

Appendix 4.2 Benthic Field Surveys Results

Appendix 4.2a: Results of Benthic Field Surveys conducted in 2014

Appendix 4.2b: Results of Benthic Field Surveys conducted in 2015

Appendix 4.2a Results of Benthic Field Surveys conducted in 2014

1. Benthic Field Survey Methodology

1.1 Field sampling

In order to collect benthic baseline information of the navigation channel of Lamma Power Station, benthos sampling was undertaken at six sampling sites (B1 to B6) (**Figure 1**). Sampling sites B1 to B4 were located along the channel while sampling sites B5 and B6 were located at the vicinities. Sampling sites B1 to B4 (15.6 – 16.9 m) were deeper than the two vicinal sites B5 and B6 (8.8 – 9.9 m) due to maintenance dredging. The coordinates of the sampling sites (**Table 1**) were fixed by Global Positioning System (device model: Garmin 78S) on board. The sampling was conducted on 17th May, 2014 under cloudy and windy weather (see **Figure 2** for photographic record).

At each sampling site, three replicates of sediment samples were collected with a 0.1 m² van Veen grab (0.1 m² sampling area × 15 cm biting depth) (see **Annex I**). Collected samples were accepted when at least two-third of grab volume was filled. When the samples were collected on board, a photographic record of the sediment texture and colour was taken. The samples were washed with gentle seawater through a sieve stack consisted of 1 mm (top) and 0.5 mm (bottom) mesh sizes to remove fine material. Large visible animals in the residues were hand-picked into a small, labeled plastic vial. All remains were transferred into a labeled plastic container followed by preservation with 70% ethanol solution and staining with 1% Rose Bengal solution.

1.2 Laboratory work

After arrival to laboratory, the samples were stored for at least one day to ensure sufficient preservation and staining. The preserved fauna were sorted out from the samples carefully by placing portion of sediment residues on a petri dish and picking up with forceps under the 10x magnification dissecting microscope. The collected fauna and fragments were transferred in to a plastic vial containing 70% ethanol. Each petri dish would be sorted twice to ensure removal of all animals. For quality assurance, the sediment residues of one-third sorted samples were randomly rechecked. No missed specimen was found in the recheck.

The collected specimens were identified to the lowest taxonomic resolution by qualified and experienced specialist. Examination of the morphological features of the specimens was undertaken with the aid of both stereoscopic and compound microscopes. The taxonomic classification was conducted in accordance to the following references:

- Polychaetes: Day (1967), Gallardo (1967), Fauchald (1977), Yang and Sun (1988), Wu et al. (1997), Sun and Yang (2004);
- Arthropods: Dai and Yang (1991), Dong (1991), Lowry (2000);
- Mollusks: Qi (2004);
- Echiuran and Sipunculan: Zhou et al. (2007);
- Echinoderm: Liao (2003).

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The number of individuals of each species was recorded by counting the anterior portions of the fauna only. Total biomass of each species was determined as preserved wet weight by blotting the animals on filter paper for 3 minutes followed by weighing to the nearest 0.0001 g with microbalance.

1.3 Data analysis

Data collected from three replicate samples at each sampling site were pooled together for data analysis. Shannon-Weaver Diversity Index (H') and Pielou's Species Evenness (J) were calculated using the formulae below,

$$H' = -\sum (N_i / N) \ln (N_i / N) \quad (\text{Shannon and Weaver, 1963})$$

$$J = H' / \ln S \quad (\text{Pielou, 1966})$$

where S is the total number of species in the sample, N is the total number of individuals, and N_i is the number of individuals of the i^{th} species.

The status of benthic community is assessed using the abundance/biomass comparison (ABC) method and W statistic is generated (Warwick, 1986; Warwick and Clarke, 1994) with the software PRIMER version 6 (Plymouth Marine Laboratory, UK). ABC method is based on an ecological theory: when the benthic community is approaching equilibrium under stable and undisturbed environment, the biomass becomes increasingly dominated by few large-sized species while abundance of each species is less. In contrast, the abundance is dominated by few small-sized species while biomass of each species is small in disturbed environment.

The ABC method plots relative proportions of biomass and abundance attributable to each species for each sampling site. The species are ranked in descending order of abundance on the x-axis (logarithmic scale) with superimposition of dominance curves of abundance and biomass on the y-axis (cumulative percentage scale). When biomass curve is above abundance curve entirely, the benthic community reflects unpolluted / undisturbed status due to the presence of few, large-sized fauna. When abundance curve is above biomass curve entirely, the benthic community reflects grossly polluted / disturbed status due to presence of numerous small-sized animals. Under moderately disturbed status of benthic community, two curves cross over one or more times (Warwick and Clarke, 1994). Then W statistic is employed to measure the extent to which the biomass curve lies above the abundance curve (Clarke, 1990). The equation of W statistic is shown below:

$$W = \sum_{i=1}^S (B_i - A_i) / [50 (S - 1)] \quad (\text{Clarke, 1990})$$

where S = total number of species; $B_i - A_i$ = difference between biomass and abundance (percentage) of the i^{th} species.

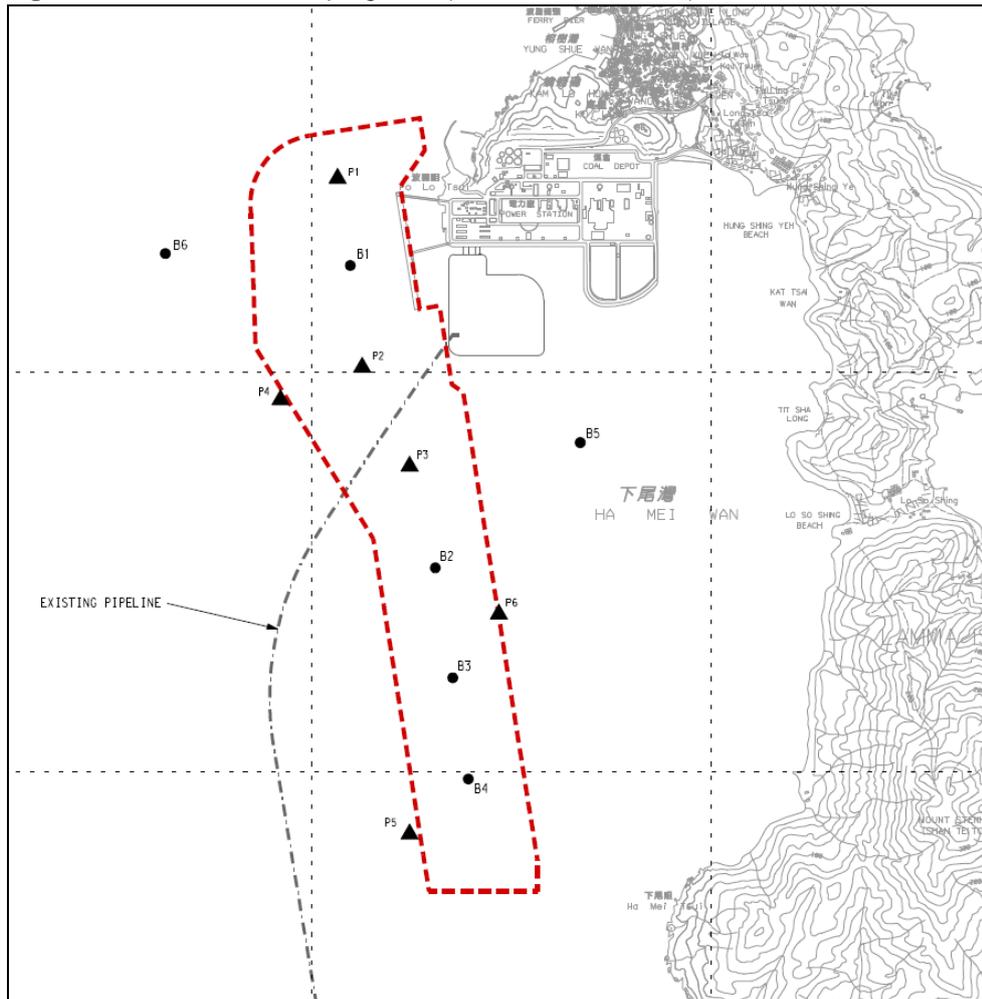
In case biomass curve lying above abundance curve, a positive W value is given representing 'undisturbed' condition, and vice versa. The W statistic presents a continuum from 'disturbed' ($W = -1$), 'moderately disturbed' ($W = 0$), to 'undisturbed' ($W = +1$) conditions.

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Table 1 The GPS coordinates (in WGS84 datum (ITRF96 Reference Frame)) and measured water depth of sampling site

Sampling site	Latitude (N)	Longitude (E)	Water depth (m)
B1	22° 12.911'	114° 05.765'	15.8
B2	22° 12.095'	114° 06.124'	16.1
B3	22° 11.797'	114° 06.185'	15.6
B4	22° 11.544'	114° 06.265'	16.9
B5	22° 12.431'	114° 06.584'	8.8
B6	22° 12.951'	114° 05.226'	9.9

Figure 1 Location of Sampling Sites (Black Dots ● B1 to B6)



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Figure 2 Photographic record of the environment at each sampling site

B1



B2



B3



B4



B5



B6



2. Baseline Condition of Benthic Habitat

2.1 Sediment Condition

Table 2 and **Figure 3** show the sediment texture and colour at each sampling site. The sediments were grey soft mud at sampling sites B1 to B4 while they were mainly soft mud (~70%) with certain proportion of fine sand (~30%) at B5 and B6. Brown surface was observed on the grey sediment at B6. No smell of hydrogen sulphite was detected at all sampling sites.

Lots of broken bivalve shells and fine sand (~30% of sediment volume) were found at sampling sites B5 and B6 after sediment washing on board (see **Figure 4**). It was possibly current-driven from the surroundings followed by settlement in the survey area with relatively calm waters due to sheltered coastline. Broken bivalve shells and fine sand were supposed to be present at other sampling sites B1 to B4 but they were probably removed by the maintenance dredging.

Table 2 Sediment texture and colour at each sampling site

Sampling site	Sediment texture	Sediment colour	Level of sulphite smell	Remark
B1	Soft mud	Grey	None	\
B2	Soft mud	Grey	None	\
B3	Soft mud	Grey	None	\
B4	Soft mud	Grey	None	\
B5	~70% soft mud & ~30% fine sand	Grey	None	Lots of broken shell
B6	~70% soft mud & ~30% fine sand	Grey with brown surface	None	Lots of broken shell

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Figure 3 Photographic record of sediment at sampling sites

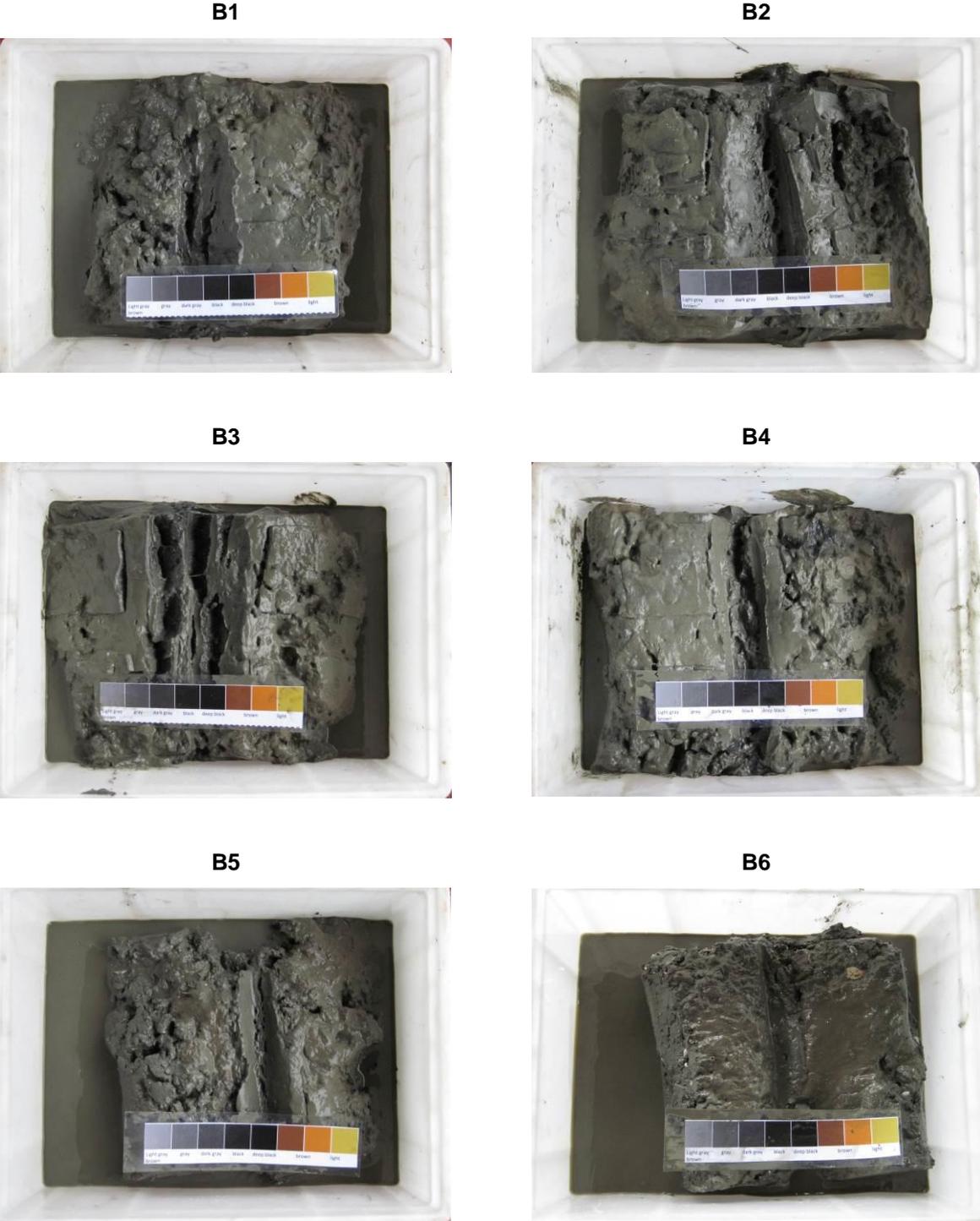


Figure 4 Lots of broken bivalve shells were found in sediments at sampling sites B5 and B6



2.2 Survey Results for Benthic Fauna

Table 3 lists the total abundance and total biomass of each phylum. A total of 478 specimens were collected in the present survey. Sixty-one of 63 taxa were identified to genus or species levels. In general the most diverse phylum was Annelida (39 polychaete species), followed by Arthropoda (1 amphipod species + 1 unidentified amphipod spp. + 4 shrimp species + 3 crab species), Mollusca (5 bivalve species + 3 gastropod species), Echinodermata (2 brittle star species + 1 sea urchin species), Cnidaria (1 sea pen species), Echiura (1 species), Sipuncula (1 species) and Nemertea (1 nemertean spp.). Overall 61% of total abundance was dominated by annelids (290 ind.). The following abundant phyla were mollusks (87 ind., 18%), sipunculans (50 ind., 10%) and arthropods (34 ind., 7%). Other phyla were relatively low in abundance (relative abundance $\leq 2\%$). The total biomass was 48.8990 g that was mainly accounted for by mollusks (36.32 g, 74%) and echinoderms (9.62 g, 20%). Other phyla had relatively lower biomass ($\leq 4\%$). All recorded species were common with no conservation importance. The complete list of collected specimens is provided in **Annex II**, and the taxonomic resolution of each collected species is provided in **Annex III**.

Table 4 shows the abundance and relative abundance of each phylum at each sampling site. For B1 to B4, annelids (polychaetes) (28-34 ind., 47-77%) and mollusks (5-33 ind., 12-47%) were relatively abundant. At B5 and B6, annelids (polychaetes) were the most abundant (71-94 ind., 57-66%) followed by sipunculans (21-29 ind., 15-23%) and arthropods (10-14 ind., 8-10%). Other taxa had relatively low abundance.

Table 5 lists the five most abundant species at each sampling site in the present survey. In general different abundant species were recorded among the sampling sites while no species was clearly dominant in the survey area. At B1, the benthic community was dominated by bivalve *Paphia undulata* (97 ind., 41%) and polychaete *Mediomastus* sp. (40 ind., 17%). At B2 and B3, bivalve *Tellina minuta* (13-60 ind., 10-32%), polychaetes *Poecilochaetus* sp. (20-33 ind., 14-18%) and *Mediomastus* sp. (17-

Improvement Dredging for Lamma Power Station Navigation Channel

40 ind., 9-29%) were relatively abundant with different densities. At B4, polychaete *Poecilochaetus* sp. (33 ind., 23%) was found to be relatively abundant. Sipunculan *Apionsoma trichocephalus* was abundant at B5 and B6 (70-97 ind., 15-23%). Other less abundant species were polychaetes *Praxillella gracilis* (40 ind., 10%), *Terebellides stroemii* (37 ind., 9%) at B5 and *Amaeana* sp. (70 ind., 15%) and *Sternaspis scutata* (53 ind., 11%) at B6.

Table 6 shows the number of species, density, biomass, H' , J and W statistic at each sampling site. For B1 to B4, the number of species was low to moderate (16-20 spp. 0.3 m^{-2}) while the density (140-233 ind. m^{-2}) and H' (2.14-2.61) were at moderate levels. B5 and B6 were clearly higher in number of species (33-43 spp. 0.3 m^{-2}), density (413-473 ind. m^{-2}) and H' (2.96-3.21) than other survey sites. The J ranged 0.71-0.90 and was similar among the sampling sites. It showed the benthic communities were generally moderate in biodiversity with quite high species evenness in the survey area.

The biomass was highly variable among the sampling sites. Highest biomass was recorded at B1 (75.09 g m^{-2}) which was mainly accounted by the abundant bivalve *Paphia undulata* (29 ind., 21.46 g). High biomass was recorded at B5 too (47.7 g m^{-2}) which was accounted by sea urchin *Lovenia subcarinata* (3 ind., 9.50 g) and bivalve *Paphia undulata* (5 ind., 2.72 g). Other sampling sites (except B3) were much lower in biomass (2.24-3.21 g m^{-2}) but it was mainly accounted by the same bivalve species of lower abundance (3-5 ind., 1.66-2.13 g).

The W statistic values generated by ABC method were positive at all sampling sites (refer to **Figure 5**). It indicated the benthic condition existed at a 'slightly disturbed' level in the survey area.

