

TABLES



Table 20.2.1 Proposed Water Quality Monitoring Sites

Environmental Zone	Monitoring Site No.	Target	Principal Role of Monitoring Site
Special Conservation Zone	L1	Mip River Forest Reserve	Water quality of a reservoir
	L7	Hoa Binh Forest Reserve	Water quality of a reservoir
	L8	Dien Vong Reservoir Conservation Area	Water quality of a reservoir
	L10	Quang Hanh Stone Mountain Special Use Forest Reserve	Land-based impact in upstream Development Zone
	⑭, 15, ⑯, 19, ⑳	World Heritage Core Area	Water quality of World Heritage Core Area
	17	World Heritage Core Area	Influence from offshore water
	18	World Heritage Buffer Area	Water quality of World Heritage Buffer Area
	13	World Heritage Buffer Area	Influence from offshore water
Conservation Zone	1,2,14	Bai Chay Bay	River water quality in Conservation Zone
	8,11	World Heritage Buffer Area	Influence from Cam Pha and Cua Ong coastal areas
Active Management Zone	①, 2, 3, 4, ⑤, 6, 7	Bai Chay and Hong Gai coastal water	Impact from Bai Chay and Hong Gai on the sea water quality
	12	World Heritage Area	Land-based impact from upstream areas
	⑨, 10	Cam Pha and Cua Ong coastal water	Land-based impact from activities in Cam Pha and Cua Ong
	L6	Bai Chay Bay	Impact from upstream area to Bai Chay bay
Development Zone	13, 15	Bai Chay Bay	Impact from upstream area to Bai Chay bay
	L9	Cua Ong coastal water	Land-based impact to Active Management Zone

Note: ○ means representative water quality monitoring sites.

Table 20.2.2 List of Additional Equipment Required for Long-term Monitoring Plan

Group	Parameter	Equipment	Quantity	Unit value (US\$)	Total (US\$)
1	COD _{Mn}	Water bath	1	3,800	3,800
		Magnetic stirrer	5	300	1,500
	COD _{Cr}	Heating mantle	1	1,900	1,900
	Subtotal				7,200
2	Phosphorus	Spectrophotometer	1	11,700	11,700
		Autoclave	1	3,400	3,400
		Sand bath	1	1,600	1,600
	Nitrogen	Kjeldahl distiller equipment set	1	5,700	5,700
		Water bath	1	1,000	1,000
		Kjeldahl digestion unit	1	1,000	1,000
Subtotal				24,400	
3	Grain size	Shaker	1	3,300	3,300
		Test sieve	1	700	700
		Vacuum desiccator	1	2,500	2,500
		Vacuum pump	1	2,500	2,500
	Water content	Electronic chemical balance	1	2,600	2,600
		Drying oven	1	1,300	1,300
	IL	Electronic force balance	1	1,200	1,200
	ORP	Muffle furnace	1	2,000	2,000
	TOC	ORP meter	1	1,000	1,000
		CIIN Corder	1	68,800	68,800
Subtotal	Microbalance	1	13,800	13,800	
				99,700	
4	Heavy metal	Atomic absorption spectrophotometer	1	82,500	82,500
		Shaker	1	2,500	2,500
		Exhauster	1	5,200	5,200
	Subtotal				90,200
5	Coliform	Autoclave	1	5,200	5,200
		Incubator	1	1,300	1,300
		Drying oven	1	1,300	1,300
		Pipette washer	1	200	200
	Subtotal				8,000
6	Other facility	Laboratory furniture (Central)	2	7,400	14,800
		Laboratory furniture (Side)	7	2,800	19,600
		Refrigerator (Reagent)	1	2,500	2,500
		Refrigerator (Sample)	1	4,500	4,500
		Storage cabinet	2	3,600	7,200
		Fume hood	2	32,900	65,800
		Water purifier	1	8,800	8,800
		Centrifuge	1	3,300	3,300
		Sink	1	2,100	2,100
		Valance table	3	2,100	6,400
		Desiccator	3	200	600
		Working desk	3	1,800	5,400
	Subtotal	Ultrasonic cleaner	1	5,000	5,000
				146,000	
7	Expendable	Cyanide ion distilling set	5	500	2,500
		Ammonium testing apparatus	5	400	2,000
		Column for chromatogram	10	300	3,000
		Condenser	5	200	1,000
		Hydrometer	1	1,100	1,100
		Specific gravity bottle (100 ml)	10	100	1,000
		Automatic burette (10 ml)	2	400	800
		Automatic burette (25 ml)	2	400	800
		Finger dispenser	1	300	300
	Subtotal				12,500
Total					388,000

Table 20.2.3 Personnel Plan for Environmental Monitoring (Staff of ERMU)

Section		Short-term			Transition-term				Long-term				Total
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
General affair	Section chief	1	1	1	1	1	1	1	1	1	1	1	11
	Assistant section chief	0	0	1	1	1	1	1	1	1	1	1	9
	Assistant	0	0	0	1	1	1	1	1	1	1	2	9
Water quality	Chief engineer	1	1	1	1	1	1	2	2	2	2	2	16
	Engineer	1	1	1	1	1	2	2	3	3	3	3	21
	Assistant	1	1	1	1	2	2	2	3	3	3	3	22
Ecology	Chief engineer	1	1	1	1	1	1	1	1	1	1	1	11
	Engineer	1	1	1	1	1	1	1	1	1	2	2	13
	Assistant	1	1	1	1	1	1	1	1	1	2	2	13
Analysis	Chief engineer	0	0	1	1	1	1	2	2	2	2	2	14
	Engineer	0	0	0	1	1	2	2	3	3	3	3	18
	Assistant	0	0	0	1	2	2	2	3	3	3	3	19
Total		7	7	9	12	14	16	18	22	22	24	25	176

Table 20.2.4 Sample Number of Water and Sediment Quality

(Unit: Samples/year)

No	Area	Site	Water Quality			Sediment Quality		
			Frequency	Layer	Sample Number	Frequency	Layer	Sample Number
1.1	Land area	Mip river	4	1	4			
1.2		Troi river	4	1	4			
1.3			4	1	4			
1.4		Man river	4	1	4			
1.5			4	1	4			
1.6		Dien Vong river	4	1	4			
1.7			4	1	4			
1.8		Sdien Vong	4	1	4			
1.9		Mong Duong river	4	1	4			
1.10		Ha Tu area	4	1	4			
①	Bai Chay bay area	Center of Bai Chai Bay	12	2	24	1	1	1
2		Cua Luc strait	4	2	8			
3	Bai Chay and Hong Gai coastal area	Bai Chai beach	4	2	8			
4		The mouth of Bai Chai bay	12	2	24			
⑤		Hong Gai area	4	2	8	1	1	1
6		Hong Gai East area	4	2	8			
7		Ha Tu area	4	2	8			
8	Cam Pha coastal area	West of Cam Pha area	4	2	8			
⑨		Center of Cam Pha area	12	2	24	1	1	1
10		East of Cam Pha area	4	2	8			
11		South of Cam Pha area	4	2	8			
12	World Heritage area	West buffer area	4	2	8			
13		West	4	2	8			
⑭		North	12	2	24	1	1	1
15		Center (1)	4	2	8			
⑮		Center (2)	12	2	24	1	1	1
17		South	4	2	8			
18		East buffer area	4	2	8			
19		East	4	2	8			
⑯		South-east	12	2	24	1	1	1
Total			-	-	296	-	-	6

Note: ○ means representative water quality monitoring sites.

