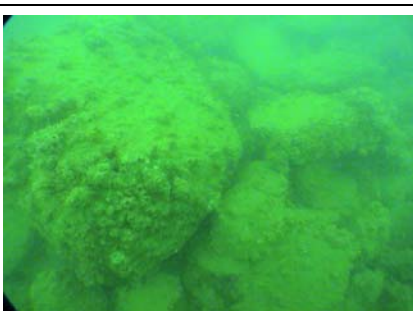
In summary, information gathered from the dive survey indicated that the surveyed study area at Cyberport does not support coral colonies or any marine ecological assemblages which are considered to be of conservation value. The two individuals of sea urchins found are considered a common species in Hong Kong. Except the two sea urchins, barnacles and a few demersal fishes, no other marine organisms were recorded. The naturalness of the Study Area is also low due to disturbance from nearby reclamation and other construction works. The Study Area is thus not considered as ecologically important


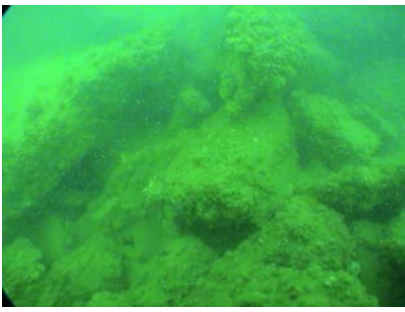

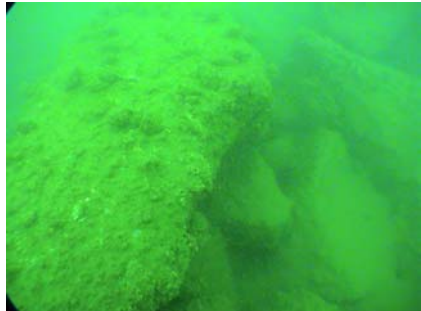
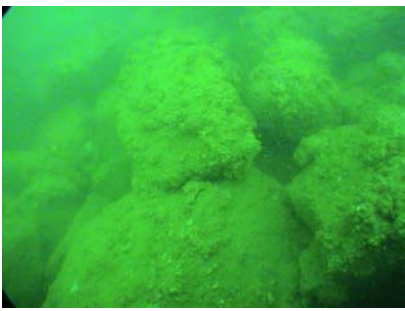
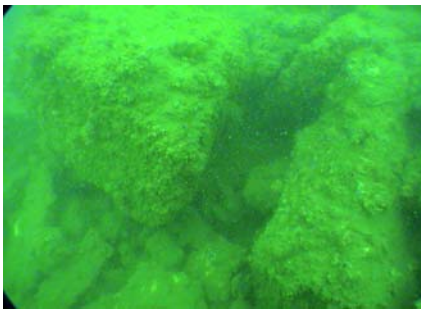

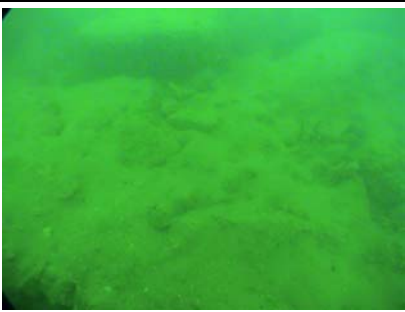

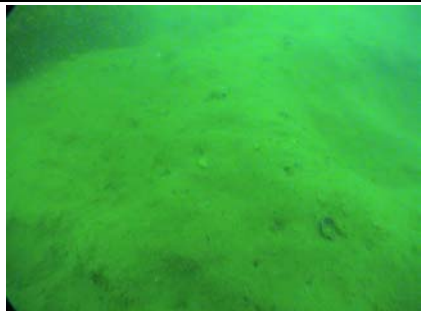
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P Transect		
		