Table 3 Total abundance and total biomass of each phylum recorded in May 2014

Phylum	Abundance	%	Biomass	%
Annelida	290	61	1.7827	4
Mollusca	87	18	36.3214	74
Sipuncula	50	10	0.0519	0
Arthropoda	34	7	1.0036	2
Echinodermata	9	2	9.6219	20
Nemertea	6	1	0.0210	0
Cnidaria	1	0	0.0144	0
Echiura	1	0	0.0821	0
Total	478		48.8990	

0 %: total individual / biomass of the phylum is less than 1% of that of all specimens

Table 4 The abundance and relative abundance (percentage) of each phylum at the sampling sites

Taxa	B1	%	B2	%	B3	%	B4	%	B5	%	B6	%
Annelida	33	47	28	50	30	71	34	77	71	57	94	66
Arthropoda	2	3	2	4	4	10	2	5	10	8	14	10
Cnidaria					1	2						
Echinodermata	1	1			2	5			4	3	2	1
Echiura							1	2				
Mollusca	33	47	26	46	5	12	7	16	8	6	8	6
Nemertea	1	1							2	2	3	2
Sipuncula									29	23	21	15
Total	70		56		42		44		124		142	

0 %: Relative abundance of the phylum is less than 1% of that of all specimens

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Table 5 The five most abundant species at each sampling site

Sampling site	Group	Species	Density (ind. m ⁻²)	Biomass (g m ⁻²)	Relative abundance (%)
B1	B	<i>Paphia undulata</i>	97	71.53	41
	P	<i>Mediomastus</i> sp.	40	0.16	17
	P	<i>Terebellides stroemii</i>	20	0.21	9
	B	<i>Tellina minuta</i>	10	0.27	4
	P	<i>Aglaophamus dibranchis</i>	10	0.06	4
B2	B	<i>Tellina minuta</i>	60	2.20	32
	P	<i>Poecilochaetus</i> sp.	33	0.10	18
	P	<i>Mediomastus</i> sp.	17	0.01	9
	P	<i>Prionospio ehlersi</i>	13	0.03	7
	G	<i>Ringicula doliaris</i>	13	0.22	7
B3	P	<i>Mediomastus</i> sp.	40	0.09	29
	P	<i>Poecilochaetus</i> sp.	20	0.05	14
	B	<i>Tellina minuta</i>	13	0.27	10
	P	<i>Prionospio ehlersi</i>	7	0.01	5
	P	<i>Aglaophamus dibranchis</i>	7	0.10	5
B4	P	<i>Poecilochaetus</i> sp.	33	0.24	23
	P	<i>Aglaophamus dibranchis</i>	13	0.07	9
	P	<i>Pholoe</i> sp.	13	0.01	9
	B	<i>Paphia undulata</i>	13	7.11	9
	B	<i>Tellina minuta</i>	10	0.79	7
B5	Sp	<i>Apionsoma trichocephalus</i>	97	0.10	23
	P	<i>Praxillella gracilis</i>	40	0.09	10
	P	<i>Terebellides stroemii</i>	37	0.20	9
	P	<i>Poecilochaetus</i> sp.	27	0.03	6
	B	<i>Paphia undulata</i>	17	9.07	4
B6	Sp	<i>Apionsoma trichocephalus</i>	70	0.08	15
	P	<i>Amaeana</i> sp.	70	0.27	15
	P	<i>Sternaspis scutata</i>	53	0.14	11
	P	<i>Terebellides stroemii</i>	20	0.26	4
	B	<i>Paphia undulata</i>	17	7.11	4

B = Bivalve, G = Gastropod, P = Polychaete

0.00 g m⁻²: biomass of the taxon is less than 0.01 g m⁻² at the sampling site

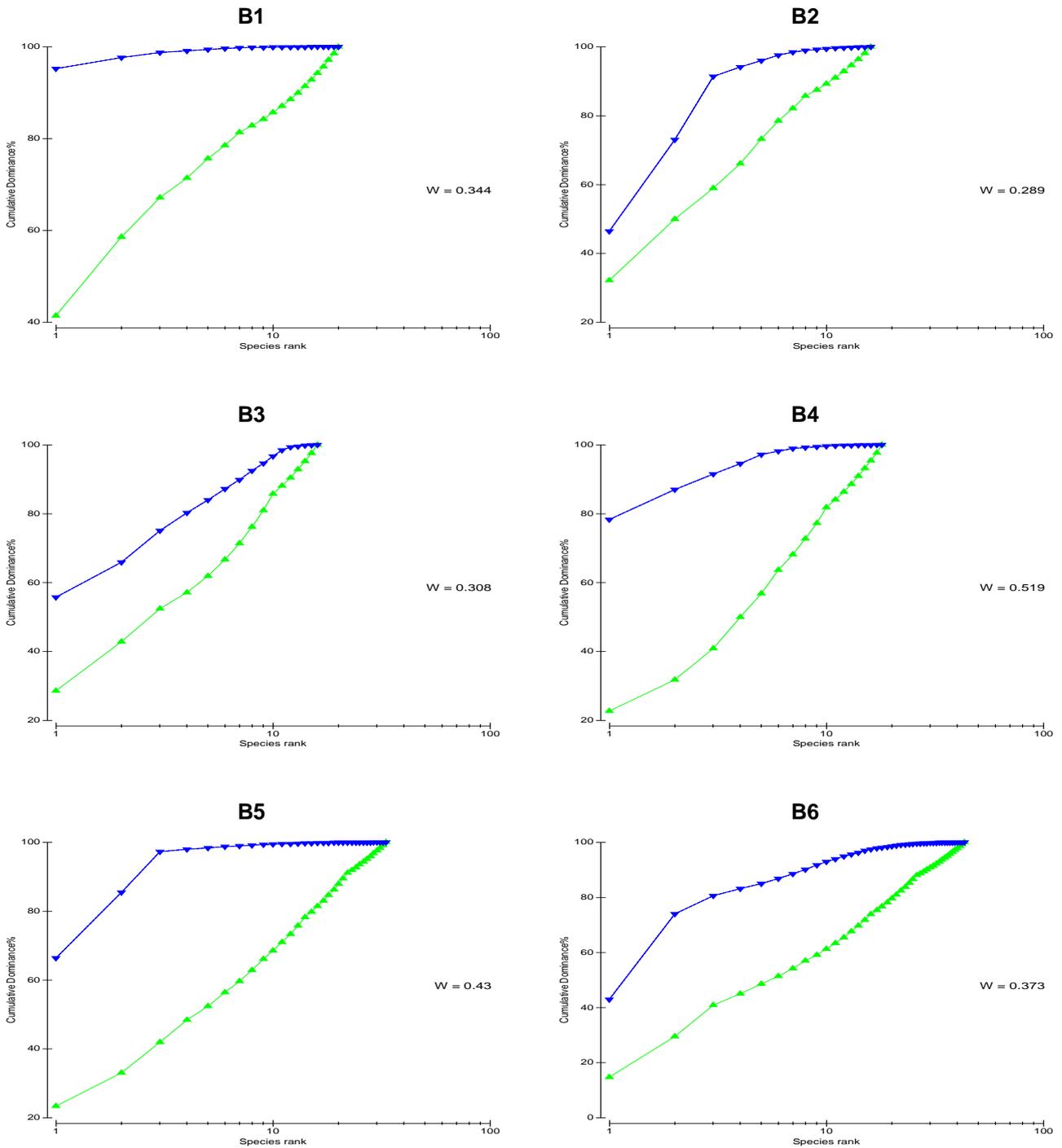
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Table 6 Number of species, density, biomass, Shannon-Weaver Diversity Index (H'), Pielou's Species Evenness (J) and W statistic at each sampling site

	B1	B2	B3	B4	B5	B6
Number of species (spp. 0.3 m⁻²)	20	16	16	18	33	43
Density (ind. m⁻²)	233	187	140	147	413	473
Biomass (g m⁻²)	75.09	11.94	2.63	9.08	47.7	16.6
Shannon-Weaver Diversity Index H'	2.14	2.24	2.41	2.61	2.96	3.21
Pielou's Species Evenness J	0.71	0.81	0.87	0.90	0.85	0.85
W statistic	0.34	0.29	0.31	0.52	0.43	0.37

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Figure 5 ABC plots of each sampling site (blue ▼ with dotted line: biomass curve; green ▲ with solid line: abundance curve)



2.3 Summary of Environmental Condition and Sediment Quality

Lamma Island lies in the middle part of Southern Water Control Zone (WCZ). The Southern WCZ is a large water control zone in Hong Kong water that extends from Lantau Island to Hong Kong Island. The western part (south of Lantau Island) and northern part (east of Lantau Island) were adversely affected by the discharge from the Pearl River and flow from Victoria Harbour respectively. On the contrary, the effects on middle (Lamma Island) and eastern part (south of Hong Kong Island) were minimized due to strong current flushing from South China Sea as well as further distances from pollution sources (EPD, 2006).

The sediment colour and texture indicated the sediments in unpolluted condition without environmental stress. As mentioned above, strong current flushing had mitigated the adverse effects of Pearl River discharge.

2.4 Summary of Baseline Condition of Benthic Habitat

According to the present survey results, the benthic communities were delineated into two groups due to different sediment textures.

Group A (sampling sites B1 to B4 within the navigation channel): the benthic communities inhabited soft mud and were characterized by low-moderate species number and moderate density. The taxa were similar in densities and no consistent dominant species could be determined amongst the sampling sites. Such even distribution of species resulted in moderate diversity index and moderate-high species evenness.

Group B (sampling sites B5 and B6 out of the navigation channel): the benthic communities inhabited 'soft mud-fine sand' mixture and were characterized by moderate-high species number and high densities. Similar to group A, no dominant species could be determined clearly. High species number and even distribution of species resulted in moderate-high diversity index and moderate-high species evenness.

Sipunculan *Apionsoma trichocephalus* was the most abundant in this group. Higher abundance of this species was believed to have no relationship with environmental stress. Instead, this species was reported as typical sand-dwelling infauna and with high abundance (relative abundance 16.7 – 67.3%) in Tung Lung Chau waters (east of Victoria Harbour) where had fine sand substratum (for details see Lam, 2007). Suitable substrata might attract the settlement of this sipunculan species at B5 and B6.

Based on positive *W*-statistic values, the benthic communities were healthy under no environmental stress in the survey area that was consistent with the sediment quality. Group A was relatively lower in biodiversity, possibly due to the impact of maintenance dredging along the navigation channel.

2.5 Comparison of Biodiversity

The benthic community was spatially divided into four groups in Hong Kong waters (Tolo Harbour, Eastern and Southern waters, Victoria Harbour, Deep Bay) (Shin et al., 2004) according to a territory-wide survey conducted by CPSL (2002). Waters of 'Eastern and Southern waters' group were characterized as unpolluted while that of other groups suffered from long-term sewage pollution (details see EPD, 2006). **Table 7** shows the mean *H'* and *J* of benthic communities of the four groups, present survey area and other vicinal sampling sites of previous surveys. Based on the wet season survey results, the biodiversity and species evenness of benthic communities of present survey area

Improvement Dredging for Lamma Power Station Navigation Channel

were similar to the unpolluted water group 'Eastern and Southern waters'. At smaller spatial scale, both parameters were generally similar to that of vicinal benthos sampling station #39 in a previous survey conducted in 2000 (for details see CPSL, 2002), which is close to sampling site B5 in the present survey. It further indicated stable and normal condition at the west of Lamma Island.

Table 7 Comparison of mean H' and J of benthic communities between present sampling sites, vicinal sampling sites and other water zones of previous studies

		Lamma Island (West)	Vicinal sampling station #39	Tolo Harbour	Eastern and Southern waters	Victoria Harbour	Deep Bay
	Reference	Present survey	CPSL, 2002		Shin <i>et al.</i> , 2004		
	Season						
H'	Wet	2.59	3.02	1.42	2.87	1.79	1.46
	Dry	\	3.27	1.36	2.82	1.64	2.32
	Mean	\	3.15	1.39	2.85	1.72	1.89
J	Wet	0.83	0.83	0.73	0.82	0.47	0.53
	Dry	\	0.93	0.83	0.81	0.44	0.73
	Mean	\	0.88	0.78	0.82	0.46	0.63

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Improvement Dredging for Lamma Power Station Navigation Channel

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Improvement Dredging for Lamma Power Station Navigation Channel

Annex I Photographic records of survey method



■ The sediment sample was collected with 0.1 m² van Veen grab



■ The collected sediments were washed with gentle seawater through a sieve stack of mesh sizes 1.0 mm and 0.5 mm.



■ The collected samples were preserved with 70% ethanol and stained with 1% Rose Bengal solution for one day in laboratory.



■ Taxonomic identification was undertaken with the aid of both stereoscopic and compound microscopes.

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II List of collected specimens at each sampling site

Sampling site: B1 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Amphipod</i> spp.			1	0.00			1	0.00
2	B	<i>Tellina iridella</i>					1	0.25	1	0.25
3	B	<i>Tellina minuta</i>	1	0.01	2	0.07			3	0.08
4	B	<i>Paphia undulata</i>	18	13.74	4	2.26	7	5.46	29	21.46
5	Ec	<i>Amphioplus lucidus</i>			1	0.03			1	0.03
6	N	Nemertean spp.	1	0.01					1	0.01
7	P	<i>Aglaophamus dibranchis</i>	1	0.00	2	0.02			3	0.02
8	P	<i>Cirriformia</i> sp.	1	0.00					1	0.00
9	P	<i>Lumbrineris</i> sp.	2	0.00					2	0.00
10	P	<i>Mediomastus</i> sp.	6	0.03	4	0.01	2	0.01	12	0.05
11	P	<i>Notomastus</i> sp.			1	0.00			1	0.00
12	P	<i>Oxydromus angustifrons</i>	1	0.00					1	0.00
13	P	<i>Paramphicteis angustifolia</i>	1	0.01					1	0.01
14	P	<i>Poecilochaetus</i> sp.			1	0.00	1	0.00	2	0.00
15	P	<i>Prionospio ehlersi</i>					1	0.00	1	0.00
16	P	<i>Schistomeringos rudolphi</i>	1	0.00					1	0.00
17	P	<i>Sigambra hanaokai</i>	1	0.00					1	0.00
18	P	<i>Sternaspis scutata</i>			1	0.00			1	0.00
19	P	<i>Terebellides stroemii</i>	4	0.06			2	0.01	6	0.06
20	S	<i>Alpheus digitalis</i>	1	0.54					1	0.54
	column sum	39	14	17	2	14	6	70	22.53	

A = Amphipod, B = Bivalve, Ec = Echinoderm, N = Nemertean, P = Polychaete, S = Shrimp

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: B2 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	B	<i>Tellina iridella</i>					1	0.95	1	0.95
2	B	<i>Tellina minuta</i>	2	0.12	13	0.33	3	0.21	18	0.66
3	B	<i>Paphia undulata</i>	3	1.66					3	1.66
4	G	<i>Ringicula doliaris</i>			3	0.05	1	0.02	4	0.07
5	P	<i>Aglaophamus dibranchis</i>	1	0.00			1	0.00	2	0.00
6	P	<i>Glycinde gurjanovae</i>			1	0.00			1	0.00
7	P	<i>Lumbrineris nagae</i>					1	0.10	1	0.10
8	P	<i>Mediomastus</i> sp.	1	0.00	3	0.00	1	0.00	5	0.00
9	P	<i>Paramphicteis angustifolia</i>			1	0.00			1	0.00
10	P	<i>Pholoe</i> sp.			2	0.00			2	0.00
11	P	<i>Piromis congoense</i>					1	0.01	1	0.01
12	P	<i>Poecilochaetus</i> sp.	3	0.01	7	0.02			10	0.03
13	P	<i>Prionospio ehlersi</i>	1	0.00	1	0.00	2	0.00	4	0.01
14	P	<i>Malacoceros</i> sp.					1	0.00	1	0.00
15	S	<i>Betaeus</i> sp.					1	0.06	1	0.06
16	S	<i>Nihonotrypaea japonica</i>			1	0.02			1	0.02
	column sum	11	2	32	0	13	1	56	3.58	

B = Bivalve, G = Gastropod, P = Polychaete, S = Shrimp

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: B3 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Idunella curvidactyla</i>					2	0.00	2	0.00
2	B	<i>Tellina minuta</i>	1	0.03	1	0.02	2	0.03	4	0.08
3	C	<i>Scalopidia spinosipes</i>					1	0.01	1	0.01
4	Cn	<i>Virgularia gustaviana</i>	1	0.01					1	0.01
5	Ec	<i>Amphioplus lucidus</i>			1	0.02	1	0.05	2	0.07
6	G	<i>Nassarius siquijorensis</i>					1	0.44	1	0.44
7	P	<i>Aglaophamus dibranchis</i>			2	0.03			2	0.03
8	P	<i>Aglaophamus sinensis</i>					1	0.04	1	0.04
9	P	<i>Linopherus paucibranchiata</i>			2	0.02			2	0.02
10	P	<i>Lumbrineris sp.</i>	1	0.00					1	0.00
11	P	<i>Mediomastus sp.</i>	7	0.01	1	0.00	4	0.01	12	0.03
12	P	<i>Pholoe sp.</i>	2	0.00					2	0.00
13	P	<i>Poecilochaetus sp.</i>	5	0.01	1	0.00			6	0.02
14	P	<i>Prionospio ehlersi</i>	1	0.00	1	0.00			2	0.00
15	P	<i>Terebellides stroemii</i>					2	0.02	2	0.02
16	S	<i>Nihonotrypaea japonica</i>			1	0.02			1	0.02
	column sum	18	0	10	0	14	1	42	0.79	

A = Amphipod, B = Bivalve, C = Crab, Cn = Cnidarian, Ec = Echinoderm, G = Gastropod, P = Polychaete, S = Shrimp

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: B4 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Idunella curvidactyla</i>			2	0.00			2	0.00
2	B	<i>Tellina minuta</i>	1	0.09	1	0.03	1	0.12	3	0.24
3	B	<i>Paphia undulata</i>			2	1.50	2	0.64	4	2.13
4	Eh	<i>Anelassorhynchus sabinus</i>					1	0.08	1	0.08
5	P	<i>Aglaophamus dibranchis</i>	2	0.02	2	0.00			4	0.02
6	P	<i>Amaeana</i> sp.			1	0.00			1	0.00
7	P	<i>Bhawania brevis</i>	1	0.00					1	0.00
8	P	<i>Glycera chirori</i>			1	0.00	1	0.00	2	0.01
9	P	<i>Linopherus paucibranchiata</i>			3	0.12			3	0.12
10	P	<i>Lumbrineris</i> sp.	1	0.00					1	0.00
11	P	<i>Mediomastus</i> sp.	2	0.00					2	0.00
12	P	<i>Notomastus</i> sp.			1	0.03			1	0.03
13	P	<i>Paramphicteis angustifolia</i>					1	0.00	1	0.00
14	P	<i>Pholoe</i> sp.	2	0.00	2	0.00			4	0.00
15	P	<i>Poecilochaetus</i> sp.	1	0.00	7	0.06	2	0.01	10	0.07
16	P	<i>Prionospio ehlersi</i>			1	0.00	1	0.00	2	0.01
17	P	<i>Sigambra hanaokai</i>					1	0.00	1	0.00
18	P	<i>Terebellides stroemii</i>	1	0.00					1	0.00
	column sum	11	0	23	2	10	1	44	2.72	

A = Amphipod, B = Bivalve, Eh = Echiuran, P = Polychaete

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: B5 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	Amphipod spp.			1	0.00	1	0.00	2	0.00
2	A	<i>Idunella curvidactyla</i>			1	0.00			1	0.00
3	B	<i>Paphia undulata</i>			3	1.44	2	1.28	5	2.72
4	B	<i>Theora lata</i>			1	0.01			1	0.01
5	C	<i>Neoxenophthalmus obscurus</i>			2	0.09			2	0.09
6	C	<i>Pinnixa penultipedalis</i>			1	0.00			1	0.00
7	Ec	<i>Amphioplus lucidus</i>			1	0.00			1	0.00
8	Ec	<i>Lovenia subcarinata</i>	2	5.91	1	3.59			3	9.50
9	G	<i>Nassarius siquijorensis</i>	1	0.44			1	1.26	2	1.70
10	N	Nemertean spp.			2	0.00			2	0.00
11	P	<i>Aglaophamus dibranchis</i>			1	0.00			1	0.00
12	P	<i>Amaeana</i> sp.			1	0.00	4	0.01	5	0.01
13	P	<i>Cirriformia</i> sp.	1	0.00	1	0.00			2	0.00
14	P	<i>Eunice indica</i>	1	0.02					1	0.02
15	P	<i>Glycinde gurjanovae</i>			1	0.00	1	0.00	2	0.00
16	P	<i>Laonice cirrata</i>			2	0.04	2	0.02	4	0.06
17	P	<i>Lumbrineris shiinoi</i>					2	0.00	2	0.00
18	P	<i>Marphysa stragulum</i>					1	0.00	1	0.00
19	P	<i>Mediomastus</i> sp.	1	0.00					1	0.00
20	P	<i>Notomastus</i> sp.			2	0.00	2	0.00	4	0.01
21	P	<i>Paralacydonia paradox</i>	1	0.00					1	0.00
22	P	<i>Pholoe</i> sp.	1	0.00			1	0.00	2	0.00
23	P	<i>Poecilochaetus</i> sp.	4	0.01	2	0.00	2	0.00	8	0.01
24	P	<i>Praxillella gracilis</i>	4	0.01	3	0.01	5	0.01	12	0.03
25	P	<i>Prionospio ehlersi</i>	1	0.00	2	0.00			3	0.00
26	P	<i>Prionospio malmgreni</i>					3	0.01	3	0.01
27	P	<i>Sigambra hanaokai</i>			1	0.00	2	0.00	3	0.00
28	P	<i>Spio</i> sp.	1	0.02					1	0.02
29	P	<i>Sternaspis scutata</i>			1	0.00	3	0.01	4	0.01
30	P	<i>Terebellides stroemii</i>	2	0.02	3	0.01	6	0.03	11	0.06