Table 20.2.5 Record of Field Survey

Station ID.....	Date	Water sampling		
	Time.....	Sampling device		
		Sample IDs	Surface	Bottom
Latitude:		BOD (mg/l) .....	.....	.....
Longitude:		COD (mg/l) .....	.....	.....
		T-N (mg/l) .....	.....	.....
Weather		T-P (mg/l) .....	.....	.....
Air temperature (°C)		NO ₂ -N (mg/l) .....	.....	.....
Wind direction		NO ₃ -N (mg/l) .....	.....	.....
Wind velocity (m/s)		NH ₄ -N (mg/l) .....	.....	.....
Water depth (m)		PO ₄ -P (mg/l) .....	.....	.....
Transparency (m)		TDS (mg/l) .....	.....	.....
		SS (mg/l) .....	.....	.....
Conventional water parameters		Metal (mg/l) .....	.....	.....
	Surface	Bottom		
Water temp. (°C) .....	.....	.....
Salinity (‰) .....	.....	.....
pH .....	.....	.....
DO (mg/l) .....	.....	.....
Turbidity (NTU) .....	.....	.....
QA/QC samples				
Sampler blank .....	.....	1/10		
Sampler duplicate .....	.....	1/10		

Depth (m)

Salinity (‰)

Notes:

Table 20.6.1 Estimated Personnel Cost of ERMU for Environmental Monitoring

(Unit: US\$)

Estimation Items	Incremental Cost											Total	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Chief	(3) 240	(3) 240	(4) 320	(4) 320	(4) 320	(4) 320	(6) 480	(6) 480	(6) 480	(6) 480	(6) 480	(6) 480	(52) 4,160
Engineer	(2) 120	(2) 120	(3) 180	(4) 240	(4) 240	(6) 360	(6) 360	(8) 480	(8) 480	(9) 540	(9) 540	(9) 540	(61) 3,660
Assistant	(2) 80	(2) 80	(2) 80	(4) 160	(6) 240	(6) 240	(6) 240	(8) 320	(8) 320	(9) 360	(10) 400	(10) 400	(63) 2,520
Total	5,280	5,280	6,960	8,640	9,600	11,040	12,960	15,360	15,360	16,560	17,040	17,040	124,080

Note: Figures in parenthesis are number of staff required.

Table 20.6.2 Cost of Facility and Equipment for Water and Sediment Quality Monitoring

(Unit: US\$)

Estimation Items	Group	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Laboratory	-				71,500								71,500
Equipment	Group1 (COD)				7,300								7,300
	Group2 (N,P)					24,400							24,400
	Group3 (Grain size, ORP, TOC)						99,700						99,700
	Group4 (Metal)							90,200					90,200
	Group5 (Coliform)							8,000					8,000
	Subtotal				78,800	24,400	107,700	90,200					229,600
Expendables	General	20	50	90	120	140	160	180	200	220	240	250	1,670
	Electricity	480	480	480	2,880	2,880	2,880	2,880	2,880	2,880	2,880	2,880	24,480
	Test Chemical				250	500	500	1,000	1,000	1,000	1,000	1,000	6,250
	Subtotal	500	530	570	3,250	3,520	3,540	4,060	4,080	4,100	4,120	4,130	32,400
	Total	500	530	570	82,050	27,920	111,240	94,260	4,080	4,100	4,120	4,130	333,500

Table 20.6.3 Number of Sample for Outsourcing Analysis from 2000 to 2002

No.	Area	Site	COD _(Mn)	COD _(Cr)	BOD
1.1	Land area	Mip river	4	4	4
1.2		Troi river	4	4	4
1.3			4	4	4
1.4		Man river	4	4	4
1.5			4	4	4
1.6		Dien Vong river	4	4	4
1.7			4	4	4
1.8		Sdien Vong	4	4	4
1.9		Mong Duong river	4	4	4
1.10		Ha Tu area	4	4	4
1	Bai Chay bay area	Center of Bai Chai Bay	8	-	8
2		Cua Luc strait	-	-	-
3	Bai Chay and Hong Gai coastal area	Near Bai Chai beach	-	-	-
4		The mouth of Bai Chai bay	8	-	8
5		Hong Gai area	-	-	-
6		Hong Gai East	-	-	-
7		Ha Tu area	-	-	-
8	Cam Pha coastal area	West of Cam Pha area	-	-	-
9		Center of Cam Pha area	8	-	8
10		East of Cam Pha area	-	-	-
11		South of Cam Pha area	-	-	-
12	World Heritage area	West buffer area	-	-	-
13		West	-	-	-
14		North	8	-	8
15		Center(1)	-	-	-
16		Center(2)	8	-	8
17		South	-	-	-
18		East Buffer Area	-	-	-
19		East	-	-	-
20		South-east	8	-	8
Total			88	40	88

Table 20.6.4 Cost of Outsourcing Analysis from 2000 to 2002

No.	Parameter	Sample Numbers	Price/Sample (US\$)	Amount (US\$)	Note
1	COD _{Mn}	88	3	264	Sea, River
2	COD _{Cr}	40	3.5	140	River
3	BOD ₅	88	3	264	Sea, River
Total		196	-	668	

Note: Allowance : 1day x 2persons x US\$ 20/per.day =US\$ 40
 Data arrangement: US\$ 500
 Boat : DOSIE's
 Bus for transportation: 1day x US\$ 120/day = US\$ 120
 Sub-total: US\$ 660
 Total : US\$ 1,328 ≈ US\$1,300/year

Table 20.6.5 Cost of Training for Water Quality Analysis

No.	Parameter	No of Samples	Price/Sample (US\$)	Amount (US\$)
1	COD _{Mn}	376	3	1,128
2	COD _{Cr}	376	3.5	1,316
3	BOD ₅	376	3	1,128
4	SS	376	2.5	940
5	T-N	376	3	1,128
6	T-P	376	3.5	1,316
7	Oil-grease	376	3	1,128
8	Phenol	376	8	3,008
9	Coliform	30	8	256
Total		3,038	-	5,708

Note: Allowance: 2day x 2persons x US\$ 20/per.day = US\$ 80
 Data arrangement: US\$ 1,000
 Boat :DOSIE's
 Bus for transportation: 2day x US\$ 120/day = US\$ 240
 Hotel: 1day x 2persons x US\$ 30/per./day = US\$ 60
 Sub-total: US\$ 1,380
 Total: US\$ 7,088 ≈ US\$7,100/year

Table 20.6.6 Cost of Training for Sediment Quality Analysis

No.	Parameter	Sample Number	Price/Sample (US\$)	Amount (US\$)
1	Grain size composition	6	10	60
2	Water content	6	3	18
3	ORP	6	5	30
4	COD _{Ma}	6	3	18
5	LL	6	5	30
6	TOC	6	5	30
7	T-S	6	4	24
8	T-N	6	5	30
9	T-P	6	5	30
10	As	6	8	48
11	Cu	6	6	36
12	Zn	6	6	36
13	Pb	6	6	36
14	Cd	6	6	36
15	Fe	6	6	36
Total		90	-	498

Note: Allowance: 2day x 2persons x US\$ 20/per.day = US\$ 80
 Data arrangement: US\$ 700
 Boat: DOSTE's
 Bus for transportation: 2day x US\$ 120/day = US\$240
 Hotel: 1day x 2persons x US\$ 30/per/day = US\$ 60
 Sub-total: US\$ 1,080
Total: US\$ 1,578 = US\$1,600/year

Table 20.6.7 Cost of Outsourcing and Training for Water and Sediment Quality Monitoring

(Unit: US\$)

Estimation Items		Incremental Cost											Total
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Outsourcing analysis (COD,BOD)		1,300	1,300	1,300									3,900
Training	Water quality				7,100								7,100
	Sediment quality						1,600						1,600
	Hotel, Bus				800	800	800	800					3,200
Total		1,300	1,300	1,300	7,900	800	2,400	800	0	0	0	0	15,800

Table 20.6.8 Cost of Boat and Vehicle for Monitoring

(Unit: US\$)