Photo 1	Photo 2	Photo 3
		
Photo 4	Photo 5	Photo 6
		
Photo 7	Photo 8	Photo 9
		
Photo 10	Photo 11	Photo 12

		
Photo 13	Photo 14	Photo 15
		
Photo 16	Photo 17	Photo 18
Point 1		Point 2
		
Photo 19	Photo 20	Photo 21
Point 2	Point 3	
		
Photo 22	Photo 23	Photo 24

Point 4		Point 5	
			
Photo 25	Photo 26	Photo 27	
Point 5		Point 6	
			
Photo 28	Photo 29	Photo 30	
Point 6	Point 7		
			
Photo 31	Photo 32	Photo 33	
Point 7	Point 8		
			
Photo 34	Photo 35	Photo 36	

Point 8	Point 9	
		
Photo 37	Photo 38	Photo 39
Point 9		Point 10
		
Photo 40	Photo 41	Photo 42
Point 10		
		
Photo 43	Photo 44	Photo 45
Point 10	Point 11	
		
Photo 46	Photo 47	Photo 48

Point 11		
		
Photo 49	Photo 50	Photo 51
Point 11		Point 12
		
Photo 52	Photo 53	Photo 54
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Photo 55	Photo 56	Photo 57
Point 12		
		
Photo 58		

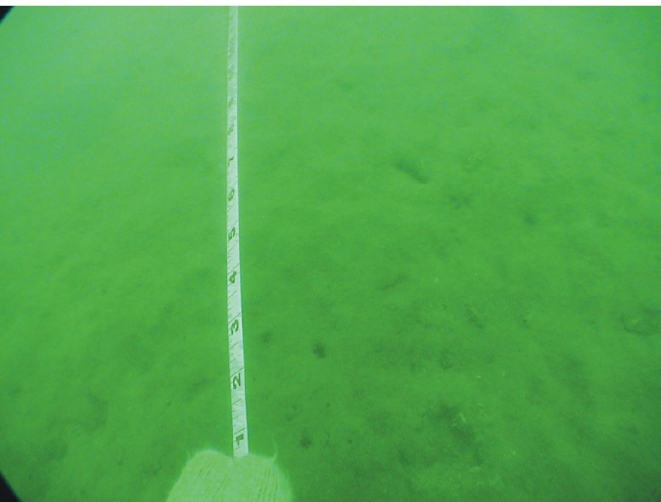


Photo 2: Seabed on P Transect

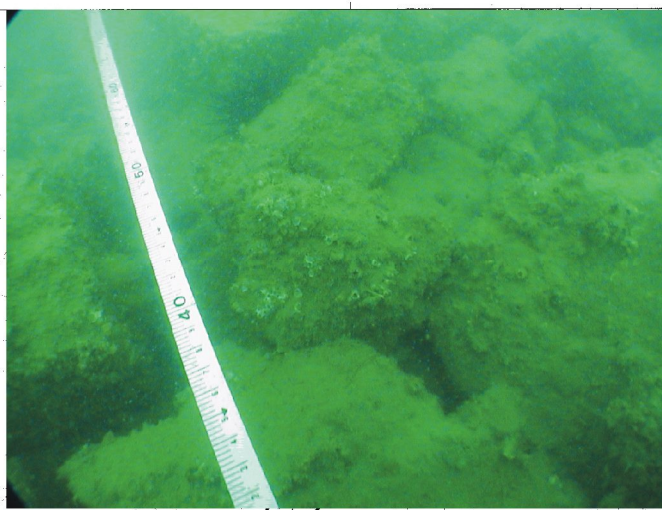


Photo 3: Seabed on P Transect

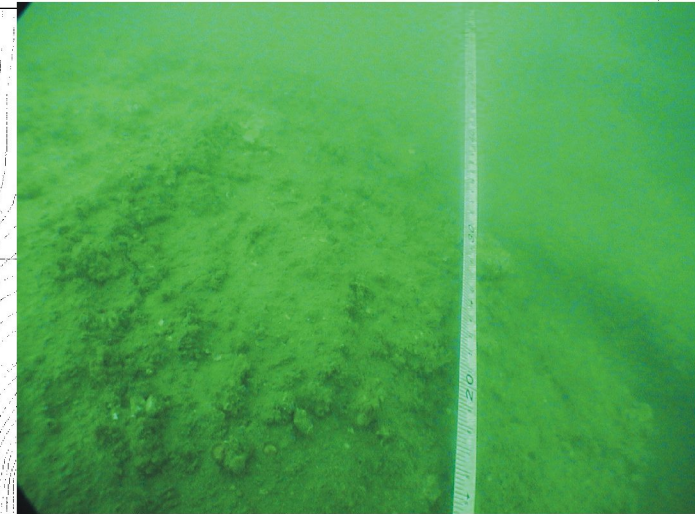


Photo 4: Seabed on P Transect

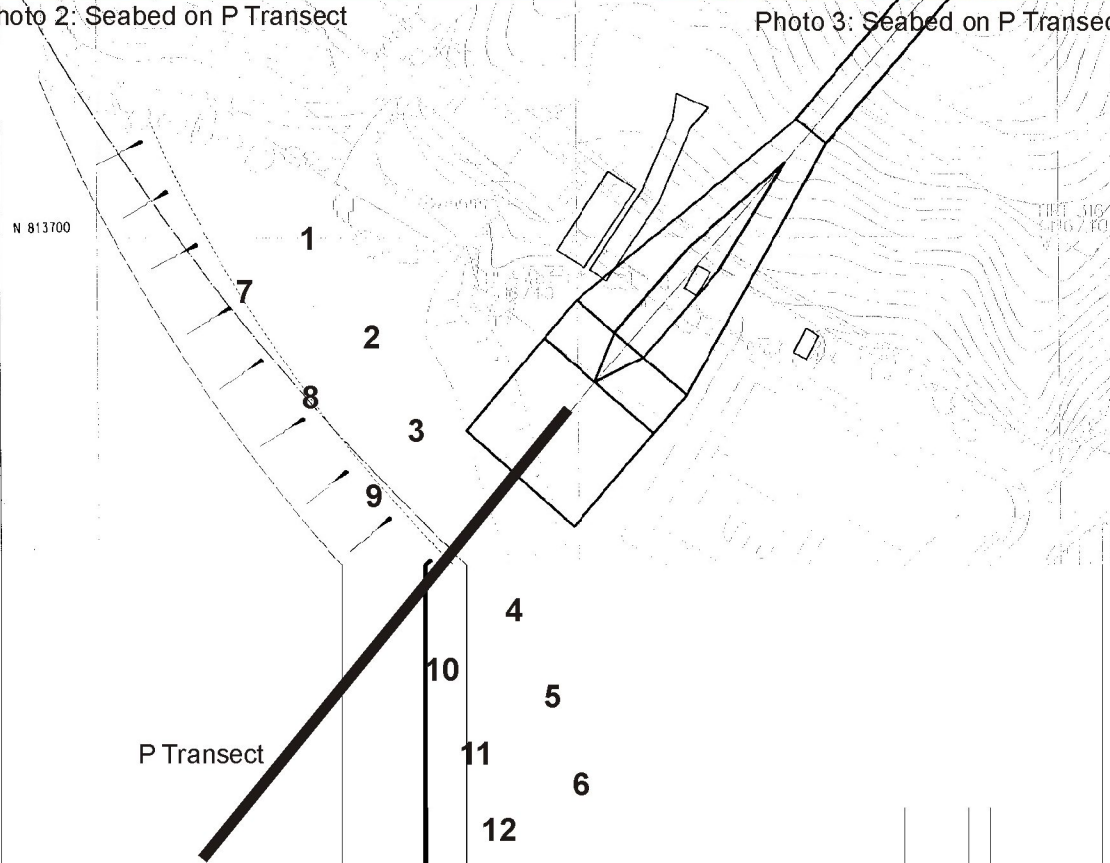


Figure 1. The locations of P Transect and the 12 bounce dive points



Photo 1: The outfall location