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: B5 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
31	S	<i>Betaeus sp.</i>					1	0.01	1	0.01
32	S	<i>Nihonotrypaea japonica</i>			2	0.00	1	0.00	3	0.01
33	Sp	<i>Apionsoma trichocephalus</i>	3	0.00	4	0.00	22	0.03	29	0.03
	column sum	23	6	39	5	62	3	124	14.31	

A = Amphipod, B = Bivalve, C = Crab, Ec = Echinoderm, G = Gastropod, N = Nemertean, P = Polychaete, S = Shrimps, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: B6 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	Amphipod spp.	2	0.00	1	0.00			3	0.00
2	B	<i>Tellina minuta</i>	1	0.06					1	0.06
3	B	<i>Paphia undulate</i>	1	0.48	2	0.71	2	0.95	5	2.13
4	B	<i>Trigonothracia pusilla</i>			1	0.13			1	0.13
5	C	<i>Neoxenophthalmus obscurus</i>					3	0.08	3	0.08
6	C	<i>Scalopidia spinosipes</i>					1	0.03	1	0.03
7	Ec	<i>Amphioplus laevis</i>			1	0.01			1	0.01
8	Ec	<i>Amphioplus lucidus</i>			1	0.01			1	0.01
9	G	<i>Clathrodrillia flavidula</i>					1	1.54	1	1.54
10	N	Nemertean spp.	2	0.01	1	0.00			3	0.01
11	P	<i>Aglaophamus sinensis</i>	1	0.00	1	0.02	2	0.03	4	0.05
12	P	<i>Amaeana</i> sp.			5	0.01	16	0.07	21	0.08
13	P	<i>Amphictene japonica</i>	1	0.33					1	0.33
14	P	<i>Bhawania brevis</i>			1	0.00			1	0.00
15	P	<i>Chaetozone</i> sp.					1	0.00	1	0.00
16	P	<i>Cirratulus</i> sp.	1	0.00					1	0.00
17	P	<i>Cirriformia</i> sp.	1	0.00	1	0.00	1	0.00	3	0.00
18	P	<i>Cossura dimorpha</i>					2	0.00	2	0.00
19	P	<i>Diopatra chiliensis</i>					1	0.04	1	0.04
20	P	<i>Ehlersileanira incisa hwanghaiensis</i>			1	0.00			1	0.00
21	P	<i>Eunice indica</i>					1	0.01	1	0.01
22	P	<i>Glycera chirori</i>	1	0.00	1	0.01			2	0.02
23	P	<i>Laonice cirrata</i>			1	0.00	1	0.00	2	0.00
24	P	<i>Lumbrineris shiinoi</i>			2	0.00			2	0.00
25	P	<i>Marphysa stragulum</i>	1	0.01					1	0.01
26	P	<i>Mediomastus</i> sp.					3	0.00	3	0.00
27	P	<i>Notomastus</i> sp.	2	0.01	1	0.00	1	0.00	4	0.01
28	P	<i>Ophelina acuminata</i>	1	0.04	1	0.05			2	0.09
29	P	<i>Oxydromus angustifrons</i>					2	0.00	2	0.00
30	P	<i>Pholoe</i> sp.	1	0.00	1	0.00			2	0.00

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: B6 Sampling date: 17/05/2014										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
31	P	<i>Piromis congoense</i>	2	0.01			1	0.00	3	0.01
32	P	<i>Poecilochaetus</i> sp.			2	0.00			2	0.00
33	P	<i>Praxillella gracilis</i>	3	0.00					3	0.00
34	P	<i>Prionospio malmgreni</i>			3	0.00			3	0.00
35	P	<i>Sigambra hanaokai</i>	1	0.00			1	0.00	2	0.00
36	P	<i>Spio</i> sp.					1	0.00	1	0.00
37	P	<i>Sternaspis scutata</i>	6	0.02	3	0.01	7	0.01	16	0.04
38	P	<i>Terebellides stroemii</i>			2	0.03	4	0.05	6	0.08
39	P	<i>Tharyx</i> sp.	1	0.01					1	0.01
40	S	<i>Betaeus</i> sp.	1	0.00					1	0.00
41	S	<i>Nihonotrypaea japonica</i>			3	0.01	1	0.08	4	0.09
42	S	<i>Atypopenaeus stenodactylus</i>			2	0.04			2	0.04
43	Sp	<i>Apionsoma trichocephalus</i>	7	0.01	8	0.01	6	0.01	21	0.02
	column sum	37	1	46	1	59	3	142	4.97	

A = Amphipod, B = Bivalve, C = Crab, Ec = Echinoderm, G = Gastropod, N = Nemertean, P = Polychaete, S = Shrimp, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III Taxonomic resolution of collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Annelida	Polychaeta	Amphinomida	Amphinomidae	<i>Linopherus paucibranchiata</i>
Animalia	Annelida	Polychaeta	Eunicida	Dorvilleidae	<i>Schistomeringos rudolphi</i>
Animalia	Annelida	Polychaeta	Eunicida	Eunicidae	<i>Eunice indica</i>
Animalia	Annelida	Polychaeta	Eunicida	Eunicidae	<i>Marphysa stragulum</i>
Animalia	Annelida	Polychaeta	Eunicida	Lumbrineridae	<i>Lumbrineris nagae</i>
Animalia	Annelida	Polychaeta	Eunicida	Lumbrineridae	<i>Lumbrineris shiinoi</i>
Animalia	Annelida	Polychaeta	Eunicida	Lumbrineridae	<i>Lumbrineris</i> sp.
Animalia	Annelida	Polychaeta	Eunicida	Onuphidae	<i>Diopatra chiliensis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Chrysopetalidae	<i>Bhawania brevis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Glyceridae	<i>Glycera chirori</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Goniadidae	<i>Glycinde gurjanovae</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Hesionidae	<i>Oxydromus angustifrons</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	<i>Paralacydonia paradox</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Nephtyidae	<i>Aglaophamus dibranchis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Nephtyidae	<i>Aglaophamus sinensis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Pholoidae	<i>Pholoe</i> sp.
Animalia	Annelida	Polychaeta	Phyllodocida	Pilargidae	<i>Sigambra hanaokai</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Sigalionidae	<i>Ehlersileanira incisa hwanghaiensis</i>
Animalia	Annelida	Polychaeta	Spionida	Poecilochaetidae	<i>Poecilochaetus</i> sp.
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Laonice cirrata</i>
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Prionospio ehlersi</i>
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Prionospio malmgreni</i>
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Rhynchospio</i> sp.
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Spio</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Ampharetidae	<i>Paramphicteis angustifolia</i>
Animalia	Annelida	Polychaeta	Terebellida	Cirratulidae	<i>Chaetozone</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Cirratulidae	<i>Cirratulus</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Cirratulidae	<i>Cirriformia</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Cirratulidae	<i>Tharyx</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Flabelligeridae	<i>Piromis congoense</i>
Animalia	Annelida	Polychaeta	Terebellida	Pectinariidae	<i>Amphictene japonica</i>
Animalia	Annelida	Polychaeta	Terebellida	Sternaspidae	<i>Sternaspis scutata</i>
Animalia	Annelida	Polychaeta	Terebellida	Terebellidae	<i>Amaeana</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Trichobranchidae	<i>Terebellides stroemii</i>
Animalia	Annelida	Polychaeta		Capitellidae	<i>Mediomastus</i> sp.

Improvement Dredging for Lamma Power Station Navigation Channel

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Annelida	Polychaeta		Capitellidae	<i>Notomastus</i> sp.
Animalia	Annelida	Polychaeta		Cossuridae	<i>Cossura dimorpha</i>
Animalia	Annelida	Polychaeta		Maldanidae	<i>Praxillella gracilis</i>
Animalia	Annelida	Polychaeta		Opheliidae	<i>Ophelina acuminata</i>
Animalia	Arthropoda	Malacostraca	Amphipoda	Liljeborgiidae	<i>Idunella curvidactyla</i>
Animalia	Arthropoda	Malacostraca	Amphipoda		Amphipod spp.
Animalia	Arthropoda	Malacostraca	Decapoda	Alpheidae	<i>Alpheus digitalis</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Alpheidae	<i>Betaeus</i> sp.
Animalia	Arthropoda	Malacostraca	Decapoda	Callianassidae	<i>Nihonotrypaea japonica</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Penaeidae	<i>Atypopenaeus stenodactylus</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Pinnotheridae	<i>Neoxenophthalmus obscurus</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Pinnotheridae	<i>Pinnixa penultipedalis</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Scalopidiidae	<i>Scalopidia spinosipes</i>
Animalia	Cnidaria	Anthozoa	Pennatulacea	Virgulariidae	<i>Virgularia gustaviana</i>
Animalia	Echinodermata	Echinoidea	Spatangoida	Loveniidae	<i>Lovenia subcarinata</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus laevis</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus lucidus</i>
Animalia	Echiura		Echiuroinea	Echiuridae	<i>Anelassorhynchus sabinus</i>
Animalia	Mollusca	Bivalvia	Anomalodesmata	Thraciidae	<i>Trigonothracia pusilla</i>
Animalia	Mollusca	Bivalvia	Veneroida	Semelidae	<i>Theora lata</i>
Animalia	Mollusca	Bivalvia	Veneroida	Tellinidae	<i>Tellina iridella</i>
Animalia	Mollusca	Bivalvia	Veneroida	Tellinidae	<i>Tellina minuta</i>
Animalia	Mollusca	Bivalvia	Veneroida	Veneridae	<i>Paphia undulate</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Nassariidae	<i>Nassarius siquijorensis</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Pseudomelatomidae	<i>Clathrodrillia flavidula</i>
Animalia	Mollusca	Gastropoda		Ringiculidae	<i>Ringicula doliaris</i>
Animalia	Nemertea				Nemertean spp.
Animalia	Sipuncula	Phascolosomatidea	Phascolosomatiformes	Phascolosomatidae	<i>Apionsoma trichocephalus</i>

Appendix 4.2b Results of Benthic Field Surveys conducted in 2015

1. Benthic Field Survey Methodology

1.1. Field sampling

In order to collect more benthic baseline information of the navigation channel of Lamma Power Station, benthos sampling was undertaken at six sampling sites (P1 to P6) in 2015 which were not identical to those sampling sites undertaken in 2014 (see **Figure 1**). Sampling sites P1 to P3 were located along the channel while P4 to P6 were located at the vicinities. Sampling sites P4 and P6 (with water depth 9.9 – 12.7 m) were shallower than the other sites (with water depth 14.5 – 16.8 m). The sampling sites were located with Global Positioning System (device model: Garmin 78S) on board. **Table 1** shows the coordinates of the sampling sites. The wet season sampling was conducted on 28th September, 2015 under sunny weather. The dry season sampling was conducted on 20th December, 2015 under cloudy and windy weather.

At each sampling site, three replicates of sediment samples were collected with a 0.1 m² van Veen grab (0.1 m² sampling area × 15 cm biting depth). Collected samples were accepted when at least two-third of grab volume was filled. When the samples were collected on board, a photographic record of the sediment texture and colour was taken. The samples were washed with gentle seawater through a sieve stack consisted of 1 mm (top) and 0.5 mm (bottom) mesh sizes to remove fine material. Large visible animals in the residues were hand-picked into a small, labeled plastic vial. All remains were transferred into a labeled plastic container followed by preservation with 70% ethanol solution and staining with 1% Rose Bengal solution.

1.2. Laboratory work

After arrival to laboratory, the samples were stored for at least one day to ensure sufficient preservation and staining. The preserved fauna were sorted out from the samples carefully by placing portion of sediment residues on a petri dish and picking up with forceps under the 10x magnification dissecting microscope. The collected fauna and fragments were transferred in to a plastic vial containing 70% ethanol. Each petri dish would be sorted twice to ensure removal of all animals. For quality assurance, the sediment residues of one-third sorted samples were randomly rechecked. No missed specimen was found in the recheck.

The collected specimens were identified to the lowest taxonomic resolution by qualified and experienced specialist. Examination of the morphological features of the specimens was undertaken with the aid of both stereoscopic and compound microscopes. The taxonomic classification was conducted in accordance to the following references:

- Polychaetes: Day (1967), Gallardo (1967), Fauchald (1977), Yang and Sun (1988), Wu et al. (1997), Sun and Yang (2004);
- Arthropods: Dai and Yang (1991), Dong (1991), Lowry (2000);
- Mollusks: Qi (2004);
- Echiuran and Sipunculan: Zhou et al. (2007);
- Echinoderm: Liao (2003).

The number of individuals of each species was recorded by counting the anterior portions of the fauna only. Total biomass of each species was determined as preserved wet weight by blotting the animals on filter paper for 3 minutes followed by weighing to the nearest 0.0001 g with microbalance.

1.3. Data analysis

Data collected from three replicate samples at each sampling site were pooled together for data analysis. Shannon-Weaver Diversity Index (H') and Pielou's Species Evenness (J) were calculated using the formulae below,

$$H' = -\sum (N_i / N) \ln (N_i / N) \quad (\text{Shannon and Weaver, 1963})$$
$$J = H' / \ln S \quad (\text{Pielou, 1966})$$

where S is the total number of species in the sample, N is the total number of individuals, and N_i is the number of individuals of the i^{th} species.

The status of benthic community is assessed using the abundance/biomass comparison (ABC) method and W statistic is generated (Warwick, 1986; Warwick and Clarke, 1994) with the software PRIMER version 6 (Plymouth Marine Laboratory, UK). ABC method is based on an ecological theory: when the benthic community is approaching equilibrium under stable and undisturbed environment, the biomass becomes increasingly dominated by few large-sized species while abundance of each species is less. In contrast, the abundance is dominated by few small-sized species while biomass of each species is small in disturbed environment.

The ABC method plots relative proportions of biomass and abundance attributable to each species for each sampling site. The species are ranked in descending order of abundance on the x-axis (logarithmic scale) with superimposition of dominance curves of abundance and biomass on the y-axis (cumulative percentage scale). When biomass curve is above abundance curve entirely, the benthic community reflects unpolluted / undisturbed status due to the presence of few, large-sized fauna. When abundance curve is above biomass curve entirely, the benthic community reflects grossly polluted / disturbed status due to presence of numerous small-sized animals. Under moderately disturbed status of benthic community, two curves cross over one or more times (Warwick and Clarke, 1994). Then W statistic is employed to measure the extent to which the biomass curve lies above the abundance curve (Clarke, 1990). The equation of W statistic is shown below:

$$W = \sum_{i=1}^S (B_i - A_i) / [50 (S - 1)] \quad (\text{Clarke, 1990})$$

where S = total number of species; $B_i - A_i$ = difference between biomass and abundance (percentage) of the i^{th} species.

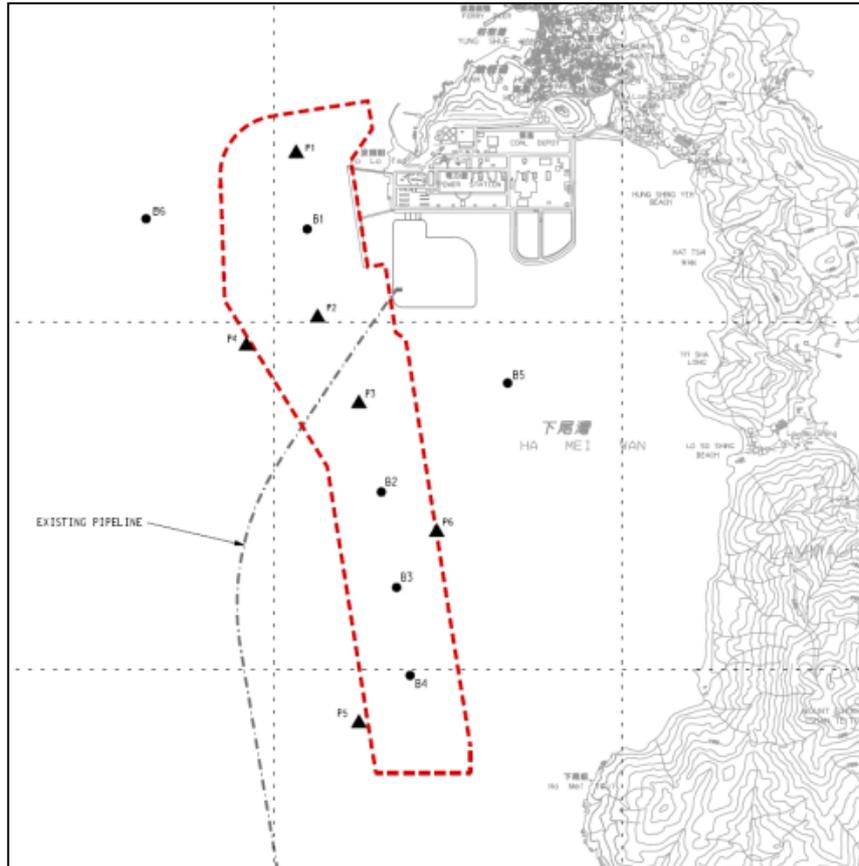
In case biomass curve lying above abundance curve, a positive W value is given representing 'undisturbed' condition, and vice versa. The W statistic presents a continuum from 'disturbed' ($W = -1$), 'moderately disturbed' ($W = 0$), to 'undisturbed' ($W = +1$) conditions.