Estimation Items	Incremental Cost											Total	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Boat													
Boat (O&M)	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	12,100
Vehicle	30,000												30,000
Vehicle (O&M)	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	22,000
Total	33,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	64,100

Table 20.6.9 Estimated Costs for Natural Environment Monitoring

Survey	Work	Type	Unit Cost (US\$)	Quantity	Cost (US\$)	
Vegetation	Satellite image analysis	Personnel expenses	30/pers/day	60 pers.day	1,800	
		LANDSAT TM DATA	4,655/scene	3 scene	13,965	
	Ground truth	Personnel expenses	30/pers/day	60 pers.day	1,800	
		Car	80/car	15 cars	1,200	
		GPS renting	4/set	15 sets	60	
Subtotal					18,825 (18,800)	
Wetland	Tidal flats and mangrove swamps	Personnel expenses	30/pers/day	160 pers.day	4,800	
		Sample analysis (Zoobenthos)	22/sample	72 samples	1,584	
		Car	80/car	40 cars	3,200	
		Helicopter	12,500/day	1 day	12,500	
Subtotal					22,084 (22,100)	
Marine Biology	Coral reefs	Personnel expenses	30/pers/day	188 pers.day	5,640	
		Boats	100/boat	17 boats	1,700	
		Cars	80/car	17 cars	1,360	
		Diving equipment	15/set	10 sets	1,530	
	Subtotal					10,230 (10,200)
	Others	Personnel expenses	30/pers/day	192 pers.day	5,760	
		Sample analysis (Fish and shellfish)	30/sample	14 samples	420	
		Sample analysis (Phytoplankton)	30/sample	40 samples	1,200	
		Sample analysis (Zooplankton)	30/sample	20 samples	600	
		Sample analysis (Zoobenthos)	30/sample	6 samples	180	
		Boats	100/sample	14 samples	1,400	
Cars		80/sample	14 samples	1,120		
Subtotal					10,680 (10,700)	

Table 20.6.10 Estimated Costs for Environmental Monitoring

(Unit: US\$)

Estimation Items	Incremental Cost											Total
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Staff of ERMU	5,280	5,280	6,960	8,640	9,600	11,040	12,960	15,360	15,360	16,560	17,040	124,080
Water quality				78,800	24,400	107,700	90,200					301,100
Facility and Equipment												
Facility and Equipment (O&M)	500	530	570	3,250	3,520	3,540	4,060	4,080	4,100	4,120	4,130	32,400
Boat&Vehicle	30,000											30,000
Boat&Vehicle(O&M)	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	34,100
Analysis and training (Entrusting)	1,300	1,300	1,300	7,900	800	2,400	800					15,800
Subtotal	34,900	4,930	4,970	93,050	31,820	116,740	98,160	7,180	7,200	7,220	7,230	413,400
Environmental Resources												
Vegetation (Entrusting)	18,800		18,800		18,800		18,800		18,800		18,800	112,800
Wetland (Entrusting)	22,100					22,100					22,100	66,300
Marine biology (Entrusting)	20,900					20,900					20,900	62,700
Landscaped Boat&O&M	700	700	700	700	700	700	700	700	700	700	700	7,700
Subtotal	62,500	700	19,500	700	19,500	43,700	19,500	700	19,500	700	62,500	249,500
Total	102,680	10,910	31,430	102,390	60,920	171,480	130,620	23,240	42,060	24,480	86,770	786,980

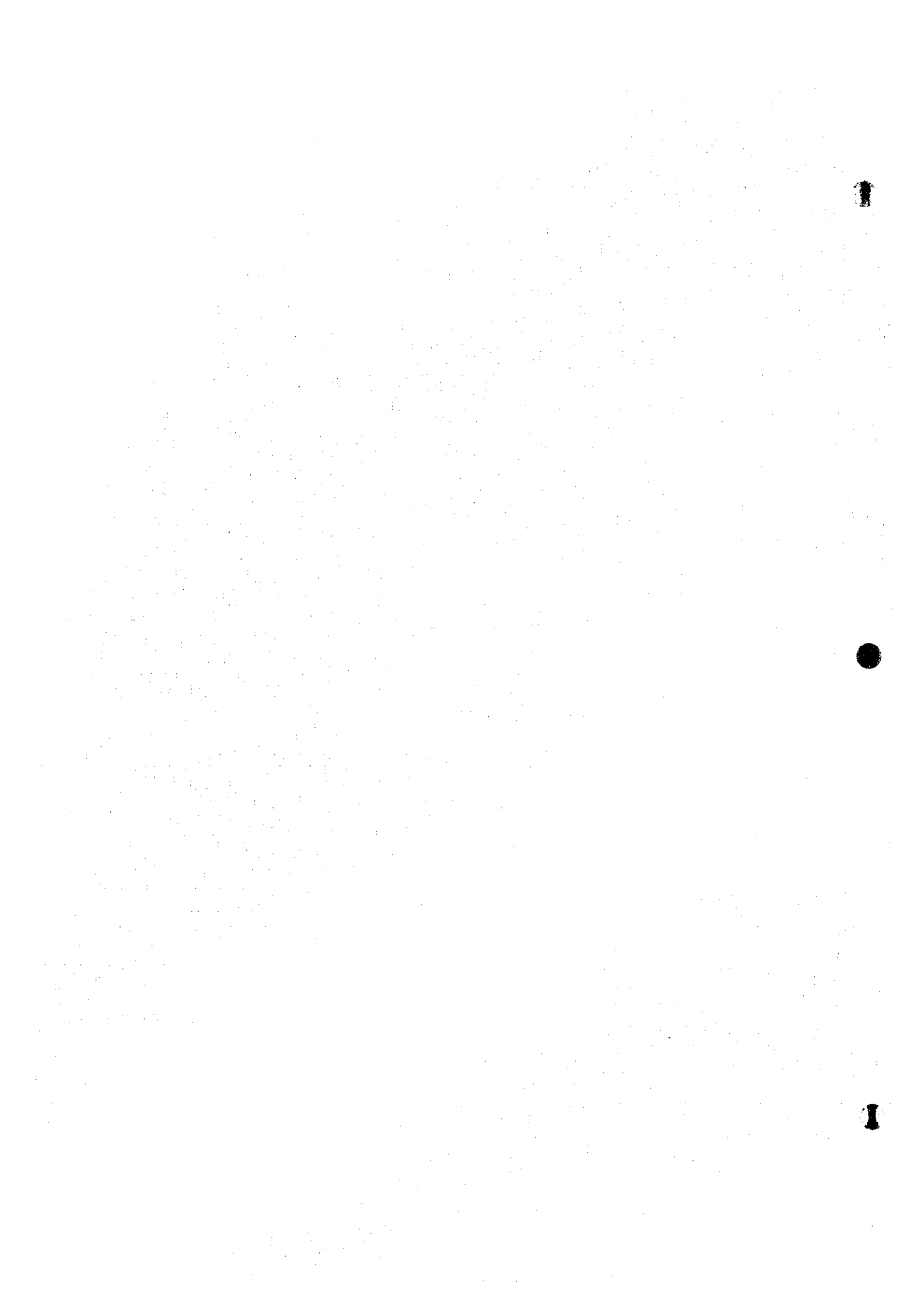
Table 20.6.11 Estimated Costs for Environmental Inspection

(Unit: US\$)

Estimation Items	Incremental Cost											Total
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Personnel	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(6)	(6)	(6)	(6)	-
Vehicle	1,920	1,920	1,920	1,920	1,920	1,920	1,920	2,880	2,880	2,880	2,880	24,960
Vehicle (O&M)	30,000							30,000				60,000
Total	2,000	2,000	2,000	2,000	2,000	2,000	2,000	4,000	4,000	4,000	4,000	30,000
	33,920	3,920	3,920	3,920	3,920	3,920	36,880	6,880	6,880	6,880	6,880	114,960

Note: Figures in parenthesis are incremental number of staff in ID.