Improvement Dredging for Lamma Power Station Navigation Channel

Table 1 The GPS coordinates (in WGS84 datum (ITRF96 Reference Frame)), collection time and measured water depth of each sampling site

Sampling site	Latitude (N)	Longitude (E)	Wet season (date: 28 Sep 2015)		Dry season (date: 20 Dec 2015)	
			Collection time (hh:mm)	Water depth (m)	Collection time (hh:mm)	Water depth (m)
P1	22° 13.132'	114° 05.914'	09:55	16.0	10:05	14.7
P2	22° 12.625'	114° 05.994'	10:05	16.8	10:30	15.7
P3	22° 12.333'	114° 06.069'	10:40	15.8	10:50	14.5
P4	22° 12.511'	114° 05.766'	10:50	11.0	12:00	9.9
P5	22° 11.281'	114° 06.018'	11:38	15.8	12:25	15.1
P6	22° 11.930'	114° 06.326'	11:50	10.9	12:10	12.7

Figure 1 Location of sampling sites (Black Triangles ▲ P1 to P6)



Improvement Dredging for Lamna Power Station Navigation Channel

Figure 2 Photographic record of the environment at each sampling site

P1



P2



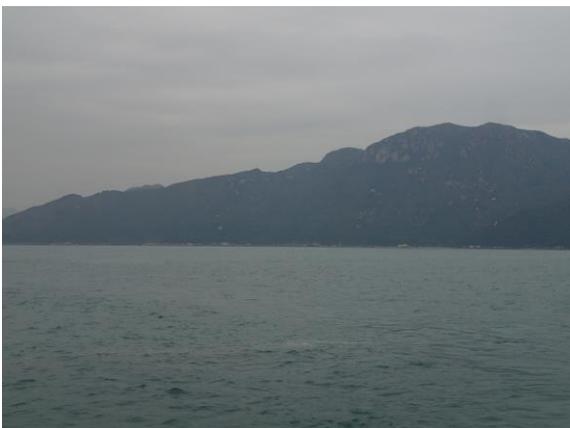
P3



P4



P5



P6



2. Baseline Condition of Benthic Habitat

2.1. Sediment Condition

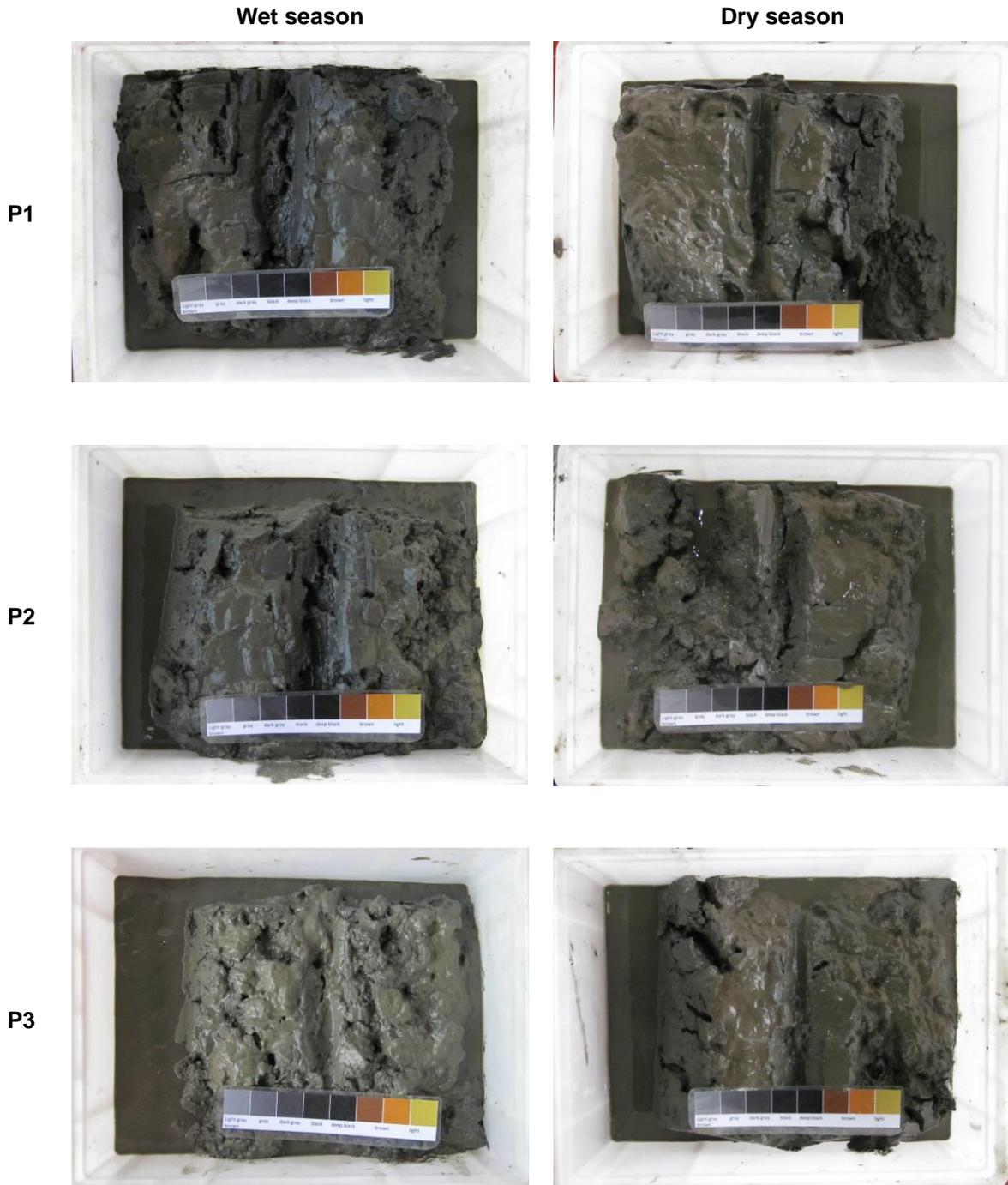
Table 2 and **Figure 3** show the sediment texture and colour at each sampling site. In both sampling seasons, the sediments of all sites were soft mud (~90-95% of volume) except P4. At P4, the sediments were a mixture of fine sand (~50%) and soft mud (~40%) in the wet season sampling. But the sediments became a mixture of coarse sand (~50%) and fine sand (~40%) in the dry season sampling. The sediment colour of all sampling sites was grey with brown surface regardless of seasons. No smell of hydrogen sulphite was detected from sediments except P1 and P5 in the dry season sampling.

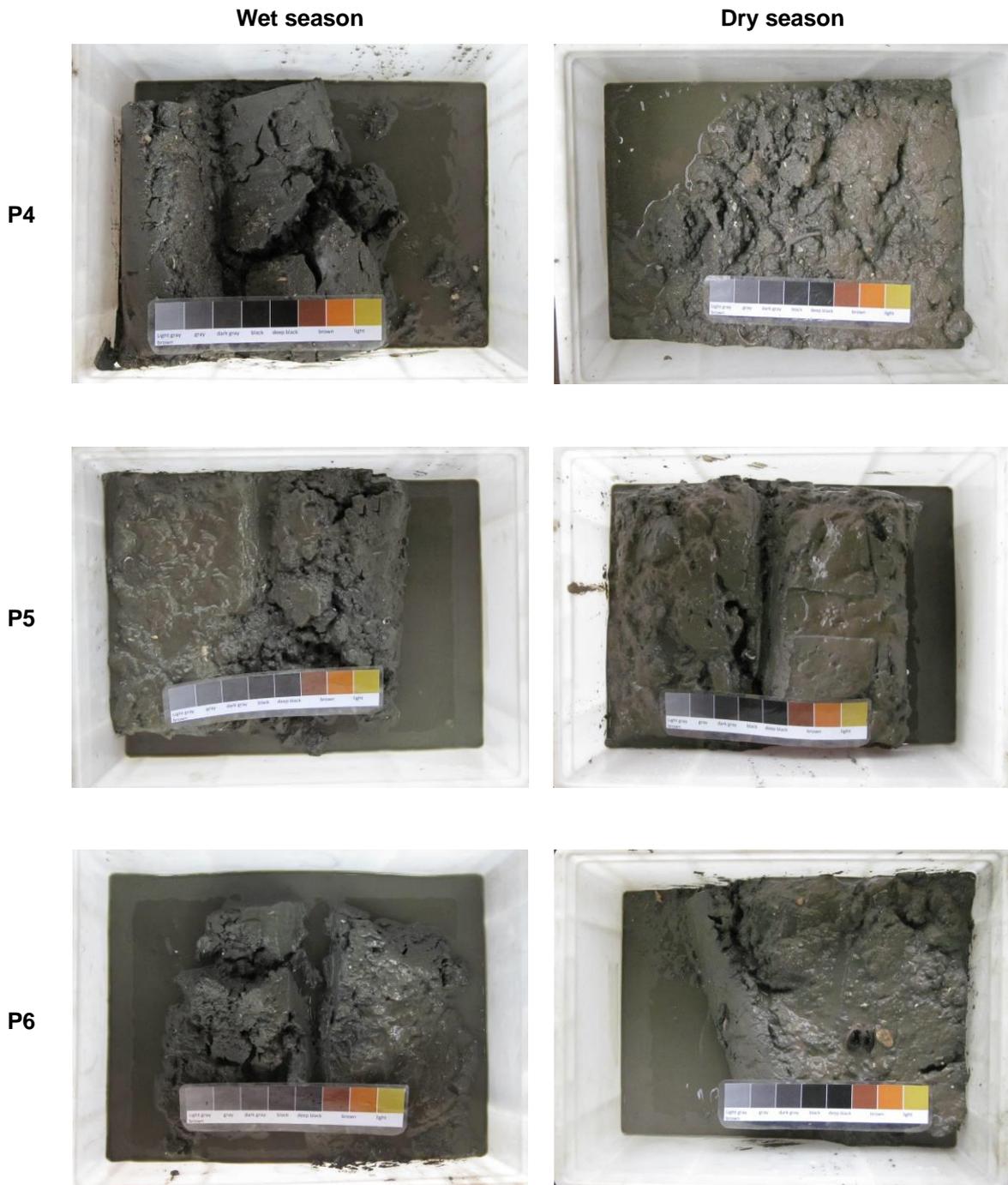
Table 2 Sediment texture and colour at each sampling site

Sampling Site	Season	Major Sediment Texture	Minor Sediment Texture	Sediment Colour	Sediment Odour	Remark
P1	Wet	~95% Soft mud	\	Grey with brown surface	\	\
	Dry	~95% Soft mud	\	Grey with brown surface	Mild	\
P2	Wet	~95% Soft mud	\	Grey with brown surface	\	\
	Dry	~95% Soft mud	\	Grey with brown surface	\	\
P3	Wet	~95% Soft mud	\	Grey with brown surface	\	\
	Dry	~95% Soft mud	\	Grey with brown surface	\	\
P4	Wet	~50% Fine sand	~40% Soft mud	Grey with brown surface	\	\
	Dry	~50% Coarse sand	~40% Fine sand	Grey with brown surface	\	\
P5	Wet	~90% Soft mud	\	Grey with brown surface	\	\
	Dry	~90% Soft mud	~10% Broken shells	Grey with brown surface	Mild	\
P6	Wet	~90% Soft mud	\	Grey with brown surface	\	\
	Dry	~90% Soft mud	~10% Broken shells	Grey with brown surface	\	\

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Figure 3 Photographic record of sediment at sampling sites





2.2. Survey Results for Benthic Fauna

Table 3 lists the total abundance and total biomass of each phylum. A total of 520 and 1400 specimens were collected in the wet season and dry season samplings respectively. 126 of 134 taxa were identified to genus or species levels. In general the most diverse phylum was Annelida (62 polychaete taxa), followed by Arthropoda (12 crab taxa + 7 amphipod taxa + 7 shrimp taxa + 1 cumacean taxon + 1 leptostracan taxon), Mollusca (14 bivalve taxa + 11 gastropod taxa + 1 Scaphopod taxon), Echinodermata (6 brittle star taxa + 1 sea urchin species), Chordata (5 fish taxa), Echiura (2 taxa), Sipuncula (2 species), Nemertea (1

Improvement Dredging for Lamma Power Station Navigation Channel

taxon) and Platyhelminthes (1 taxon). All recorded species were common with no conservation interest. The complete taxonomic resolution is listed in **Annex III**.

In the wet season sampling, 40% and 39% of total abundance were dominated by Annelida (209 ind.) and Mollusca (203 ind.) respectively. The less abundant phyla were Arthropoda (41 ind., 8%), Echinodermata (35 ind., 7%) and Sipuncula (14 ind., 3%). Other phyla were relatively low in abundance (relative abundance $\leq 2\%$). The total biomass was 158.2341 g that was mainly accounted by Mollusca (136.3844 g, 86%). Other less weighted phyla were Chordata (11.4480 g, 7%) and Arthropoda (7.3258 g, 5%). Other phyla were relatively less in biomass (total $\leq 3\%$).

Similar results were found in the dry season sampling. 60% and 15% of total abundance were dominated by Annelida (836 ind.) and Mollusca (208 ind.) respectively. The less abundant phyla were Arthropoda (125 ind., 9%), Sipuncula (96 ind., 7%), Echinodermata (82 ind., 6%) and Nemertea (49 ind., 4%). Other phyla were relatively low in abundance (relative abundance $\leq 1\%$). The total biomass was 116.3702 g that was mainly accounted by Mollusca (105.1391 g, 90%). Other less weighted phyla were Annelida (3.7776 g, 3%) and Arthropoda (3.6324 g, 3%). Other phyla were relatively less in biomass (total $\leq 4\%$). The complete list of collected specimens is provided in **Annex II**.

Table 4 shows the abundance and relative abundance of each phylum at each sampling site. In the wet season sampling, P3 and P4 were moderate in total abundance (144-191 ind.). P3 was mainly accounted by Mollusca (145 ind., 76%) followed by Annelida (30 ind., 16%). P4 was mainly accounted by Annelida (90 ind., 63%) followed by Arthropoda (19 ind., 13%). P1, P2 and P6 were low to moderate in total abundance (47-62 ind.) while the abundant phyla were Annelida (24-28 ind., 45-56%) and Mollusca (9-24 ind., 19-39%). P5 was low in total abundance (28 ind.) while all phyla were relatively even in abundances. In the dry season sampling, the total abundance of each sampling site increased obviously. P4 was high in total abundance (533 ind.) that was mainly accounted by Annelida (364 ind., 68%) followed by Sipuncula (74 ind., 14%) and Arthropoda (53 ind., 10%). Sites P1, P2, P3, P5 and P6 were moderate in abundance (137-214 ind.) that were mainly accounted by Annelida (57-144 ind., 39-67%) followed by Mollusca (20-46 ind., 9-30%). No obvious change of dominant phyla was observed at all sampling sites except P3. The dominant phylum Mollusca (76%) in wet season sampling was replaced by Annelida (57%) in dry season sampling.

Table 5 lists the five most abundant species at each sampling site in the wet season sampling. In general different abundant species were recorded among the sampling sites. No species was clearly dominant in the survey area except P3. At P1 and P2, the species distributions were even while polychaete *Mediomastus* sp. (27-43 ind. m⁻², 17-21%), bivalve *Paratapes undulatus* (10-30 ind. m⁻², 6-15%) and brittle star *Amphioplus lucidus* (13-27 ind. m⁻², 8-13%) were common at low-moderate abundance. At P3, bivalve *Timoclea lionota* (477 ind. m⁻², 75%) was clearly dominant followed by polychaete *Mediomastus* sp. (63 ind. m⁻², 10%). At P4, the species distribution was very even while polychaetes *Prionospio ehlersi* (40 ind. m⁻², 8%), *Marphysa stragulum* (33 ind. m⁻², 7%), *Prionospio malmgreni* (27 ind. m⁻², 6%), sipunculan *Apionsoma trichocephalus* (37 ind. m⁻², 8%) and echiuran *Arhynchite* sp. (30 ind. m⁻², 6%) were common at low-moderate abundance. At P5, the abundance of each taxon was very low (7-17 ind. m⁻²) while no abundant taxon could be determined. At P6, the species distributions were even while bivalves *Paratapes undulatus* (30 ind. m⁻², 19%), *Laonice cirrata* (17 ind. m⁻², 11%), polychaetes *Laonice cirrata* (17 ind. m⁻², 11%) and *Aglaophamus sinensis* (13 ind. m⁻², 9%) were common at low-moderate abundance.

Table 6 lists the five most abundant species at each sampling site in the dry season sampling. Relatively the dominant species changed and its densities increased clearly at all sampling sites. It indicated the recruitment of benthic fauna between two seasons of sampling. At P1 and P2, polychaete *Prionospio ehlersi* (87-103 ind. m⁻², 16-19%) was the most abundant with moderate density. Other common species were bivalve *Saccella cuspidata* (33-63 ind. m⁻², 7-10%), brittle star *Amphiodia obtecta* (33-40 ind. m⁻², 6-7%) and polychaete *Sigambra hanaokai* (30-50 ind. m⁻², 7-8%) at low-moderate densities. At P3,

Improvement Dredging for Lamma Power Station Navigation Channel

polychaete *Prionospio ehlersi* (147 ind. m⁻², 25%) was the most abundant at moderate density followed by gastropod *Monotygmata* sp. (57 ind. m⁻², 10%) and bivalve *Tellina minuta* (40 ind. m⁻², 7%). At P4, polychaetes *Prionospio malmgreni* (497 ind. m⁻², 28%), *Cirriiformia* sp. (143 ind. m⁻², 8%) and sipunculan *Apionsoma trichocephalus* (247 ind. m⁻², 14%) were dominant at moderate-high densities. At P5, bivalve *Saccella cuspidata* (63 ind. m⁻², 13%), gastropod *Monotygmata* sp. (40 ind. m⁻², 8%), polychaete *Prionospio ehlersi* (37 ind. m⁻², 8%) and brittle star *Amphiodia obtecta* (33 ind. m⁻², 7%) were common species at low-moderate densities. At P6, polychaetes *Prionospio ehlersi* (80 ind. m⁻², 11%), *Laonice cirrata* (53 ind. m⁻², 7%), Maldanidae spp. (37 ind. m⁻², 5%) and sipunculan *Apionsoma trichocephalus* (37 ind. m⁻², 5%) were common at low-moderate densities. Different from the wet season sampling, polychaete *Prionospio ehlersi* was a common species with moderate density at all sampling sites except P4.

Table 7 and **Figure 4** show the species number, site density, biomass, H' , J and W statistic at each sampling site. In the wet season sampling, P4 was moderate-high in species number (39 spp. 0.3 m⁻²) and site density (480 ind. m⁻²). The species distribution was very even resulting in high J (0.91) and H' (3.33). At P3, the site density was highest (637 ind. m⁻²) relatively with low-moderate species number (17 spp. 0.3 m⁻²). However the community was highly dominated by one bivalve species (relative abundance 75%) resulting in very low H' (1.10) and J (0.39). At other sampling sites (P1, P2, P5, P6), the biological parameters were similar with low-moderate species number (15-23 spp. 0.3 m⁻²), low-moderate site density (93-207 ind. m⁻²). The species distribution was even (J 0.86-0.94) that resulted in moderate H' (2.34-2.83).

In the dry season sampling, increases of species number and site density were obvious in the survey area. P4 was very high in species number (67 spp. 0.3 m⁻²) and site density (1777 ind. m⁻²). The abundant species were quite even in densities resulting in moderate J (0.72) and high H' (3.03). At P3, the species number was moderate-high (33 spp. 0.3 m⁻²) and the site density was high (590 ind. m⁻²). Different from the wet season sampling, the abundant species were quite even in densities. The H' (2.94) and J (0.84) increased to moderate values clearly. At other sampling sites, the species numbers were moderate-high (36-60 spp. 0.3 m⁻²) and the site densities were high (457-713 ind. m⁻²). The species distribution was even (J 0.86-0.89) that resulted in moderate-high H' (3.07-3.59).

The biomass was highly variable among the sampling sites. It depended on the abundance of large-sized bivalves and gastropods. In the wet season sampling, higher biomass was recorded at P1, P3 and P6 (136.70-139.14 g m⁻²) which was mainly accounted by the large-sized bivalves *Paratapes undulatus* (9 ind., 33.76-39.25 g at P1 and P6) and abundant, small bivalve *Timoclea lionota* (143 ind., 29.66 g at P3). Moderate biomass was recorded at P5 (66.50 g m⁻²) which was accounted by bivalve *Paratapes undulatus* (3 ind., 13.48 g) too. Other sampling sites were less in biomass (11.72-34.66 g m⁻²). In the dry season sampling, the highest biomass was recorded at P1 (167.35 g m⁻²) which was still accounted by the large-sized bivalves *Paratapes undulatus* (8 ind., 41.34 g). P6 was also high in biomass (80.42 g m⁻²) but it was mainly accounted by one individual of large-sized gastropods *Murex trapa* (6.94 g), *Turricula javana* (8.60 g) and bivalve *Paratapes undulatus* (5.20 g). Other sampling sites were less in biomass (15.21-46.89 g m⁻²) that was mainly accounted by few individuals of bivalve *Paratapes undulatus*.

The W statistic values generated by ABC method were positive at all sampling sites (**Figure 5**). In the wet season sampling, P3 was relatively less (0.07) in W statistic value indicating 'moderately disturbed' condition. Other sampling sites ranged 0.37-0.64 in W statistic values indicating 'slightly disturbed' condition. Obvious changes were found at P3 and P4 in the dry season sampling. The W statistic value of P3 increased to 0.42 and indicated 'slightly disturbed' condition. Such increase was due to the cease of previously dominant small bivalve. However the W statistic value of P4 decreased to 0.09 at P4 and indicated 'moderately disturbed' condition. Such decrease was due to the dominance of small polychaete and sipunculan found in the dry season sampling. The W statistic values of other sampling sites remained stable (0.40-0.45) and indicated 'slightly disturbed' condition.

Improvement Dredging for Lamma Power Station Navigation Channel

Table 3 Total abundance and total biomass of each phylum

Phylum	Abundance	%	Biomass	%
Wet season				
Annelida	209	40	1.7032	1
Mollusca	203	39	136.3844	86
Arthropoda	41	8	7.3258	5
Echinodermata	35	7	1.2873	1
Sipuncula	14	3	0.0380	0
Echiura	10	2	0.0386	0
Nemertea	5	1	0.0088	0
Chordata	3	1	11.4480	7
sub-total	520		158.2341	
Dry season				
Annelida	836	60	3.7776	3
Mollusca	208	15	105.1391	90
Arthropoda	125	9	3.6324	3
Sipuncula	96	7	0.1215	0
Echinodermata	82	6	1.4663	1
Nemertea	49	4	0.3791	0
Chordata	3	0	1.8536	2
Platyhelminthes	1	0	0.0006	0
sub-total	1400		116.3702	
Total	1920		274.6043	

0 %: total individual / biomass of the phylum is less than 1% of that of all specimens

Improvement Dredging for Lamma Power Station Navigation Channel

Table 4 The abundance and relative abundance (percentage) of each phylum at each sampling site

Phylum	Site P1		P2		P3		P4		P5		P6													
	W	%	D	%	W	%	D	%	W	%	D	%												
Annelida	28	45	68	50	27	56	102	53	30	16	101	57	90	63	364	68	10	36	57	39	24	51	144	67
Arthropoda			11	8	6	13	17	9	6	3	15	8	19	13	53	10	6	21	16	11	4	9	13	6
Chordata			1	1	1	2			1	1									1	1	1	2	1	0
Echinodermata	8	13	13	9	4	8	22	11	8	4	7	4	9	6	9	2	6	21	18	12			13	6
Echiura					1	2							9	6										
Mollusca	24	39	36	26	9	19	38	20	145	76	46	26	4	3	24	5	4	14	44	30	17	36	20	9
Nemertea	2	3	8	6			10	5	1	1	8	5	2	1	9	2			4	3			10	5
Platyhelminthes																							1	0
Sipuncula							5	3					11	8	74	14	2	7	5	3	1	2	12	6
Total	62		137		48		194		191		177		144		533		28		145		47		214	

W: Wet season, D: Dry season

0 %: Relative abundance of the phylum is less than 1% of that of all specimens

Improvement Dredging for Lamma Power Station Navigation Channel

Table 5 The five most abundant species at each sampling site in the wet season sampling

Sampling site	Group	Species	Density (ind. m ⁻²)	Biomass (g m ⁻²)	Relative abundance (%)
P1	P	<i>Mediomastus</i> sp.	43	0.11	21
	B	<i>Paratapes undulatus</i>	30	130.84	15
	B	<i>Theora lata</i>	27	1.56	13
	Ec	<i>Amphioplus lucidus</i>	27	1.22	13
	B	<i>Timoclea lionota</i>	20	4.22	10
P2	P	<i>Mediomastus</i> sp.	27	0.08	17
	P	<i>Aglaophamus sinensis</i>	23	0.55	15
	S	<i>Leptochela</i> sp.	17	0.10	10
	Ec	<i>Amphioplus lucidus</i>	13	0.41	8
	B	<i>Paratapes undulatus</i>	10	31.33	6
P3	B	<i>Timoclea lionota</i>	477	98.88	75
	P	<i>Mediomastus</i> sp.	63	0.17	10
	Ec	<i>Amphioplus lucidus</i>	20	1.26	3
	S	<i>Leptochela</i> sp.	17	0.16	3
	P	<i>Euclymene</i> sp.	17	0.31	3
P4	P	<i>Prionospio ehlersi</i>	40	0.03	8
	Sp	<i>Apionsoma trichocephalus</i>	37	0.11	8
	P	<i>Marphysa stragulum</i>	33	1.21	7
	Eh	<i>Arhynchite</i> sp.	30	0.07	6
	P	<i>Prionospio malmgreni</i>	27	0.02	6
P5	Ec	<i>Amphioplus lucidus</i>	17	0.17	18
	B	<i>Paratapes undulatus</i>	10	44.93	11
	P	<i>Lumbrineris nagae</i>	10	0.17	11
	Sp	<i>Apionsoma trichocephalus</i>	7	0.01	7
	S	<i>Leptochela</i> sp.	7	0.09	7
P6	B	<i>Paratapes undulatus</i>	30	112.54	19
	P	<i>Laonice cirrata</i>	17	0.12	11
	B	<i>Timoclea lionota</i>	13	2.18	9
	P	<i>Aglaophamus sinensis</i>	13	0.25	9
	P	<i>Poecilochaetus</i> sp.	10	0.09	6

B = Bivalve, Ec = Echinoderm, Eh = Echiuran, P = Polychaete, S = Shrimp, Sp = Sipunculan
 0.00 g m⁻²: biomass of the taxon is less than 0.01 g m⁻² at the sampling site

Improvement Dredging for Lamma Power Station Navigation Channel

Table 6 The five most abundant species at each sampling site in the dry season sampling

Sampling site	Group	Species	Density (ind. m ⁻²)	Biomass (g m ⁻²)	Relative abundance (%)
P1	P	<i>Prionospio ehlersi</i>	87	0.09	19
	B	<i>Saccella cuspidata</i>	33	0.60	7
	Ec	<i>Amphiodia obtecta</i>	33	0.51	7
	P	<i>Sigambra hanaokai</i>	30	0.02	7
	B	<i>Paratapes undulatus</i>	27	137.81	6
P2	P	<i>Prionospio ehlersi</i>	103	0.10	16
	B	<i>Saccella cuspidata</i>	63	1.87	10
	P	<i>Sigambra hanaokai</i>	50	0.02	8
	Ec	<i>Amphiodia obtecta</i>	40	0.77	6
	N	Nemertea spp.	33	0.85	5
P3	P	<i>Prionospio ehlersi</i>	147	0.15	25
	G	<i>Monotygmata</i> sp.	57	0.20	10
	B	<i>Tellina minuta</i>	40	6.77	7
	P	<i>Decamastus</i> sp.	33	0.03	6
	N	Nemertea spp.	27	0.22	5
P4	P	<i>Prionospio malmgreni</i>	497	0.15	28
	Sp	<i>Apionsoma trichocephalus</i>	247	0.18	14
	P	<i>Cirriformia</i> sp.	143	0.09	8
	P	<i>Marphysa stragulum</i>	67	1.47	4
	P	<i>Mediomastus</i> sp.	67	0.04	4
P5	B	<i>Saccella cuspidata</i>	63	1.90	13
	G	<i>Monotygmata</i> sp.	40	0.14	8
	P	<i>Prionospio ehlersi</i>	37	0.02	8
	Ec	<i>Amphiodia obtecta</i>	33	0.54	7
	C	<i>Neoxenophthalmus obscurus</i>	23	1.76	5
P6	P	<i>Prionospio ehlersi</i>	80	0.05	11
	P	<i>Laonice cirrata</i>	53	0.77	7
	P	Maldanidae spp.	37	0.25	5
	Sp	<i>Apionsoma trichocephalus</i>	37	0.03	5
	N	Nemertea spp.	33	0.02	5

B = Bivalve, Ec = Echinoderm, G = Gastropod, N = Nemertean, P = Polychaete, Sp = Sipunculan
 0.00 g m⁻²: biomass of the taxon is less than 0.01 g m⁻² at the sampling site

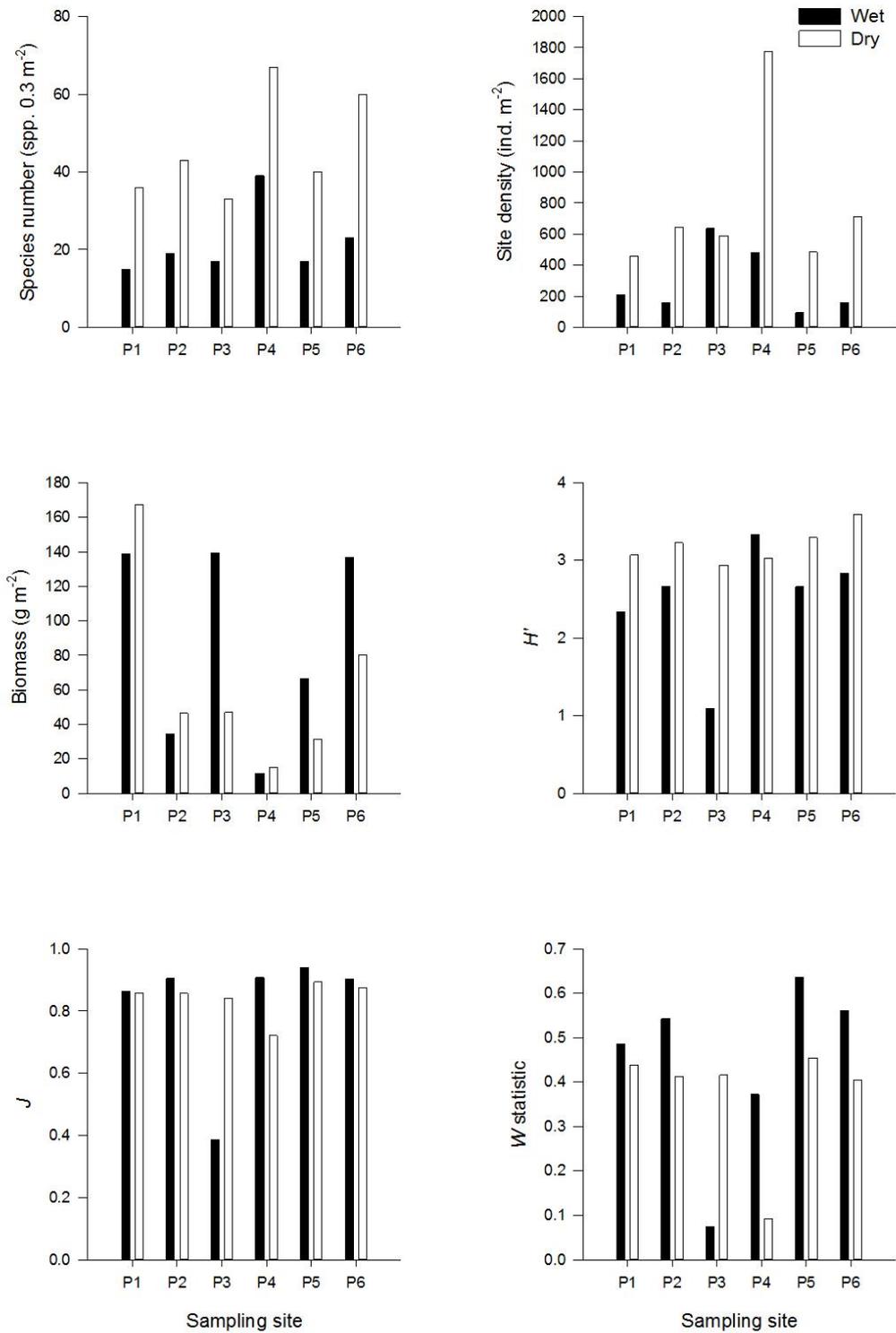
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Table 7 Species number, site density, biomass, Shannon-Weaver Diversity Index (H'), Pielou's Species Evenness (J) and W statistic at each sampling site

	P1		P2		P3		P4		P5		P6		
	Season	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
Species number (spp. 0.3 m⁻²)		15	36	19	43	17	33	39	67	17	40	23	60
Site density (ind. m⁻²)		207	457	160	647	637	590	480	1777	93	483	157	713
Biomass (g m⁻²)		138.78	167.35	34.66	46.49	139.14	46.89	11.72	15.21	66.50	31.54	136.70	80.42
Shannon-Weaver Diversity Index H'		2.34	3.07	2.67	3.22	1.10	2.94	3.33	3.03	2.66	3.30	2.83	3.59
Pielou's Species Evenness J		0.86	0.86	0.91	0.86	0.39	0.84	0.91	0.72	0.94	0.89	0.90	0.88
W statistic		0.49	0.44	0.54	0.41	0.07	0.42	0.37	0.09	0.64	0.45	0.56	0.40

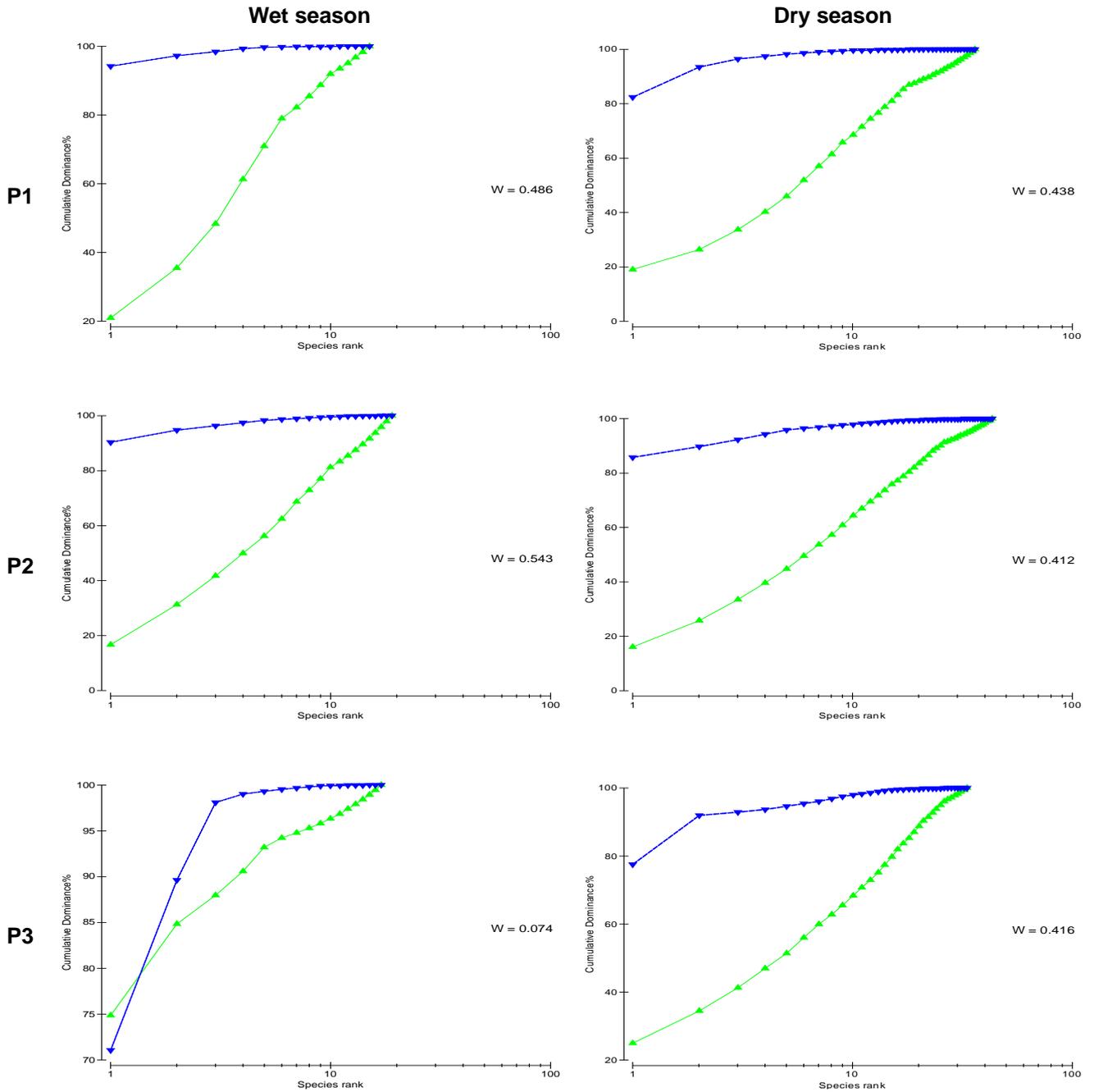
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Figure 4 Species number, site density, biomass, Shannon-Weaver Diversity Index (H'), Pielou's Species Evenness (J) and W statistic at each sampling site

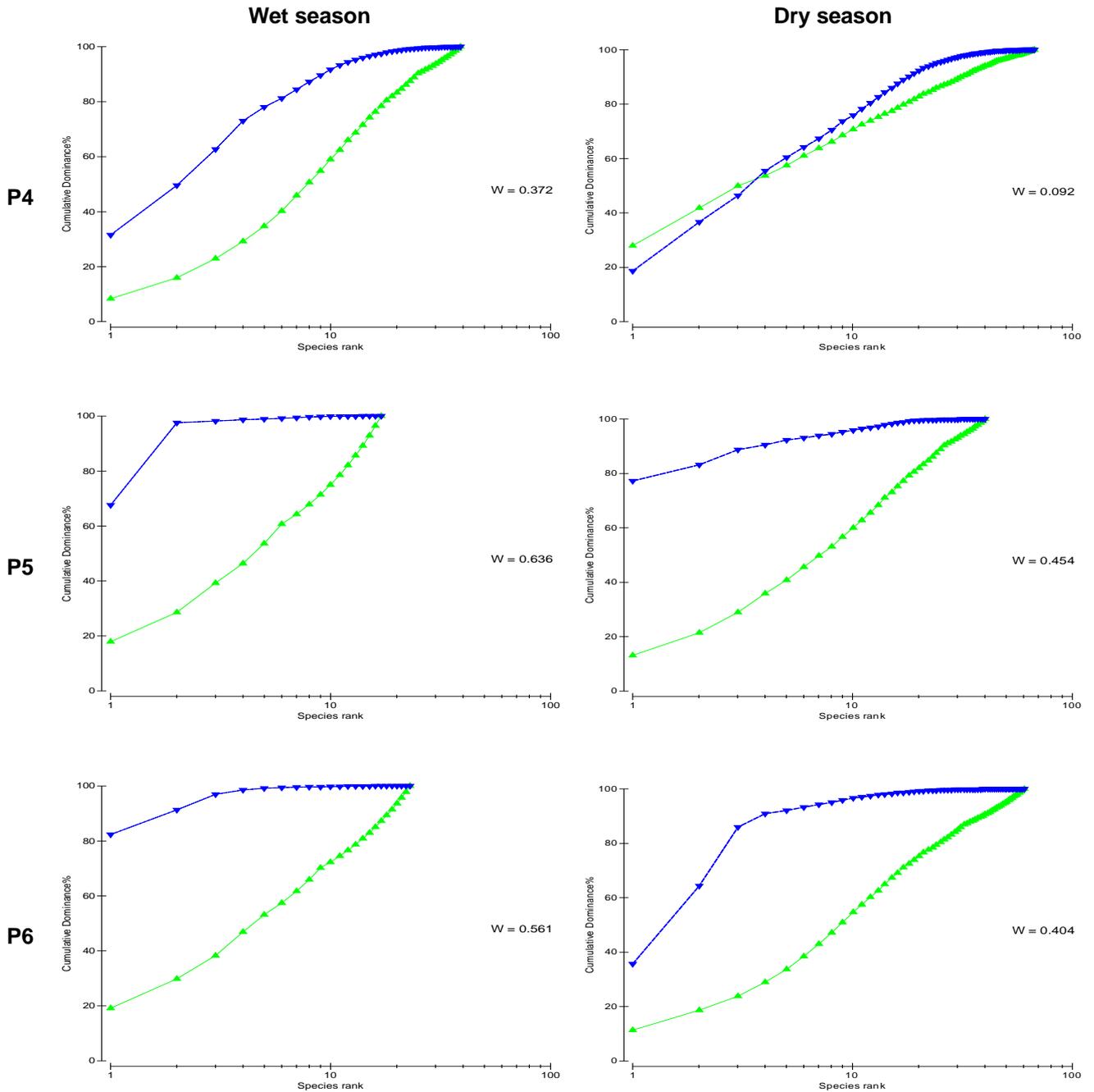


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Figure 5 ABC plots of each sampling site (blue ▼ with dotted line: biomass curve; green ▲ with solid line: abundance curve)



Improvement Dredging for Lamma Power Station Navigation Channel



(blue ▼ with dotted line: biomass curve; green ▲ with solid line: abundance curve)

2.3. Summary of Baseline Condition of Benthic Habitat

Inside-channel sites P1 to P3: the benthic communities inhabited in soft mud at all three sites. P1 and P2, closest to the coal vessel berthing pier, were similar in biological parameters. The benthic communities were characterized of low-moderate species number, moderate site density, diversity index and species evenness in the wet season sampling. Due to recruitment of benthic fauna as mentioned, increases of species number, site density and diversity index were clear. Relatively P3, farther from coal vessel berthing pier, was characterized of low-moderate species number and high site density in the wet season sampling. But such high site density was mainly accounted by one small-sized bivalve *Timoclea lionota* resulting in low diversity index and species evenness. There was so far no information about the ecological characteristics of this bivalve species. Another bivalve species of same genus, *Timoclea ovata*, had been reported a sensitive species present under unpolluted conditions (Borja *et al.*, 2000; Carvalho *et al.*, 2006). However it had also been reported a species tolerant to slightly stressed condition (Simboura and Zenetos, 2002). Sampling site P3 was occasionally dredged while the water quality and sediment quality were normal in general. It was believed that *Timoclea lionota* adopted similar living mode as *Timoclea ovata*, being a tolerant species present in unpolluted or slightly disturbed condition. In the dry season sampling, this bivalve species was no longer found at P3 that might indicate *r*-selected life strategy. And the biological parameters of P3 became similar to P1 and P2.