FIGURES



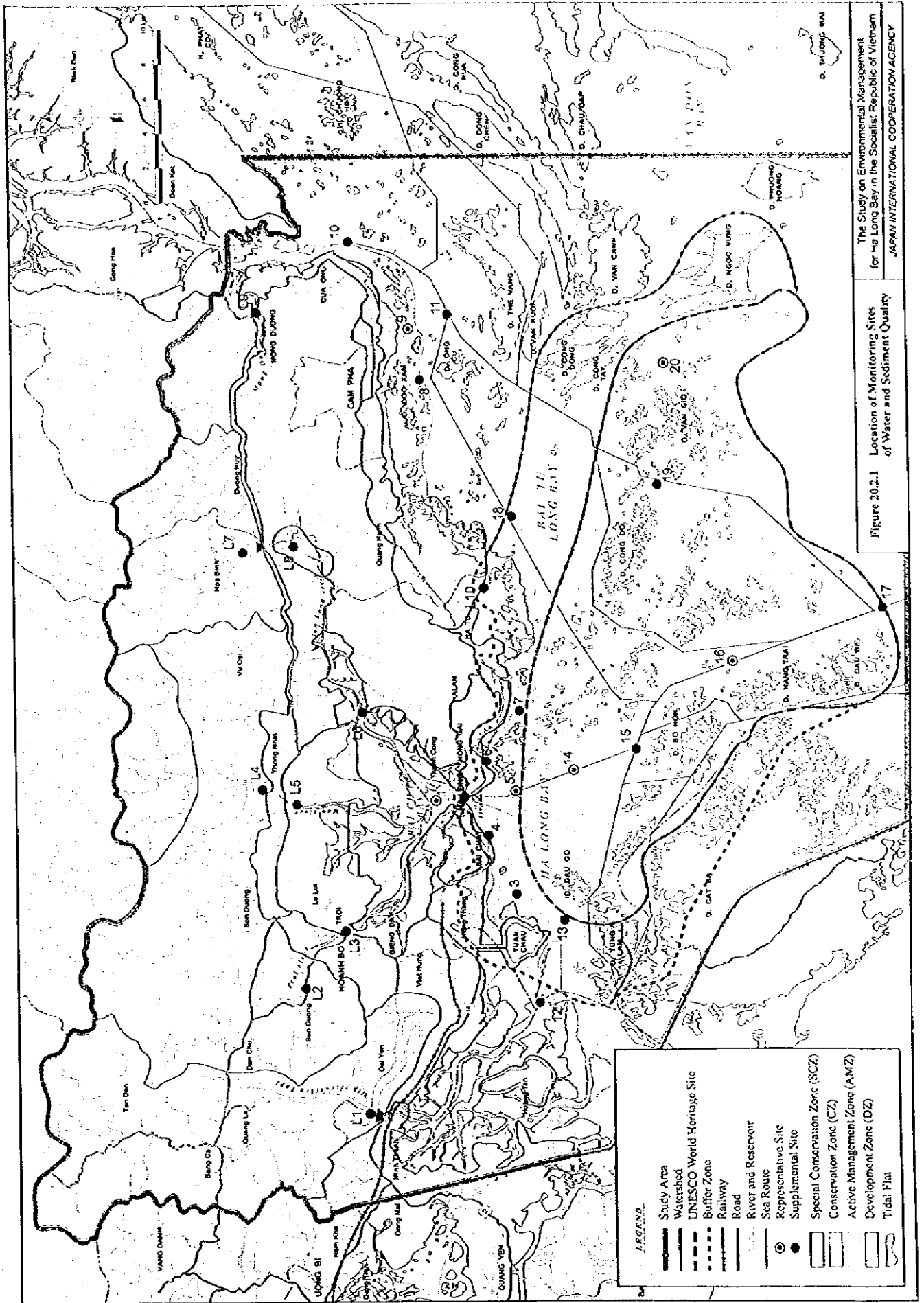


Figure 20.2.1 Location of Monitoring Sites of Water and Sediment Quality

The Study on Environmental Management for Ha Long Bay in the Socialist Republic of Vietnam
 JAPAN INTERNATIONAL COOPERATION AGENCY

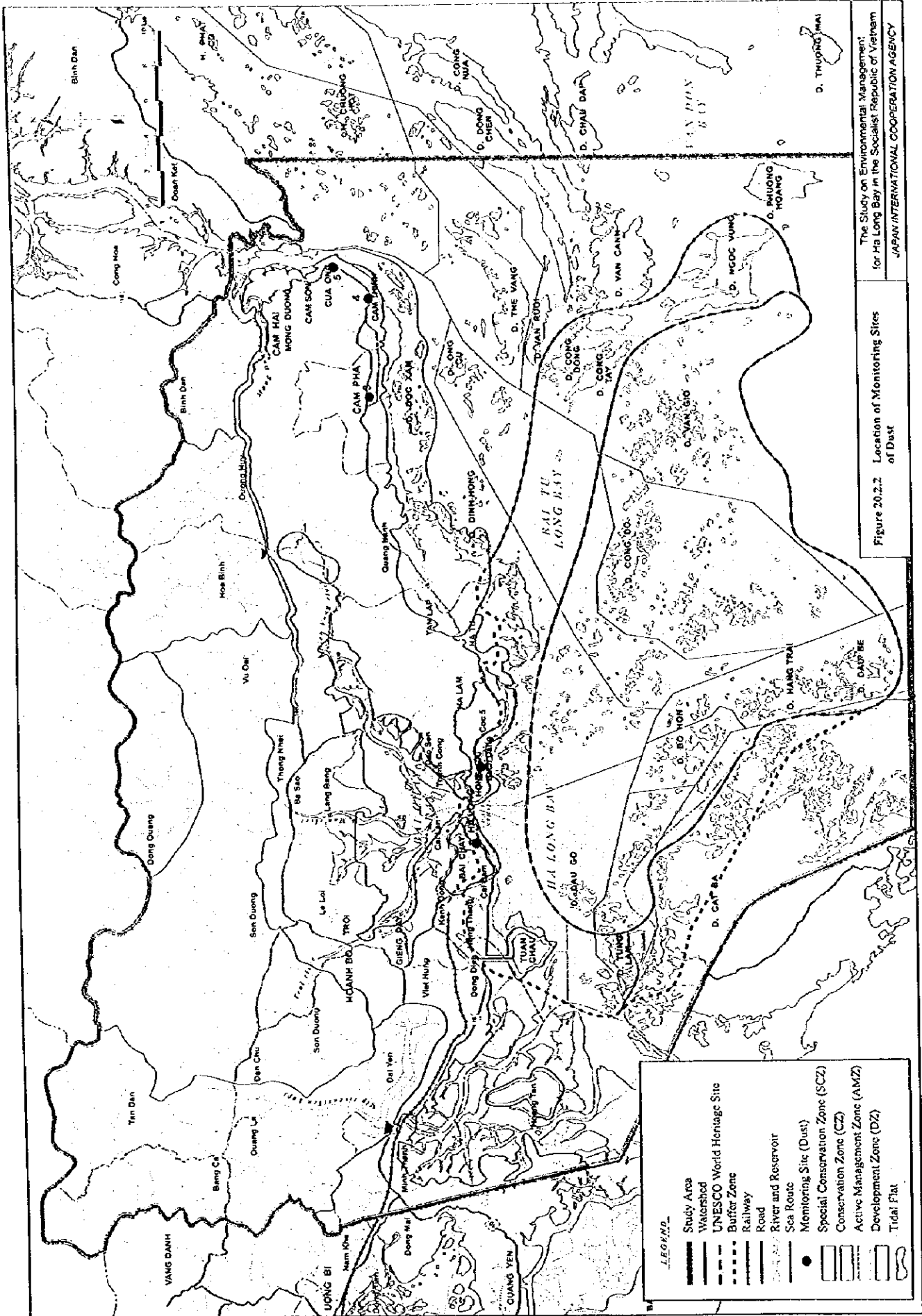


Figure 20.2.2 Location of Monitoring Sites of Dust

The Study on Environmental Management for Ha Long Bay in the Socialist Republic of Vietnam
JAPAN INTERNATIONAL COOPERATION AGENCY

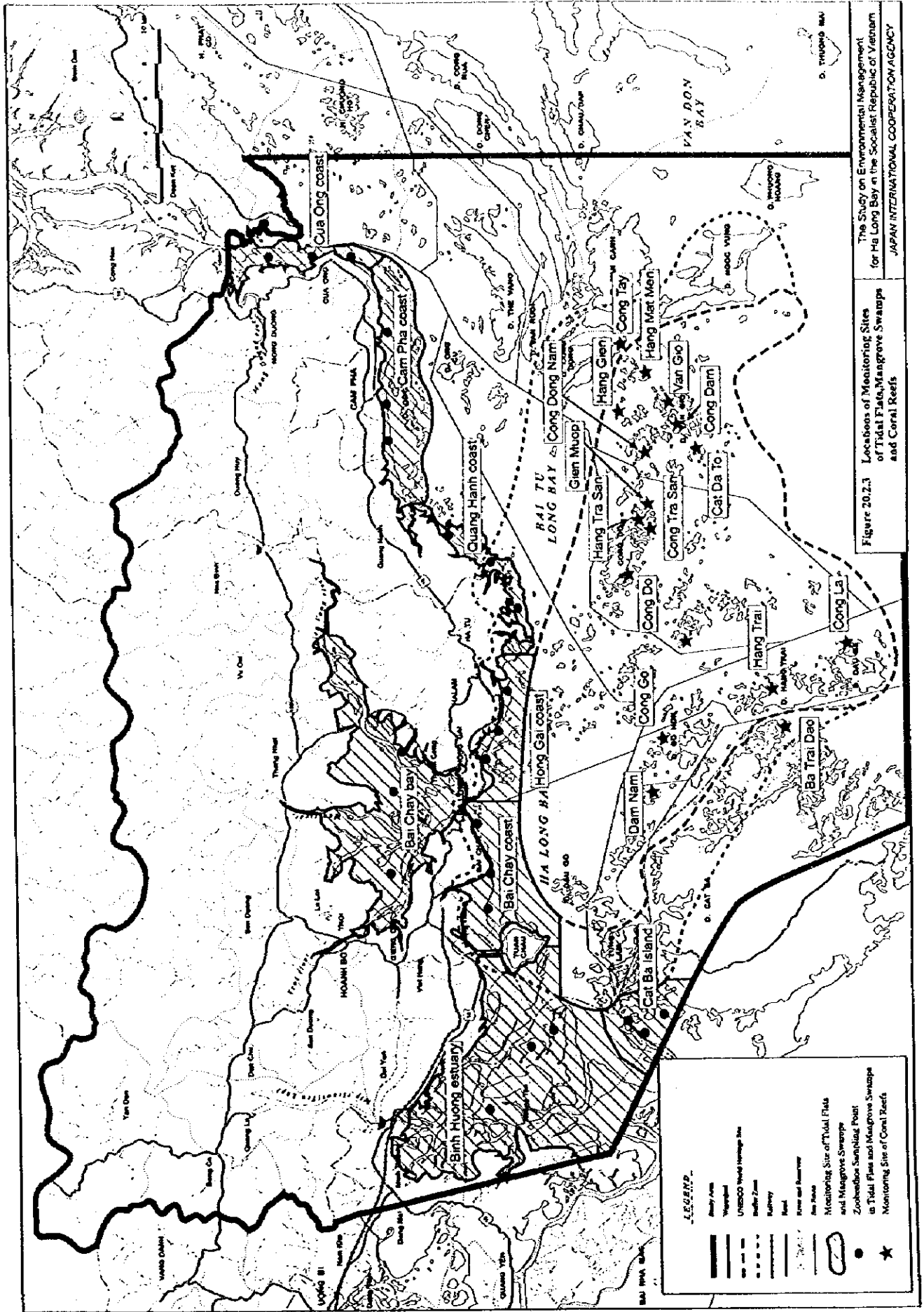
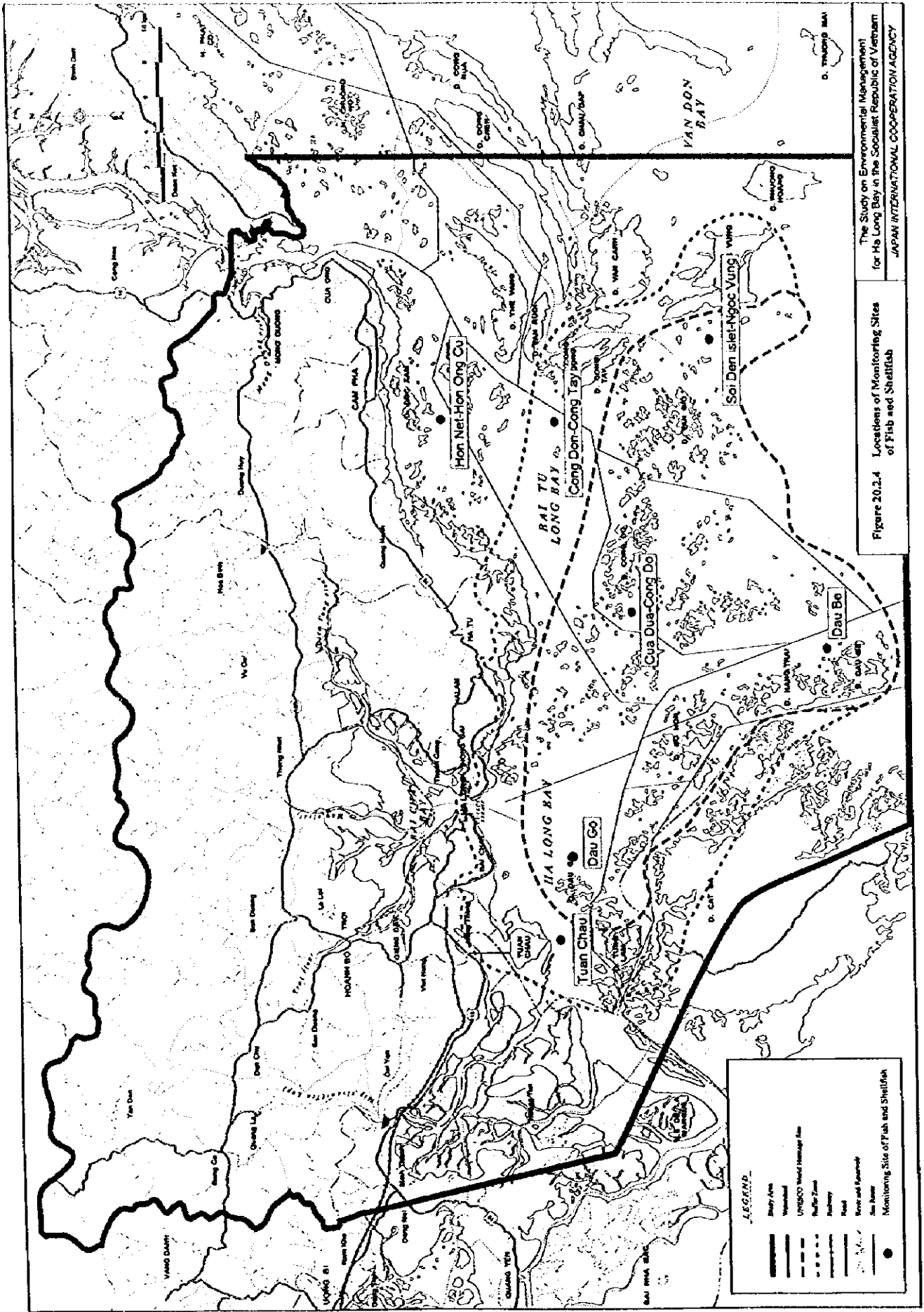