Outside-channel sites P4 to P6, in the vicinity: the benthic community at P4 inhabited in heterogeneous mixture of coarse sand, fine sand and soft mud at shallower depth. It was characterized of high-very high species number and site density regardless of seasons. Even species distribution led to high diversity index and species evenness. The benthic communities inhabited in soft mud at P5 and P6. It was characterized of low-moderate species number and site density while the diversity index and species evenness were at moderate level in the wet season sampling. Due to recruitment of benthic fauna as mentioned, increases of species number, site density and diversity index were clear.

There was no clear difference between inside-channel and outside-channel sites. The benthic communities were healthy without environmental stress in the survey area based on positive *W*-statistic values. The biodiversity was usually higher in more heterogeneous sediment texture (i.e. P4).

Between the wet and dry season samplings, polychaete *Prionospio ehlersi* was more common and abundant in the survey area while polychaete *Prionospio malmgreni* was highly abundant at P4. This polychaete genus was reported as opportunistic fauna proliferating in organic-enriched sediments (Borja *et al.*, 2000, Cheung *et al.*, 2008). The accumulation of organic matter from Pearl River discharge during wet season might favour the colonization of these polychaetes. It might also account for the mild odour of hydrogen sulphite detected from P1 and P5 sediments. However it posed no significant threat to the benthic communities based on increased species number, site density and biodiversity index.

2.4. Comparison of biodiversity

The benthic community was spatially divided into four groups in Hong Kong waters (Tolo Harbour, Eastern and Southern waters, Victoria Harbour, Deep Bay) (Shin *et al.*, 2004) according to a territory-wide survey conducted by CPSL (2002). Waters of 'Eastern and Southern waters' group was characterized as unpolluted while that of other groups suffered from long-term sewage pollution (details see EPD, 2006). **Table 8** shows the mean *H'* and *J* of benthic communities of the four groups, present survey area and other vicinal sampling sites of previous surveys. In general, the biodiversity and species evenness of benthic communities of present survey area were similar to the unpolluted water group 'Eastern and Southern waters'. Relative to previous wet season survey conducted in 2014, both parameters were very similar. It indicated stable and normal condition at the west of Lamma Island.

Improvement Dredging for Lamma Power Station Navigation Channel

Table 8 Comparison of mean H' and J of benthic communities between present sampling sites, vicinal sampling sites and other water zones of previous studies

		Lamma Island (West)		Vicinal sampling station #39	Tolo Harbour	Eastern and Southern waters	Victoria Harbour	Deep Bay
Reference		Present survey	Survey in 2014	CPSL, 2002	Shin <i>et al.</i> , 2004			
Season								
H'	Wet	2.49	2.59	3.02	1.42	2.87	1.79	1.46
	Dry	3.19	\	3.27	1.36	2.82	1.64	2.32
	Mean	2.84	\	3.15	1.39	2.85	1.72	1.89
J	Wet	0.82	0.83	0.83	0.73	0.82	0.47	0.53
	Dry	0.84	\	0.93	0.83	0.81	0.44	0.73
	Mean	0.83	\	0.88	0.78	0.82	0.46	0.63

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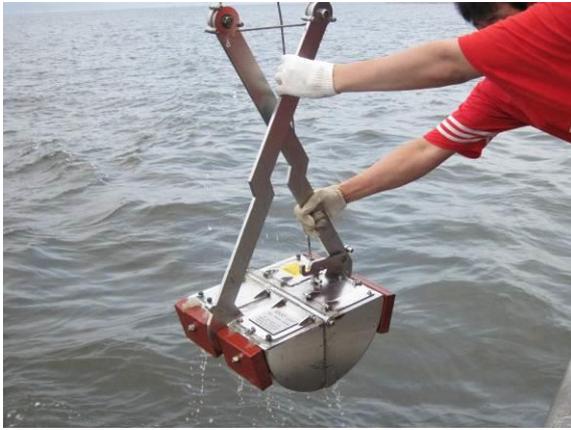
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Annex I **Photographic Records**



■ The sediment sample was collected with 0.1 m² van Veen grab



■ The collected sediments were washed with gentle seawater through a sieve stack of mesh sizes 1.0 mm and 0.5 mm.



■ The preserved macrofauna in sediment residues was sorted out in laboratory



■ Taxonomic identification was undertaken with the aid of both stereoscopic and compound microscopes.

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II List of collected specimens at each sampling site

Sampling site: P1 Sampling date: 28/09/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	B	<i>Paratapes undulatus</i>	3	16.35	5	18.97	1	3.93	9	39.25
2	B	<i>Theora lata</i>	5	0.35			3	0.12	8	0.47
3	B	<i>Timoclea lionota</i>	5	1.11			1	0.16	6	1.27
4	Ec	<i>Amphioplus lucidus</i>					8	0.37	8	0.37
5	G	<i>Nassarius olivaceus</i>	1	0.16					1	0.16
6	N	Nemertea spp.			1	0.00	1	0.00	2	0.00
7	P	<i>Aglaophamus dibranchis</i>	2	0.01	1	0.00	2	0.01	5	0.02
8	P	<i>Aglaophamus sinensis</i>	1	0.01					1	0.01
9	P	<i>Euclymene</i> sp.	1	0.01	1	0.00			2	0.01
10	P	<i>Mediomastus</i> sp.	4	0.01	3	0.01	6	0.01	13	0.03
11	P	<i>Notomastus</i> sp.					1	0.00	1	0.00
12	P	<i>Pectinaria conchilega</i>			1	0.04			1	0.04
13	P	<i>Prionospio malmgreni</i>					2	0.00	2	0.00
14	P	<i>Prionospio</i> sp.			2	0.00			2	0.00
15	P	<i>Schistomeringos rudolphi</i>	1	0.00					1	0.00
		column sum	23	18.00	14	19.03	25	4.60	62	41.63

B = Bivalve, Ec = Echinoderm, G = Gastropod, N = Nemertean, P = Polychaete

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P2 Sampling date: 28/09/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Corophium</i> sp.			1	0.00			1	0.00
2	B	<i>Paratapes undulatus</i>	3	9.40					3	9.40
3	B	<i>Tellina minuta</i>			2	0.09			2	0.09
4	B	<i>Theora lata</i>					1	0.01	1	0.01
5	B	<i>Timoclea lionota</i>					3	0.45	3	0.45
6	Ec	<i>Amphioplus lucidus</i>			2	0.05	2	0.07	4	0.12
7	Eh	<i>Thalassema sabinum</i>	1	0.02					1	0.02
8	F	<i>Bregmaceros macclellandii</i>					1	0.03	1	0.03
9	P	<i>Aglaophamus dibranchis</i>					1	0.00	1	0.00
10	P	<i>Aglaophamus sinensis</i>	3	0.09	3	0.05	1	0.03	7	0.16
11	P	<i>Glycera chirori</i>	1	0.01					1	0.01
12	P	<i>Laonice cirrata</i>	1	0.02	1	0.00			2	0.03
13	P	Maldanidae spp					1	0.01	1	0.01
14	P	<i>Mediomastus</i> sp.	1	0.01	5	0.01	2	0.01	8	0.02
15	P	<i>Ophiodromus angustifrons</i>			1	0.01			1	0.01
16	P	<i>Prionospio ehlersi</i>			1	0.00	1	0.00	2	0.00
17	P	<i>Sigambra hanaokai</i>			1	0.00	2	0.00	3	0.00
18	P	<i>Sternaspis scutata</i>	1	0.01					1	0.01
19	S	<i>Leptochela</i> sp.	1	0.01	4	0.02			5	0.03
		column sum	12	9.57	21	0.23	15	0.60	48	10.40

A = Amphipod, B = Bivalve, Ec = Echinoderm, Eh = Echiuran, F = Fish, P = Polychaete, S = Shrimp

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P3 Sampling date: 28/09/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	B	<i>Paratapes undulatus</i>					1	3.54	1	3.54
2	B	<i>Theora lata</i>			1	0.01			1	0.01
3	B	<i>Timoclea lionota</i>	11	2.57	7	1.53	125	25.56	143	29.66
4	Ec	<i>Amphioplus depressus</i>			2	0.12			2	0.12
5	Ec	<i>Amphioplus lucidus</i>	1	0.02	5	0.36			6	0.38
6	F	Muraenidae spp.					1	7.75	1	7.75
7	N	Nemertea spp.			1	0.00			1	0.00
8	P	<i>Aglaophamus dibranchis</i>					1	0.01	1	0.01
9	P	<i>Chloeia violacea</i>			1	0.06			1	0.06
10	P	<i>Cossurella dimorpha</i>			1	0.00			1	0.00
11	P	<i>Euclymene</i> sp.	1	0.01	2	0.04	2	0.05	5	0.09
12	P	<i>Linopherus paucibranchiata</i>			1	0.01			1	0.01
13	P	<i>Mediomastus</i> sp.	2	0.00	16	0.04	1	0.00	19	0.05
14	P	<i>Poecilochaetus</i> sp.	1	0.00					1	0.00
15	P	<i>Prionospio malmgreni</i>			1	0.00			1	0.00
16	S	<i>Leptochela</i> sp.	2	0.02	1	0.01	2	0.02	5	0.05
17	S	<i>Nihonotrypaea japonica</i>			1	0.00			1	0.00
		column sum	18	2.62	40	2.19	133	36.93	191	41.74

B = Bivalve, Ec = Echinoderm, F = Fish, N = Nemertean, P = Polychaete, S = Shrimp

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P4 Sampling date: 28/09/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ampelisca</i> sp.			3	0.00			3	0.00
2	B	<i>Dosinia histrio</i>			1	0.46			1	0.46
3	B	<i>Paphia gallus</i>	1	0.51	1	0.57	1	0.03	3	1.11
4	C	<i>Neoxenophthalmus obscurus</i>	1	0.08	3	0.25	4	0.31	8	0.63
5	C	<i>Portunus pulchricristatus</i>					1	0.11	1	0.11
6	C	<i>Typhlocarcinus villosus</i>			1	0.18	1	0.00	2	0.18
7	Ec	<i>Amphioplus depressus</i>			4	0.05	1	0.06	5	0.11
8	Ec	<i>Amphioplus lucidus</i>	1	0.03	1	0.00	2	0.05	4	0.08
9	Eh	<i>Arhynchite</i> sp.	1	0.00	4	0.00	4	0.01	9	0.02
10	N	Nemertea spp.	1	0.00			1	0.00	2	0.00
11	P	<i>Amphictene japonica</i>			1	0.04			1	0.04
12	P	<i>Cirriformia</i> sp.					1	0.00	1	0.00
13	P	<i>Euclymene</i> sp.			4	0.02			4	0.02
14	P	<i>Eunice indica</i>			1	0.00			1	0.00
15	P	<i>Glycera chirori</i>	2	0.05	4	0.02	2	0.03	8	0.10
16	P	<i>Glycinde gurjanovae</i>	1	0.00	1	0.00			2	0.00
17	P	<i>Harmothoe</i> sp.	2	0.00	2	0.01	2	0.01	6	0.02
18	P	<i>Laonice cirrata</i>			1	0.00			1	0.00
19	P	<i>Lumbrineris</i> sp.			1	0.00			1	0.00
20	P	<i>Lysippe</i> sp.			1	0.00			1	0.00
21	P	<i>Magelona</i> sp.	1	0.00					1	0.00
22	P	<i>Marphysa stragulum</i>	4	0.17	4	0.15	2	0.05	10	0.36
23	P	<i>Mediomastus</i> sp.	1	0.00	1	0.00			2	0.00
24	P	<i>Nectoneanthes</i> sp.					1	0.00	1	0.00
25	P	<i>Onuphis eremita</i>			1	0.00			1	0.00
26	P	<i>Paralacydonia paradox</i>					1	0.00	1	0.00
27	P	<i>Phyllodoce</i> sp.	1	0.01	1	0.00			2	0.01

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P4 Sampling date: 28/09/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
28	P	<i>Pista sp.</i>	1	0.00					1	0.00
29	P	<i>Poecilochaetus sp.</i>	2	0.00	2	0.00			4	0.01
30	P	<i>Prionospio ehlersi</i>					12	0.01	12	0.01
31	P	<i>Prionospio malmgreni</i>	1	0.00	7	0.00			8	0.01
32	P	<i>Scolecopsis sp.</i>	1	0.00					1	0.00
33	P	<i>Sternaspis scutata</i>			1	0.01	1	0.01	2	0.01
34	P	<i>Tharyx sp.</i>	2	0.00	2	0.00	2	0.00	6	0.01
35	P	<i>Thelepus sp.</i>	4	0.02	3	0.03			7	0.06
36	P	<i>Trichobranchus sp.</i>	2	0.00	2	0.00	1	0.00	5	0.01
37	S	<i>Leptochela sp.</i>			1	0.00	2	0.02	3	0.02
38	S	<i>Nihonotrypaea japonica</i>	1	0.03	1	0.05			2	0.08
39	Sp	<i>Apionsoma trichocephalus</i>	2	0.01	8	0.02	1	0.01	11	0.03
		column sum	33	0.93	68	1.88	43	0.71	144	3.52

A = Amphipod, B = Bivalve, C = Crab, Ec = Echinoderm, Eh = Echiuran, N = Nemertean, P = Polychaete, S = Shrimp, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P5 Sampling date: 28/09/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	B	<i>Paratapes undulatus</i>					3	13.48	3	13.48
2	B	<i>Theora lata</i>	1	0.00					1	0.00
3	C	<i>Macrophthalmus latreillei</i>	1	5.97					1	5.97
4	C	<i>Neoxenophthalmus obscurus</i>			1	0.03			1	0.03
5	Ec	<i>Amphioplus depressus</i>					1	0.06	1	0.06
6	Ec	<i>Amphioplus lucidus</i>	1	0.04	4	0.01			5	0.05
7	P	<i>Ehlersileanira incisa hwanghaiensis</i>	1	0.09					1	0.09
8	P	<i>Glycera chirori</i>			1	0.01			1	0.01
9	P	<i>Lumbrineris nagae</i>	1	0.01	1	0.01	1	0.04	3	0.05
10	P	<i>Mediomastus</i> sp.			1	0.00			1	0.00
11	P	<i>Ophiodromus angustifrons</i>	1	0.00					1	0.00
12	P	<i>Owenia fusiformis</i>	1	0.01	1	0.02			2	0.02
13	P	<i>Sternaspis scutata</i>					1	0.00	1	0.00
14	S	<i>Alpheus digitalis</i>					1	0.14	1	0.14
15	S	<i>Leptochela</i> sp.	1	0.02			1	0.01	2	0.03
16	S	<i>Nihonotrypaea japonica</i>			1	0.01			1	0.01
17	Sp	<i>Apionsoma trichocephalus</i>			2	0.00			2	0.00
		column sum	8	6.13	12	0.09	8	13.72	28	19.94

B = Bivalve, C = Crab, Ec = Echinoderm, P = Polychaete, S = Shrimp, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P6 Sampling date: 28/09/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ceradocus</i> sp.	1	0.00					1	0.00
2	B	<i>Orthoyoldia lepidula</i>			2	0.27			2	0.27
3	B	<i>Paratapes undulatus</i>	2	9.09	4	19.01	3	5.65	9	33.76
4	B	<i>Tellina minuta</i>	1	0.02					1	0.02
5	B	<i>Timoclea lionota</i>	4	0.66					4	0.66
6	F	Muraenidae spp.	1	3.67					1	3.67
7	G	<i>Polinices mammata</i>	1	2.32					1	2.32
8	P	<i>Aglaophamus sinensis</i>	2	0.04	1	0.02	1	0.02	4	0.08
9	P	<i>Amphictene japonica</i>	1	0.00					1	0.00
10	P	<i>Euclymene</i> sp.			1	0.00	1	0.01	2	0.02
11	P	<i>Glycera chirori</i>			2	0.00			2	0.00
12	P	<i>Laonice cirrata</i>	3	0.02	2	0.02			5	0.04
13	P	<i>Leocrates chinensis</i>	1	0.05					1	0.05
14	P	<i>Mediomastus</i> sp.			1	0.00			1	0.00
15	P	<i>Owenia fusiformis</i>	1	0.02					1	0.02
16	P	<i>Poecilochaetus</i> sp.	2	0.03	1	0.00			3	0.03
17	P	<i>Prionospio malmgreni</i>			1	0.00			1	0.00
18	P	<i>Samytha</i> sp.			1	0.00			1	0.00
19	P	<i>Sigambra hanaokai</i>			1	0.00			1	0.00
20	P	<i>Thelepus</i> sp.	1	0.01					1	0.01
21	S	<i>Alpheus digitalis</i>	1	0.02			1	0.03	2	0.05
22	S	<i>Leptocheila</i> sp.			1	0.00			1	0.00
23	Sp	<i>Apionsoma trichocephalus</i>			1	0.00			1	0.00
		column sum	22	15.95	19	19.33	6	5.72	47	41.00