Figure 20.2.3 Locations of Monitoring Sites of Tidal Flats, Mangrove Swamps and Coral Reefs

The Study on Environmental Management for Ha Long Bay in the Socialist Republic of Vietnam
JAPAN INTERNATIONAL COOPERATION AGENCY



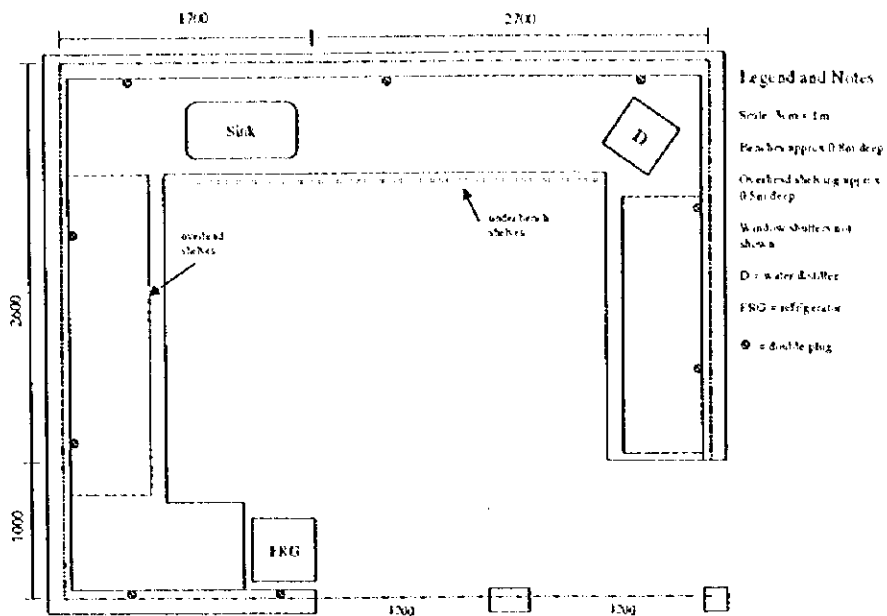


Figure 20.5.1 Plan for Field Equipment Room at DOSTE

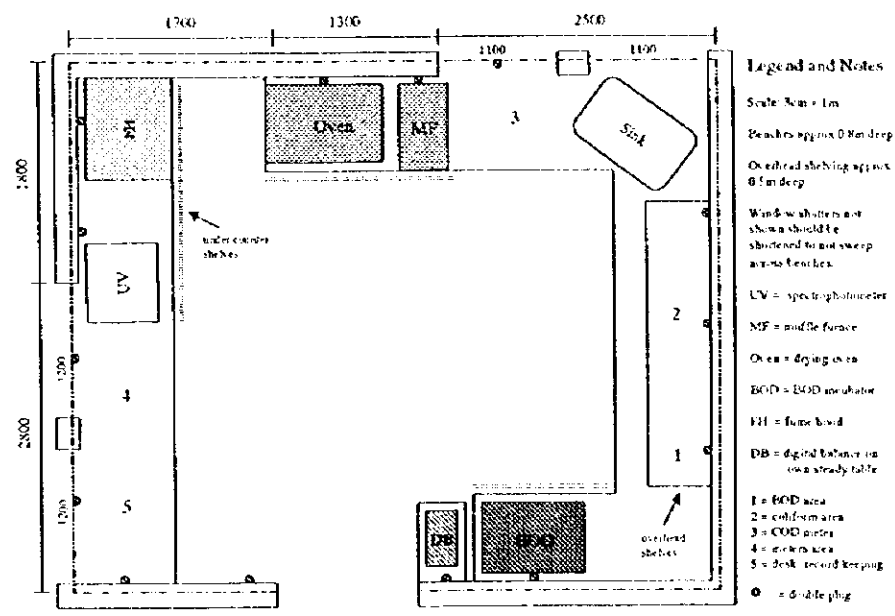


Figure 20.5.2 Plan for Laboratory at DOSTE

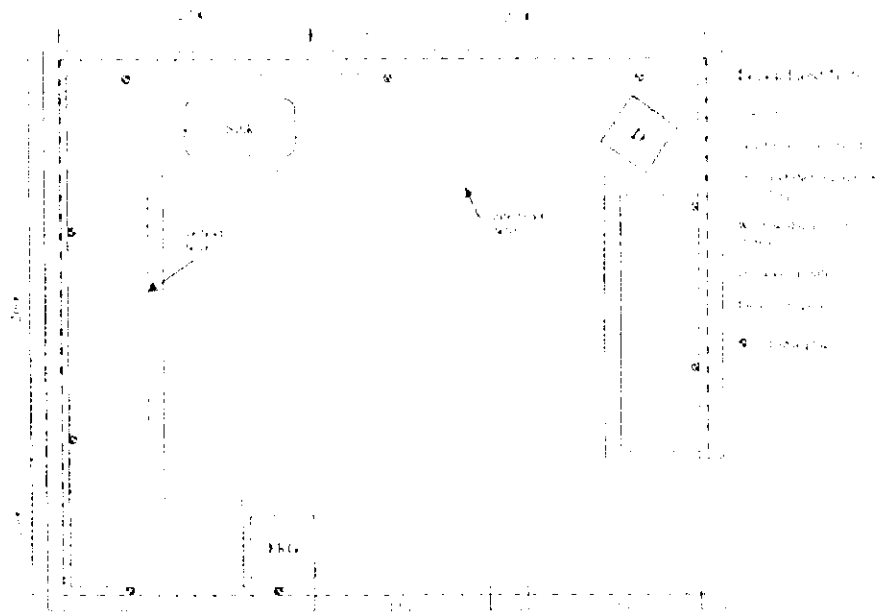


Figure 20.5.1 Plan for Field Equipment Room at DOSTE

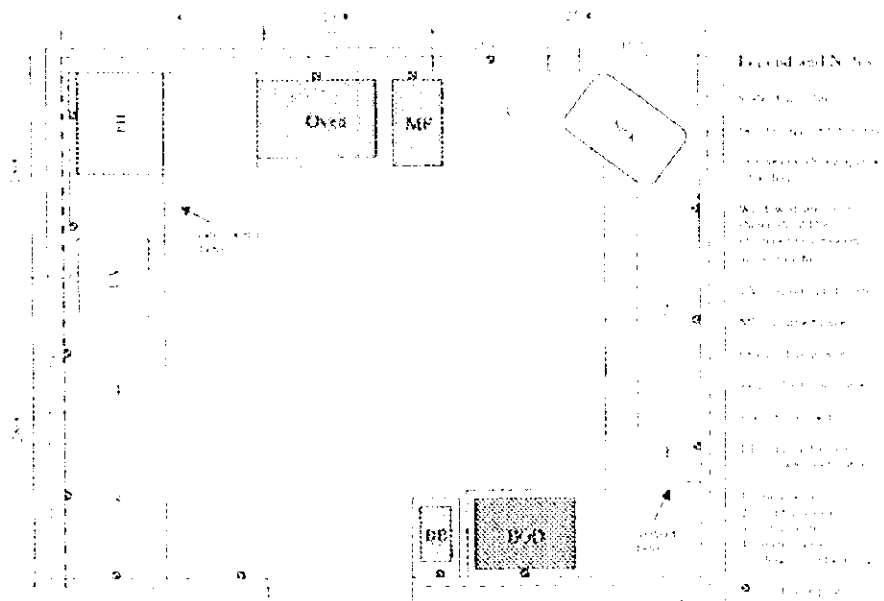


Figure 20.5.2 Plan for Laboratory at DOSTE

CHAPTER 21

CHAPTER 21 LEGAL AND INSTITUTIONAL FRAMEWORK

21.1 Environmental Management Functions

Environmental management can be described in terms of its basic functions. These functions are part of a system for good governance and environmental protection. The proposed set of environmental management functions that should be performed by the agencies responsible for the implementation of the EMP is shown below grouped into six categories.

Category	Environmental Management Function
(1) Policy and Standards	development of policy, strategy, plans, and overall direction
(2) Scientific and Technical Analysis	environmental standards and conservation criteria environmental monitoring and laboratory analysis state of environment reporting environmental protection research and development environmental impact assessment
(3) Enforcement	complaints and dispute resolution inspection
(4) Education and Environmental Awareness	education, training, and environmental awareness
(5) Control and Waste Management	licensing pollution control supervision and collection of pollution charges solid and hazardous waste management
(6) Natural Resource Management	protected area management tidal flats protection

In Quang Ninh province, there are many agencies with individual and shared responsibilities for these environmental management functions. However, many of the key functions have been neglected or are being managed at a low level of activity. This reflects the low priorities of the agencies, insufficient financial resources, and low levels of staffing that have been provided. Ultimately, the agency responsible for implementation of the EMP must perform all of these functions at a much higher level.

21.2 Proposed Organizational Structure

The EMP has three main elements, namely conservation and protection of natural resources, environmental and land use planning, and control of pollution and waste. The proposed organisation structure for implementation of the EMP

emphasizes the multi-sector nature of environmental management including the appropriate agencies to ensure that these three elements and the environmental management functions listed in the previous section will be carried out.

The capacity of existing provincial level agencies with respect to environmental management and environmental protection is very low. These agencies do not have sufficient staff, existing staff require more training, and more equipment is needed. Fortunately, Quang Ninh province is currently at relatively low levels of socioeconomic development. Industrial pollution is relatively low and the population is small. There are few serious environmental problems, except for the extensive ecological damage and human health problems associated with environmentally unsound mining practices. This will give the province a little time to develop the capacity to put in place a sound environmental management system. Environmental management agencies have time to learn from experience. They can gradually build up the necessary parts of the environmental management system. Priority areas that are particularly weak (e.g., industrial pollution control, environmental inspection, environmental monitoring, and tidal flat protection) can start at modest levels and over time evolve into fully functional organisational units.

Up to the year 2010, it is best to work within the existing government framework. A committee for implementation of the EMP must be created under the overall direction of QNPC. Most of the agencies will retain their existing responsibilities. New organizational units will be created to allow the agencies to better fulfil their responsibilities. This approach has the advantage that it is relatively easy to implement and does not require many changes to the existing institutional framework. Its flexibility will allow the agencies to help each other as major needs arise.

However, it may be difficult to achieve the high level of cooperation and coordination amongst agencies that will be required. The existing government framework perpetuates a fragmented decision making structure that disperses environmental management responsibilities among many agencies. No one management agency will have a complete perspective on the EMP. No one agency will have enough authority to make the difficult decisions to resolve conflicts

between development priorities and environmental protection goals. Therefore, it is recommended to establish a single environmental management authority in order to ensure effective implementation of the EMP after 2010.

During the period up to 2005, the emphasis should be on building capacity in terms of number of staff, training, and equipment in the agencies responsible for environmental management. This will provide the knowledgeable and experienced staff that will be needed for the new environmental management authority. During the period from 2006 to 2010, the emphasis should be placed on designing, developing, building institutional support and ensuring adequate funding for activities of the responsible organization of the EMP.

21.2.1 Establishment of the Implementation Committee (IC) for the EMP

The QNPC should promulgate a decision or instruction to define the legal mandate for establishment of IC and the implementation arrangements for the EMP. The proposed organization chart for IC is presented below:

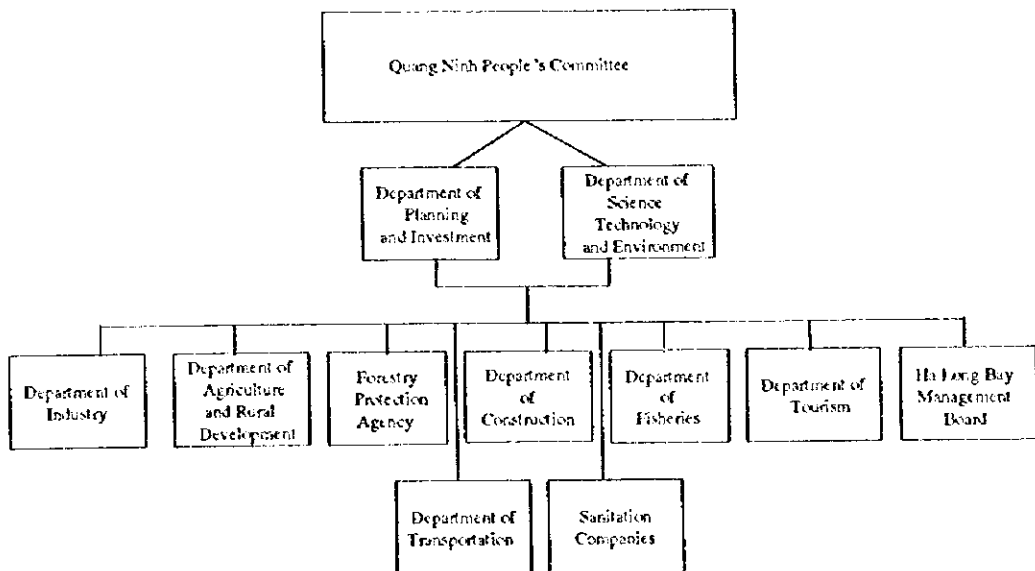


Figure 21.2.1 Organizational Chart of the Implementation Committee

(1) Key Provincial Level Agencies

The key provincial level agencies of IC are:

- Department of Science Technology and Environment (DOSTE)
- Department of Planning and Investment (DPI)
- Department of Construction (DOC)
- Ha Long Bay Management Board (HLMB)
- Department of Agriculture and Rural Development (DARD)
- Forest Protection Agency (FPA)
- Department of Fisheries (DOF)
- Department of Industry (DOI)
- Department of Tourism (DOTOUR)
- Department of Transportation (DOT)
- Sanitation Companies (SAN)

These agencies will be responsible for actual implementation and management of the programs and other activities of the EMP. DPI and DOSTE should be the lead agencies, and act as the secretariat for IC to conduct following administrative activities:

- 1) preparation of annual plans and budgets,
- 2) preparation of annual reports on the EMP activities, and
- 3) making meeting arrangements and taking minutes of meetings.

The IC will be chaired by the Chairman of QNPC, with co-deputy chairmen from DPI and DOSTE.

(2) Key National Level Agencies

The key national agencies responsible for environmental management of economic sectors and development management are:

- Quang Ninh Port Authority (QNPA)
- VINACOAL
- Ministry of Industry (MOI)
- Ministry of Construction (MOC)

- General Department of Tourism (GDTOUR)
- National Maritime Agency (NMA) of Ministry of Transportation and Communication

The cooperation of these national agencies to ensure that state owned enterprises (SOE) under their control comply with and implement the environmental programs is essential to ensure the success of the EMP. The IC will ensure that all agencies are well informed about the goals, programs, and current activities of the EMP. The goals of the EMP must be promoted with these agencies. The EMP documents will be provided to all agencies and to SOE of these agencies operating in the EMP area. The IC will distribute its annual plan, annual budget, and annual report to these agencies so that they are well aware of the activities being undertaken by the EMP implementation agencies. The national level agencies will be requested to participate in an annual workshop on the EMP. This workshop will review progress, discuss new initiatives, and focus on identifying opportunities for collaboration and cooperation.