A = Amphipod, B = Bivalve, F = Fish, G = Gastropod, P = Polychaete, S = Shrimp, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P1 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ampelisca</i> sp.			2	0.00	2	0.00	4	0.00
2	A	<i>Idunella curvidactyla</i>			1	0.00			1	0.00
3	B	<i>Barbatia</i> sp.	1	0.01					1	0.01
4	B	<i>Paratapes undulatus</i>	3	18.46	3	13.31	2	9.57	8	41.34
5	B	<i>Saccella cuspidata</i>	6	0.08	2	0.04	2	0.05	10	0.18
6	C	<i>Neoxenophthalmus obscurus</i>	3	0.14	1	0.01	2	0.05	6	0.20
7	Ec	<i>Amphiodia obtecta</i>	6	0.09	3	0.06	1	0.00	10	0.15
8	Ec	<i>Amphioplus</i> sp.			2	0.01	1	0.02	3	0.03
9	F	<i>Paratrypauchen microcephalus</i>	1	1.51					1	1.51
10	G	<i>Eocylichna musashiensis</i>	4	0.03	3	0.03			7	0.06
11	G	<i>Monotygma</i> sp.	2	0.02	4	0.02			6	0.03
12	G	<i>Murex trapa</i>			1	5.59			1	5.59
13	G	<i>Nassarius siquijorensis</i>					1	0.53	1	0.53
14	G	<i>Tanea tenuipicta</i>			1	0.09			1	0.09
15	G	<i>Turricula nelliae spuria</i>	1	0.33					1	0.33
16	N	Nemertea spp.			5	0.02	3	0.01	8	0.03
17	P	<i>Aglaophamus dibranchis</i>	1	0.00			3	0.01	4	0.01
18	P	<i>Aglaophamus sinensis</i>	2	0.02			1	0.00	3	0.02
19	P	<i>Anobothrus</i> sp.			1	0.00			1	0.00
20	P	<i>Bhawania brevis</i>	1	0.00			2	0.00	3	0.00
21	P	<i>Chaetozone</i> sp.			1	0.01			1	0.01
22	P	<i>Cirriformia</i> sp.					1	0.00	1	0.00
23	P	<i>Cossurella dimorpha</i>	1	0.00					1	0.00
24	P	<i>Decamastus</i> sp.	2	0.00	1	0.00			3	0.00
25	P	<i>Glycera</i> sp.					1	0.00	1	0.00
26	P	<i>Glycinde gurjanovae</i>	1	0.00					1	0.00
27	P	<i>Lumbrineris shiinoi</i>	1	0.00	1	0.00			2	0.01

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P1 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
28	P	<i>Lumbrineris</i> sp.	1	0.03					1	0.03
29	P	Maldanidae spp					1	0.00	1	0.00
30	P	<i>Mediomastus</i> sp.	1	0.00	2	0.01	1	0.00	4	0.01
31	P	<i>Notomastus</i> sp.					1	0.00	1	0.00
32	P	<i>Otopsis</i> sp.			1	0.00			1	0.00
33	P	<i>Prionospio ehlersi</i>	5	0.00	14	0.02	7	0.01	26	0.03
34	P	<i>Prionospio</i> sp.					1	0.00	1	0.00
35	P	<i>Schistomeringos rudolphi</i>	3	0.00					3	0.00
36	P	<i>Sigambra hanaokai</i>	3	0.00	3	0.00	3	0.00	9	0.00
		column sum	49	20.75	52	19.19	36	10.26	137	50.20

A = Amphipod, B = Bivalve, C = Crab, Ec = Echinoderm, F = Fish, G = Gastropod, N = Nemertean, P = Polychaete

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P2 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ampelisca</i> sp.			9	0.00			9	0.00
2	B	<i>Paratapes undulatus</i>			2	6.96	1	4.99	3	11.95
3	B	<i>Saccella cuspidata</i>	5	0.21	4	0.14	10	0.21	19	0.56
4	C	<i>Neoxenophthalmus obscurus</i>	2	0.03			1	0.05	3	0.07
5	C	<i>Pinnixa penultipedalis</i>			1	0.02			1	0.02
6	C	<i>Scalopidia spinosipes</i>			1	0.37			1	0.37
7	Ec	<i>Amphiodia obtecta</i>	4	0.11	2	0.01	6	0.12	12	0.23
8	Ec	<i>Amphioplus lucidus</i>					3	0.04	3	0.04
9	Ec	<i>Amphioplus</i> sp.	1	0.03			6	0.02	7	0.04
10	G	<i>Acrilla acuminata</i>			1	0.00	3	0.01	4	0.01
11	G	<i>Eocylichna musashiensis</i>	3	0.01	2	0.02			5	0.04
12	G	<i>Monotyigma</i> sp.			2	0.02	1	0.00	3	0.02
13	G	<i>Tanea tenuipicta</i>					1	0.01	1	0.01
14	N	Nemertea spp.	1	0.00	3	0.00	6	0.25	10	0.26
15	P	<i>Aglaophamus dibranchis</i>					3	0.01	3	0.01
16	P	<i>Aglaophamus sinensis</i>					1	0.05	1	0.05
17	P	<i>Aricidea</i> sp.			1	0.00			1	0.00
18	P	<i>Bhawania brevis</i>	2	0.00			1	0.00	3	0.00
19	P	<i>Cirriformia</i> sp.			1	0.00	1	0.00	2	0.00
20	P	<i>Cossurella dimorpha</i>	1	0.00	1	0.00	1	0.00	3	0.00
21	P	<i>Decamastus</i> sp.	3	0.00	2	0.00	2	0.00	7	0.01
22	P	<i>Ehlersileanira incisa hwanghaiensis</i>					1	0.01	1	0.01
23	P	<i>Eteone</i> sp.			1	0.00			1	0.00
24	P	<i>Glycinde gurjanovae</i>	1	0.00					1	0.00
25	P	<i>Harmothoe</i> sp.					1	0.00	1	0.00
26	P	<i>Laonice cirrata</i>	2	0.07					2	0.07
27	P	<i>Linopherus paucibranchiata</i>	1	0.00					1	0.00

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P2 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
28	P	<i>Lumbrineris shiinoi</i>					1	0.00	1	0.00
29	P	<i>Magelona</i> sp.	1	0.00					1	0.00
30	P	<i>Mediomastus</i> sp.			4	0.01	3	0.00	7	0.01
31	P	<i>Micronephtys sphaerocirrata</i>	1	0.00	2	0.00	1	0.00	4	0.00
32	P	<i>Notomastus</i> sp.			1	0.00			1	0.00
33	P	<i>Ophiodromus angustifrons</i>	1	0.00	1	0.00	2	0.00	4	0.00
34	P	<i>Otopsis</i> sp.			1	0.00			1	0.00
35	P	<i>Poecilochaetus</i> sp.					1	0.00	1	0.00
36	P	<i>Polydora</i> sp.			1	0.00			1	0.00
37	P	<i>Prionospio ehlersi</i>	13	0.01	9	0.01	9	0.01	31	0.03
38	P	<i>Prionospio malmgreni</i>			6	0.01	2	0.00	8	0.01
39	P	<i>Sigambra hanaokai</i>	1	0.00	3	0.00	11	0.01	15	0.01
40	S	<i>Alpheus</i> sp.					2	0.01	2	0.01
41	S	<i>Betaeus</i> sp.			1	0.05			1	0.05
42	Sc	Dentaliidae spp.	1	0.01			2	0.02	3	0.03
43	Sp	<i>Apionsoma trichocephalus</i>	3	0.00	1	0.00	1	0.00	5	0.00
		column sum	47	0.50	63	7.64	84	5.81	194	13.95

A = Amphipod, B = Bivalve, C = Crab, Ec = Echinoderm, G = Gastropod, N = Nemertean, P = Polychaete, , S = Shrimp, Sc = Scaphopod, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P3 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ampelisca</i> sp.	1	0.00			1	0.00	2	0.00
2	A	<i>Idunella curvidactyla</i>					1	0.00	1	0.00
3	B	<i>Paratapes undulatus</i>	1	5.71	1	4.18	1	1.00	3	10.90
4	B	<i>Saccella cuspidata</i>	1	0.02	1	0.02	3	0.09	5	0.13
5	B	<i>Solen dunkerianus</i>			1	0.11			1	0.11
6	B	<i>Tellina minuta</i>	9	1.50	1	0.36	2	0.18	12	2.03
7	C	<i>Neoxenophthalmus obscurus</i>	3	0.07	1	0.02	3	0.03	7	0.11
8	C	<i>Scalopidia spinosipes</i>	1	0.01	1	0.01	2	0.06	4	0.08
9	Ec	<i>Amphiodia obtecta</i>			2	0.03			2	0.03
10	Ec	<i>Amphioplus intermedius</i>			2	0.00			2	0.00
11	Ec	<i>Amphioplus</i> sp.			3	0.01			3	0.01
12	G	<i>Eocylichna musashiensis</i>			2	0.01	2	0.01	4	0.02
13	G	<i>Monotygya</i> sp.	17	0.06					17	0.06
14	N	Nemertea spp.	3	0.02	1	0.00	4	0.04	8	0.07
15	P	<i>Aglaophamus dibranchis</i>			2	0.00	1	0.01	3	0.01
16	P	<i>Aglaophamus sinensis</i>					1	0.03	1	0.03
17	P	<i>Cossurella dimorpha</i>			1	0.00	1	0.00	2	0.00
18	P	<i>Decamastus</i> sp.	2	0.00	6	0.00	2	0.00	10	0.01
19	P	<i>Glycinde gurjanovae</i>			1	0.00			1	0.00
20	P	<i>Laonice cirrata</i>	2	0.05	1	0.08			3	0.13
21	P	<i>Linopherus paucibranchiata</i>	2	0.00	3	0.12			5	0.12
22	P	<i>Lumbrineris shiinoi</i>	1	0.10	1	0.00			2	0.11
23	P	<i>Mediomastus</i> sp.			3	0.00	1	0.00	4	0.01
24	P	<i>Ophiodromus angustifrons</i>	2	0.00	2	0.00	1	0.00	5	0.00
25	P	<i>Otopsis</i> sp.	1	0.00	1	0.00	1	0.00	3	0.00
26	P	<i>Prionospio ehlersi</i>	13	0.01	14	0.01	17	0.02	44	0.04
27	P	<i>Prionospio malmgreni</i>	4	0.00					4	0.00

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P3 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
28	P	<i>Samytha</i> sp.			1	0.01			1	0.01
29	P	<i>Schistomeringos rudolphi</i>			2	0.00	2	0.00	4	0.00
30	P	<i>Sigambra hanaokai</i>	2	0.00	2	0.00	4	0.00	8	0.00
31	P	<i>Sternaspis scutata</i>			1	0.00			1	0.00
32	S	<i>Processa japonica</i>			1	0.01			1	0.01
33	Sc	Dentaliidae spp.	2	0.03			2	0.01	4	0.04
		column sum	67	7.59	58	4.99	52	1.49	177	14.07

A = Amphipod, B = Bivalve, C = Crab, Ec = Echinoderm, G = Gastropod, N = Nemertean, P = Polychaete, S = Shrimp, Sc = Scaphopod

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P4 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ampelisca</i> sp.	4	0.00	1	0.00	3	0.00	8	0.00
2	A	Amphipod spp.			1	0.00			1	0.00
3	A	<i>Ceradocus</i> sp.	3	0.00					3	0.00
4	A	<i>Cheiriphotis</i> sp.			5	0.00	1	0.00	6	0.00
5	B	<i>Cryptopecten bullatus</i>	1	0.06					1	0.06
6	B	<i>Diplodonta sowerbyi</i>			7	0.08			7	0.08
7	B	<i>Saccella cuspidata</i>	1	0.06			2	0.05	3	0.11
8	B	<i>Tellina minuta</i>	4	0.01	1	0.05	1	0.01	6	0.08
9	C	<i>Charybdis natator</i>			1	0.02			1	0.02
10	C	<i>Goneplax</i> sp.	1	0.10			1	0.07	2	0.17
11	C	<i>Hexapinus granuliferus</i>	3	0.02					3	0.02
12	C	<i>Neoxenophthalmus obscurus</i>	1	0.04	2	0.19			3	0.23
13	C	<i>Pinnixa penultipedalis</i>			1	0.01			1	0.01
14	C	<i>Raphidopus ciliatus</i>			1	0.01	3	0.09	4	0.10
15	C	<i>Scalopidia spinosipes</i>			2	0.37	3	0.48	5	0.85
16	C	<i>Typhlocarcinus villosus</i>	1	0.10	1	0.01			2	0.11
17	C	Unidentified juvenile crab	5	0.00			1	0.00	6	0.00
18	Cu	<i>Eocuma</i> sp.					1	0.00	1	0.00
19	Ec	<i>Amphioplus depressus</i>			1	0.34	1	0.08	2	0.42
20	Ec	<i>Amphioplus laevis</i>	2	0.01	1	0.10			3	0.10
21	Ec	<i>Amphioplus</i> sp.	1	0.01	2	0.00			3	0.02
22	Ec	<i>Salmacis sphaeroides</i>	1	0.00					1	0.00
23	G	<i>Calyptrea</i> sp.	3	0.02					3	0.02
24	G	<i>Eocylichna musashiensis</i>			2	0.02	1	0.00	3	0.02
25	G	<i>Monotygya</i> sp.	1	0.01					1	0.01
26	Le	<i>Nebalia</i> sp.					1	0.00	1	0.00
27	N	Nemertea spp.	3	0.01	6	0.01			9	0.02

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P4 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
28	P	<i>Aglaophamus dibranchis</i>			4	0.00	1	0.00	5	0.00
29	P	<i>Aonides oxycephala</i>	1	0.00					1	0.00
30	P	<i>Cirriformia</i> sp.	12	0.01	19	0.01	12	0.01	43	0.03
31	P	<i>Decamastus</i> sp.	2	0.00					2	0.00
32	P	<i>Ehlersileanira incisa hwanghaiensis</i>	1	0.01					1	0.01
33	P	<i>Eteone</i> sp.			3	0.00			3	0.00
34	P	<i>Glycera chirori</i>	5	0.02	4	0.01	4	0.00	13	0.03
35	P	<i>Glycinde gurjanovae</i>	1	0.00	3	0.01	2	0.00	6	0.01
36	P	<i>Harmothoe</i> sp.	9	0.03	3	0.00	7	0.02	19	0.05
37	P	<i>Laonice cirrata</i>					1	0.01	1	0.01
38	P	<i>Linopherus paucibranchiata</i>	1	0.00					1	0.00
39	P	<i>Loimia</i> sp.	1	0.01					1	0.01
40	P	<i>Lumbrineris shiinoi</i>			4	0.00	1	0.00	5	0.00
41	P	<i>Lysidice ninetta</i>			1	0.00	1	0.00	2	0.00
42	P	<i>Lysippe</i> sp.	1	0.00			1	0.00	2	0.00
43	P	<i>Magelona</i> sp.			3	0.00	1	0.00	4	0.00
44	P	Maldanidae spp.			1	0.00			1	0.00
45	P	<i>Marphysa stragulum</i>	8	0.23	9	0.15	3	0.06	20	0.44
46	P	<i>Mediomastus</i> sp.	5	0.00	8	0.00	7	0.00	20	0.01
47	P	<i>Nectoneanthes</i> sp.			2	0.00	2	0.00	4	0.01
48	P	<i>Notomastus</i> sp.	4	0.02	10	0.04	1	0.00	15	0.07
49	P	<i>Onuphis eremita</i>	8	0.09	4	0.05			12	0.14
50	P	<i>Ophelina acuminata</i>					1	0.01	1	0.01
51	P	<i>Otopsis</i> sp.					2	0.00	2	0.00
52	P	<i>Owenia fusiformis</i>					1	0.00	1	0.00
53	P	<i>Paralacydonia paradox</i>			1	0.00	1	0.00	2	0.00
54	P	<i>Pectinaria conchilega</i>					1	0.83	1	0.83
55	P	<i>Phyllodoce</i> sp.			1	0.00			1	0.00

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P4 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
56	P	<i>Phylo ornatus</i>					2	0.00	2	0.00
57	P	<i>Poecilochaetus</i> sp.	5	0.01	6	0.01	1	0.00	12	0.02
58	P	<i>Prionospio malmgreni</i>	9	0.00	115	0.03	25	0.01	149	0.05
59	P	<i>Scalibregma inflatum</i>					1	0.00	1	0.00
60	P	<i>Scolecopsis</i> sp.	1	0.01					1	0.01
61	P	<i>Sigambra hanaokai</i>	1	0.00	2	0.00			3	0.00
62	P	<i>Sternaspis scutata</i>			1	0.01			1	0.01
63	P	<i>Thelepus</i> sp.	3	0.04	1	0.11	2	0.00	6	0.15
64	S	<i>Alpheus</i> sp.					2	0.01	2	0.01
65	S	<i>Nihonotrypaea japonica</i>	1	0.00	2	0.06			3	0.06
66	S	Penaeidae spp.			1	0.15			1	0.15
67	Sp	<i>Apionsoma trichocephalus</i>	58	0.05	4	0.00	12	0.01	74	0.05
		column sum	172	0.96	247	1.85	114	1.75	533	4.56

A = Amphipod, B = Bivalve, C = Crab, Cu = Cumaeon, Ec = Echinoderm, G = Gastropod, Le = Leptostracan, N = Nemertean,
P = Polychaete, S = Shrimp, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P5 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ampelisca</i> sp.	1	0.00					1	0.00
2	B	<i>Anodontia</i> sp.			1	0.00			1	0.00
3	B	<i>Corbula venusta</i>	1	0.02	2	0.01			3	0.03
4	B	<i>Paratapes undulatus</i>	1	7.30					1	7.30
5	B	<i>Saccula cuspidata</i>	5	0.23	9	0.23	5	0.11	19	0.57
6	B	<i>Tellina minuta</i>			1	0.01	1	0.16	2	0.17
7	C	<i>Eucrate</i> sp.			1	0.00			1	0.00
8	C	<i>Neoxenophthalmus obscurus</i>	2	0.18	2	0.08	3	0.27	7	0.53
9	C	<i>Pinnixa penultipedalis</i>					2	0.05	2	0.05
10	C	<i>Scalopidia spinosipes</i>	1	0.00	1	0.04			2	0.04
11	Ec	<i>Amphiodia obtecta</i>	4	0.05	1	0.00	5	0.11	10	0.16
12	Ec	<i>Amphioplus lucidus</i>	2	0.01			1	0.05	3	0.06
13	Ec	<i>Amphioplus</i> sp.	2	0.02	1	0.01	2	0.01	5	0.03
14	F	<i>Bregmaceros atlanticus</i>			1	0.06			1	0.06
15	G	<i>Eocylichna musashiensis</i>	1	0.00	4	0.05			5	0.05
16	G	<i>Monotygia</i> sp.	1	0.00	10	0.04	1	0.00	12	0.04
17	N	Nemertea spp.					4	0.01	4	0.01
18	P	<i>Aglaophamus dibranchis</i>	3	0.00	1	0.00	2	0.00	6	0.01
19	P	<i>Aglaophamus sinensis</i>			1	0.04			1	0.04
20	P	<i>Bhawania brevis</i>			1	0.00			1	0.00
21	P	<i>Cossurella dimorpha</i>	2	0.00	1	0.00			3	0.00
22	P	<i>Decamastus</i> sp.	3	0.00			1	0.00	4	0.00
23	P	<i>Eteone</i> sp.					1	0.00	1	0.00
24	P	<i>Glycera chirori</i>	1	0.01	1	0.03			2	0.04
25	P	<i>Laonice cirrata</i>	4	0.07					4	0.07
26	P	<i>Linopherus paucibranchiata</i>	1	0.03	6	0.06			7	0.09
27	P	<i>Lumbrineris shiinoi</i>			1	0.00	1	0.00	2	0.00

Improvement Dredging for Lamna Power Station Navigation Channel

Sampling site: P5 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
28	P	<i>Magelona</i> sp.	1	0.00	2	0.00			3	0.01
29	P	<i>Mediomastus</i> sp.	1	0.00			1	0.00	2	0.00
30	P	<i>Micronephtys sphaerocirrata</i>	2	0.00					2	0.00
31	P	<i>Notomastus</i> sp.					1	0.00	1	0.00
32	P	<i>Otopsis</i> sp.			1	0.00			1	0.00
33	P	<i>Paralacydonia paradox</i>					1	0.00	1	0.00
34	P	<i>Prionospio ehlersi</i>	3	0.00	5	0.00	3	0.00	11	0.00
35	P	<i>Schistomeringos rudolphi</i>			1	0.00			1	0.00
36	P	<i>Sigambra hanaokai</i>	1	0.00	3	0.00			4	0.00
37	S	<i>Alpheus digitalis</i>			1	0.06			1	0.06
38	S	<i>Processa japonica</i>	1	0.00	1	0.01			2	0.01
39	Sc	Dentaliidae spp.	1	0.00					1	0.00
40	Sp	<i>Apionsoma trichocephalus</i>	5	0.01					5	0.01
		column sum	50	7.95	60	0.73	35	0.78	145	9.46

A = Amphipod, B = Bivalve, C = Crab, Ec = Echinoderm, F = Fish, G = Gastropod, N = Nemertean, P = Polychaete, , S = Shrimp, Sc = Scaphopod, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex II (Cont'd) List of collected specimens at each sampling site

Sampling site: P6 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
1	A	<i>Ampelisca</i> sp.			2	0.00			2	0.00
2	A	<i>Ceradocus</i> sp.	1	0.00					1	0.00
3	B	<i>Paratapes undulatus</i>			1	5.20			1	5.20
4	B	<i>Saccella cuspidata</i>	1	0.07	1	0.00			2	0.07
5	B	<i>Tellina minuta</i>	1	0.08	2	0.22			3	0.31
6	C	<i>Eucrate</i> sp.					1	0.02	1	0.02
7	C	<i>Goneplax</i> sp.			1	0.00			1	0.00
8	C	<i>Hexapinus granuliferus</i>			1	0.06			1	0.06
9	C	<i>Neoxenophthalmus obscurus</i>	3	0.09	1	0.11	2	0.00	6	0.20
10	Cu	<i>Eocuma</i> sp.					1	0.00	1	0.00
11	Ec	<i>Amphiodia obtecta</i>					1	0.00	1	0.00
12	Ec	<i>Amphioplus laevis</i>	3	0.01	5	0.10	1	0.00	9	0.11
13	Ec	<i>Amphioplus lucidus</i>					1	0.00	1	0.00
14	Ec	<i>Amphioplus</i> sp.			1	0.01	1	0.00	2	0.02
15	F	<i>Oxyurichthys</i> sp.	1	0.29					1	0.29
16	G	<i>Eocylichna musashiensis</i>	1	0.02					1	0.02
17	G	<i>Monotygma</i> sp.	4	0.01					4	0.01
18	G	<i>Murex trapa</i>	1	6.94					1	6.94
19	G	<i>Nassarius siquijorensis</i>					1	1.18	1	1.18
20	G	<i>Turricula javana</i>	1	8.60					1	8.60
21	G	<i>Turricula nelliae spuria</i>			1	0.17			1	0.17
22	N	Nemertea spp.	4	0.00	3	0.00	3	0.00	10	0.01
23	P	<i>Aglaophamus dibranchis</i>	2	0.00	5	0.00	1	0.00	8	0.01
24	P	<i>Aglaophamus sinensis</i>	1	0.01	4	0.06	1	0.03	6	0.10
25	P	<i>Aricidea</i> sp.	1	0.00					1	0.00
26	P	<i>Bhawania brevis</i>	1	0.00	2	0.00	1	0.00	4	0.01
27	P	<i>Capitella</i> sp.	1	0.00	1	0.00			2	0.00

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P6 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
28	P	<i>Chaetozone</i> sp.	2	0.00	1	0.00			3	0.00
29	P	<i>Cossurella dimorpha</i>	1	0.00			1	0.00	2	0.00
30	P	<i>Decamastus</i> sp.	1	0.00	1	0.00	6	0.01	8	0.01
31	P	<i>Glycera chirori</i>	1	0.00			2	0.01	3	0.01
32	P	<i>Glycinde gurjanovae</i>	1	0.00					1	0.00
33	P	<i>Harmothoe</i> sp.			1	0.00			1	0.00
34	P	<i>Laonice cirrata</i>	3	0.01	2	0.00	11	0.22	16	0.23
35	P	<i>Linopherus paucibranchiata</i>	1	0.00			1	0.00	2	0.00
36	P	<i>Loimia</i> sp.			1	0.02			1	0.02
37	P	<i>Lumbrineris nagae</i>			1	0.03			1	0.03
38	P	<i>Lumbrineris shiinoi</i>			1	0.00			1	0.00
39	P	<i>Magelona</i> sp.	1	0.00			2	0.00	3	0.00
40	P	Maldanidae spp.	1	0.00	6	0.03	4	0.04	11	0.08
41	P	<i>Marphysa stragulum</i>					2	0.04	2	0.04
42	P	<i>Mediomastus</i> sp.					1	0.00	1	0.00
43	P	<i>Micronephtys sphaerocirrata</i>			1	0.00	1	0.00	2	0.00
44	P	<i>Notomastus</i> sp.					1	0.00	1	0.00
45	P	<i>Ophelina acuminata</i>			1	0.17	1	0.01	2	0.18
46	P	<i>Ophiodromus angustifrons</i>			1	0.00			1	0.00
47	P	<i>Otopsis</i> sp.			1	0.00	1	0.00	2	0.00
48	P	<i>Paralacydonia paradox</i>			2	0.00			2	0.00
49	P	<i>Piromis congoensis</i>	1	0.04					1	0.04
50	P	<i>Poecilochaetus</i> sp.			1	0.00			1	0.00
51	P	<i>Polydora</i> sp.					1	0.00	1	0.00
52	P	<i>Prionospio ehlersi</i>	4	0.00	8	0.00	12	0.01	24	0.01
53	P	<i>Prionospio malmgreni</i>	3	0.00	6	0.00	1	0.00	10	0.00
54	P	<i>Schistomeringos rudolphi</i>			4	0.00	1	0.00	5	0.00
55	P	<i>Sigambra hanaokai</i>	5	0.00	4	0.00	1	0.00	10	0.01

Improvement Dredging for Lamma Power Station Navigation Channel

Sampling site: P6 Sampling date: 20/12/2015										
No	Group	Species	1		2		3		row sum	
			ind.	wt.	ind.	wt.	ind.	wt.	ind.	wt.
56	P	<i>Sternaspis scutata</i>	1	0.00	4	0.01			5	0.01
57	Pl	Platyhelminthes spp.	1	0.00					1	0.00
58	Sc	Dentaliidae spp.	1	0.00	1	0.02	3	0.02	5	0.04
59	Sp	<i>Apionsoma trichocephalus</i>	1	0.00	7	0.00	3	0.01	11	0.01
60	Sp	<i>Phascolosoma esculenta</i>					1	0.05	1	0.05
		column sum	56	16.21	86	6.24	72	1.67	214	24.12

A = Amphipod, B = Bivalve, C = Crab, Cu = Cumaeen, Ec = Echinoderm, F = Fish, G = Gastropod, N = Nemertean, P = Polychaete, PI = Platyhelminthes, Sc = Scaphopod, Sp = Sipunculan

ind. = no. of individual / 0.1 m²; wt. = wet weight, g / 0.1 m²

wt = 0.00 g / 0.1 m² : The specimen with total biomass less than 0.01 g / 0.1 m²

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III Taxonomic resolution of each collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Annelida	Polychaeta	Amphinomida	Amphinomidae	<i>Chloeia violacea</i>
Animalia	Annelida	Polychaeta	Amphinomida	Amphinomidae	<i>Linopherus paucibranchiata</i>
Animalia	Annelida	Polychaeta	Eunicida	Dorvilleidae	<i>Schistomeringos rudolphi</i>
Animalia	Annelida	Polychaeta	Eunicida	Eunicidae	<i>Eunice indica</i>
Animalia	Annelida	Polychaeta	Eunicida	Eunicidae	<i>Lysidice ninetta</i>
Animalia	Annelida	Polychaeta	Eunicida	Eunicidae	<i>Marphysa stragulum</i>
Animalia	Annelida	Polychaeta	Eunicida	Lumbrineridae	<i>Lumbrineris nagae</i>
Animalia	Annelida	Polychaeta	Eunicida	Lumbrineridae	<i>Lumbrineris shiinoi</i>
Animalia	Annelida	Polychaeta	Eunicida	Lumbrineridae	<i>Lumbrineris sp.</i>
Animalia	Annelida	Polychaeta	Eunicida	Onuphidae	<i>Onuphis eremita</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Chrysopetalidae	<i>Bhawania brevis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Glyceridae	<i>Glycera chirori</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Glyceridae	<i>Glycera sp.</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Goniadidae	<i>Glycinde gurjanovae</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Hesionidae	<i>Leocrates chinensis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Hesionidae	<i>Ophiodromus angustifrons</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	<i>Paralacydonia paradox</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Nephtyidae	<i>Aglaophamus dibranchis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Nephtyidae	<i>Aglaophamus sinensis</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Nephtyidae	<i>Micronephtys sphaerocirrata</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Nereididae	<i>Nectoneanthes sp.</i>

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III (Cont'd) Taxonomic resolution of each collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	<i>Eteone</i> sp.
Animalia	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	<i>Phyllodoce</i> sp.
Animalia	Annelida	Polychaeta	Phyllodocida	Pilargidae	<i>Otopsis</i> sp.
Animalia	Annelida	Polychaeta	Phyllodocida	Pilargidae	<i>Sigambra hanaokai</i>
Animalia	Annelida	Polychaeta	Phyllodocida	Polynoidae	<i>Harmothoe</i> sp.
Animalia	Annelida	Polychaeta	Phyllodocida	Sigalionidae	<i>Ehlersileanira incisa hwanghaiensis</i>
Animalia	Annelida	Polychaeta	Sabellida	Oweniidae	<i>Owenia fusiformis</i>
Animalia	Annelida	Polychaeta	Spionida	Magelonidae	<i>Magelona</i> sp.
Animalia	Annelida	Polychaeta	Spionida	Poecilochaetidae	<i>Poecilochaetus</i> sp.
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Aonides oxycephala</i>
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Laonice cirrata</i>
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Polydora</i> sp.
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Prionospio ehlersi</i>
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Prionospio malmgreni</i>
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Prionospio</i> sp.
Animalia	Annelida	Polychaeta	Spionida	Spionidae	<i>Scolecopsis</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Ampharetidae	<i>Anobothrus</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Ampharetidae	<i>Lysippe</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Ampharetidae	<i>Samytha</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Cirratulidae	<i>Chaetozone</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Cirratulidae	<i>Cirriformia</i> sp.

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III (Cont'd) Taxonomic resolution of each collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Annelida	Polychaeta	Terebellida	Cirratulidae	<i>Tharyx</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Flabelligeridae	<i>Piromis congoensis</i>
Animalia	Annelida	Polychaeta	Terebellida	Pectinariidae	<i>Amphictene japonica</i>
Animalia	Annelida	Polychaeta	Terebellida	Pectinariidae	<i>Pectinaria conchilega</i>
Animalia	Annelida	Polychaeta	Terebellida	Sternaspidae	<i>Sternaspis scutata</i>
Animalia	Annelida	Polychaeta	Terebellida	Terebellidae	<i>Loimia</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Terebellidae	<i>Pista</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Terebellidae	<i>Thelepus</i> sp.
Animalia	Annelida	Polychaeta	Terebellida	Trichobranchidae	<i>Trichobranchus</i> sp.
Animalia	Annelida	Polychaeta		Capitellidae	<i>Capitella</i> sp.
Animalia	Annelida	Polychaeta		Capitellidae	<i>Decamastus</i> sp.
Animalia	Annelida	Polychaeta		Capitellidae	<i>Mediomastus</i> sp.
Animalia	Annelida	Polychaeta		Capitellidae	<i>Notomastus</i> sp.
Animalia	Annelida	Polychaeta		Cossuridae	<i>Cossurella dimorpha</i>
Animalia	Annelida	Polychaeta		Maldanidae	<i>Euclymene</i> sp.
Animalia	Annelida	Polychaeta		Maldanidae	Maldanidae spp
Animalia	Annelida	Polychaeta		Opheliidae	<i>Ophelina acuminata</i>
Animalia	Annelida	Polychaeta		Orbiniidae	<i>Phylo ornatus</i>
Animalia	Annelida	Polychaeta		Paraonidae	<i>Aricidea</i> sp.
Animalia	Annelida	Polychaeta		Scalibregmidae	<i>Scalibregma inflatum</i>
Animalia	Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	<i>Ampelisca</i> sp.

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III (Cont'd) Taxonomic resolution of each collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Arthropoda	Malacostraca	Amphipoda	Corophiidae	<i>Cheiriphotis</i> sp.
Animalia	Arthropoda	Malacostraca	Amphipoda	Corophiidae	<i>Corophium</i> sp.
Animalia	Arthropoda	Malacostraca	Amphipoda	Liljeborgiidae	<i>Idunella curvidactyla</i>
Animalia	Arthropoda	Malacostraca	Amphipoda	Liljeborgiidae	<i>Idunella curvidactyla</i>
Animalia	Arthropoda	Malacostraca	Amphipoda	Maeridae	<i>Ceradocus</i> sp.
Animalia	Arthropoda	Malacostraca	Amphipoda		Amphipod spp.
Animalia	Arthropoda	Malacostraca	Cumacea	Bodotriidae	<i>Eocuma</i> sp.
Animalia	Arthropoda	Malacostraca	Decapoda	Alpheidae	<i>Alpheus digitalis</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Alpheidae	<i>Alpheus</i> sp.
Animalia	Arthropoda	Malacostraca	Decapoda	Alpheidae	<i>Betaeus</i> sp.
Animalia	Arthropoda	Malacostraca	Decapoda	Callianassidae	<i>Nihonotrypaea japonica</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Goneplacidae	<i>Eucrate</i> sp.
Animalia	Arthropoda	Malacostraca	Decapoda	Goneplacidae	<i>Goneplax</i> sp.
Animalia	Arthropoda	Malacostraca	Decapoda	Goneplacidae	<i>Typhlocarcinus villosus</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Hexapodidae	<i>Hexapinus granuliferus</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Ocypodidae	<i>Macrophthalmus latreillei</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Pasiphaeidae	<i>Leptochela</i> sp.
Animalia	Arthropoda	Malacostraca	Decapoda	Penaeidae	Penaeidae spp.
Animalia	Arthropoda	Malacostraca	Decapoda	Pinnotheridae	<i>Neoxenophthalmus obscurus</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Pinnotheridae	<i>Pinnixa penultipedalis</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Porcellanidae	<i>Raphidopus ciliatus</i>

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III (Cont'd) Taxonomic resolution of each collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Arthropoda	Malacostraca	Decapoda	Portunidae	<i>Charybdis natator</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Portunidae	<i>Portunus pulchricristatus</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Processidae	<i>Processa japonica</i>
Animalia	Arthropoda	Malacostraca	Decapoda	Scalopidiidae	<i>Scalopidia spinosipes</i>
Animalia	Arthropoda	Malacostraca	Decapoda		Unidentified juvenile crab
Animalia	Arthropoda	Malacostraca	Leptostraca	Nebaliidae	<i>Nebalia</i> sp.
Animalia	Chordata	Actinopterygii	Anguilliformes	Muraenidae	Muraenidae spp.
Animalia	Chordata	Actinopterygii	Gadiformes	Bregmacerotidae	<i>Bregmaceros atlanticus</i>
Animalia	Chordata	Actinopterygii	Gadiformes	Bregmacerotidae	<i>Bregmaceros macclellandii</i>
Animalia	Chordata	Actinopterygii	Perciformes	Gobiidae	<i>Oxyurichthys</i> sp.
Animalia	Chordata	Actinopterygii	Perciformes	Gobiidae	<i>Paratrypauchen microcephalus</i>
Animalia	Echinodermata	Echinoidea	Camarodonta	Temnopleuridae	<i>Salmacis sphaeroides</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphiodia obtecta</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus depressus</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus intermedius</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus laevis</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus lucidus</i>
Animalia	Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	<i>Amphioplus</i> sp.
Animalia	Echiura		Echiuroinea	Echiuridae	<i>Arhynchite</i> sp.
Animalia	Echiura		Echiuroinea	Echiuridae	<i>Thalassema sabinum</i>
Animalia	Mollusca	Bivalvia	Arcoida	Arcidae	<i>Barbatia</i> sp.

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III (Cont'd) Taxonomic resolution of each collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Mollusca	Bivalvia	Myoida	Corbulidae	<i>Corbula venusta</i>
Animalia	Mollusca	Bivalvia	Nuculanoida	Yoldiidae	<i>Orthoyoldia lepidula</i>
Animalia	Mollusca	Bivalvia	Nuculoidea	Nuculanidae	<i>Saccella cuspidata</i>
Animalia	Mollusca	Bivalvia	Pectinoida	Pectinidae	<i>Cryptopecten bullatus</i>
Animalia	Mollusca	Bivalvia	Veneroida	Lucinidae	<i>Anodontia</i> sp.
Animalia	Mollusca	Bivalvia	Veneroida	Semelidae	<i>Theora lata</i>
Animalia	Mollusca	Bivalvia	Veneroida	Solenidae	<i>Solen dunkerianus</i>
Animalia	Mollusca	Bivalvia	Veneroida	Tellinidae	<i>Tellina minuta</i>
Animalia	Mollusca	Bivalvia	Veneroida	Ungulinidae	<i>Diplodonta sowerbyi</i>
Animalia	Mollusca	Bivalvia	Veneroida	Veneridae	<i>Dosinia histrio</i>
Animalia	Mollusca	Bivalvia	Veneroida	Veneridae	<i>Paphia gallus</i>
Animalia	Mollusca	Bivalvia	Veneroida	Veneridae	<i>Paratapes undulatus</i>
Animalia	Mollusca	Bivalvia	Veneroida	Veneridae	<i>Timoclea lionota</i>
Animalia	Mollusca	Gastropoda	Caenogastropoda	Epitoniidae	<i>Acrilla acuminata</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Clavatulidae	<i>Turricula javana</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Clavatulidae	<i>Turricula nelliae spuria</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Muricidae	<i>Murex trapa</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Nassariidae	<i>Nassarius olivaceus</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Nassariidae	<i>Nassarius siquijorensis</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Naticidae	<i>Polinices mammata</i>
Animalia	Mollusca	Gastropoda	Neogastropoda	Naticidae	<i>Tanea tenuipicta</i>

Improvement Dredging for Lamma Power Station Navigation Channel

Annex III (Cont'd) Taxonomic resolution of each collected species

Kingdom	Phylum	Class	Order	Family	Species
Animalia	Mollusca	Gastropoda	Neotaenioglossa	Calyptraeidae	<i>Calyptraea</i> sp.
Animalia	Mollusca	Gastropoda	Opisthobranchia	Tricliidae	<i>Eocylichna musashiensis</i>
Animalia	Mollusca	Gastropoda		Pyramidellidae	<i>Monotygma</i> sp.
Animalia	Mollusca	Scaphopoda	Dentaliida	Dentaliidae	Dentaliidae spp.
Animalia	Nemertea				Nemertea spp.
Animalia	Platyhelminthes				Platyhelminthes spp.
Animalia	Sipuncula	Phascolosomatidea	Phascolosomatiformes	Phascolosomatidae	<i>Apionsoma trichocephalus</i>
Animalia	Sipuncula	Phascolosomatidea	Phascolosomatiformes	Phascolosomatidae	<i>Phascolosoma esculenta</i>