(3) Key National Agencies with Environmental and Conservation Responsibilities

- MOSTE
- National Environment Agency (NEA)
- Ministry of Culture and Information (MCI)
- UNESCO Vietnam

While DOSTE is under the direct administrative control of QNPC, it is under the professional guidance of MOSTE. The National Environment Agency (NEA) is responsible for providing most of the direction, guidance and assistance on environmental matters to DOSTE, MOSTE is also responsible for more specific administrative policy that is to provide guidance to DOSTE and other organisations on the implementation of state environmental management. MOSTE and NEA will continue to influence development of DOSTE by providing resources such as special equipment, special projects, and through controlling access to Official Development Assistance (ODA). MCI and UNESCO Vietnam provide professional guidance with respect to HLMB.

(4) New Organizational Units

Effective implementation of the EMP will require formal creation and strengthening of three new organisational units, namely the Environmental Research and Monitoring Unit, the Industrial Pollution Control Unit, and the Tidal Flats Protection Unit.

1) Environmental Research and Monitoring Unit (ERMU)

This unit will have four primary functions:

- to conduct activities to fulfil the State responsibilities for environmental monitoring in Ha Long bay,
- to conduct long term research into environmental problems in Ha Long bay,
- to provide training and educational opportunities for students of environmental science and monitoring, and
- to conduct monitoring and research activities to evaluate the effectiveness of the EMP.

Capacity building requirements for ERMU include recruitment of staff, training in environmental monitoring methods (data acquisition, laboratory analysis, statistical analysis, information management, and reporting) and the provision of necessary equipment.

2) Industrial Pollution Control Unit (IPCU)

IPCU will have the primary functions of :

- control and management of industrial wastewater,
- control and management of industrial solid waste,
- to clarify and publicise existing environmental regulations for key economic sectors (e.g. tourism, mining, marine transportation),
- to assist industry to develop plans to bring each industrial facility into compliance with environmental regulations, and
- to monitor progress towards each facility's implementation.

Capacity building requirements for IPCU include recruitment of staff, training in the operation of a pollution control system for each of the key industrial sectors

(mining, transportation, and tourism), and pollution reduction techniques including wastewater treatment, dust prevention, and land reclamation.

3) Tidal Flats Protection Unit (TFPU)

TFPU will have the following primary functions:

- survey and evaluation of tidal flats to determine the value of tidal flat areas,
- conducting planning to make the best use of each tidal flat in each location,
- providing advice to QNPC on sustainable use of tidal flats,
- promotion of the protection and enhancement of tidal flats,
- research and development, and
- coordination with DARD.

Capacity building requirements for TFPU include recruitment of staff, training in the in tidal flats survey and evaluation techniques.

(5) Proposed Allocation of Responsibilities

The allocation of responsibilities, described below, is summarized in Tables 21.2.1 and 21.2.2. Very few changes to the existing responsibilities of the agencies are proposed.

1) NEA's responsibilities

NEA is the lead agency for implementation of almost all of the environmental management functions, except for those related to protected area management and tidal flats and mangrove protection. However, in practice much of the responsibility is delegated to the provincial level. With respect to the EMP, NEA will continue to have responsibility for:

- setting policy and strategy,
- conducting the review and appraisal of development projects that require assessment at the national level,
- licensing of national institutions,
- supervision and collection of discharges (once such programs become operable), and
- guidance on environmental monitoring and laboratory analysis.

2) QNPC and DOSTE Director

The QNPC and DOSTE Director will have primary responsibility for setting policy and strategy for the EMP. They will also be responsible for the establishment of conservation criteria for the EMP. QNPC with the advice of the new TFPU will have primary responsibility for development of new regulations of land use on tidal flats. It is anticipated that the new responsibility for collection of fees from pollution charges and operation of the proposed visitor center for disseminating environmental information will be delegated to DOSTE and require a new division in DOSTE.

3) Inspection and Environmental Management Divisions of DOSTE

The Inspection Division of DOSTE will be primarily responsible for:

- complaint and dispute resolution, and
- environmental inspection.

Capacity building for environmental inspection will require both additional staff and training for environmental inspection in DOSTE as well as the inspection departments of national ministries. The Environmental Management Division of DOSTE will be primarily responsible for:

- Environmental Impact Assessment (EIA) of development projects at the provincial level,
- training and environmental awareness, and
- ensuring compliance of the municipal sanitation companies with environmental laws governing domestic solid waste management and domestic sewage disposal.

4) HLMB

HLMB will have primary responsibility for:

- protected area management of the World Heritage area,
- participating in setting policy and strategy with respect to conservation issues, and
- setting the conservation criteria within their mandate for the management of the World Heritage site.

Capacity building for HLMB will be required to enhance patrol capability to guard the World Heritage site and to improve solid waste management.

(6) Other Proposed Institutional Changes

Table 21.2.3 provides a summary of new institutional arrangements that will be required for effective implementation of the EMP. In addition to the creation and funding of ERMU, IPCU, and TFPU as well as capacity building of the Inspection Division of DOSTE, Inspection Units of provincial departments of national ministries and HLMB, other key institutional changes are proposed as follows:

1) Incorporation of the EMP into the Development Master Plan of Ha Long City for 1994-2010 (HLMP)

An immediate priority is to increase the emphasis being placed on including environmental considerations into the development planning of new projects. This should be coordinated with greater efforts to incorporate environmental considerations in regional planning activities. The EMP provides an environmental impact assessment (EIA) of the proposed socioeconomic development macro frame to 2010. The EMP also provides a recommended environmental zoning and conservation criteria to guide land use decisions.

One potential avenue for inclusion of the results of the EMP into HLMP is through the planning process to produce the next amendment of HLMP. The necessary institutional arrangements to allow for the incorporation of the results of the EMP into the process for amending HLMP should be developed as part of overall implementation of the EMP.

2) Regulation of land use in tidal flats

The coastline, tidal flats, mangrove ecosystems, sea grass beds, and beaches are valued as environmental resources. These resources are at risk from the existing and future development pressures including expansion of the coal mining areas, urban development, development of port facilities and associated infrastructure, industrial development, and expansion of shrimp aquaculture. The EMP will contain recommendations on how to mitigate the potential adverse environmental effects associated with these developments.

However, at present there is no management system in place to guide industrial, urban, and aquaculture development and use. It is recommended that a decision be issued by QNPC on the management and control of development in tidal flat areas. This decision should put in place an effective management system. Also, it should place severe restrictions on all development in these areas until the next amendment to HLMP is completed. It may require agreement at the national level with the Ministry of Agricultural & Rural Development.

3) Establishment of a policy and a national program for collection of pollution charges

The EMP will require funding commitments from the national and provincial levels. One potential source of additional funding is a program of collection of pollution charges. Such programs are under consideration in Vietnam and may be a source of funding for future environmental management activities in Ha Long bay. It is recognised that it may take some time before such a program is implemented in Vietnam. However, such a program will provide an excellent means to fund the industrial pollution control activities.

21.2.2 Establishment of the Quang Ninh Environmental Management Authority

In the future as the socioeconomic development proceeds, environmental risks will increase, and the need for more intensive environmental management will become more important. Based on the planned levels of industrial and urban development in current socioeconomic development macro frame, it is anticipated that a single environmental management authority will be needed to ensure effective implementation of the EMP. This environmental management authority would have broad responsibilities for conservation and protection of natural resources, environmental and land use planning, and control of pollution and waste. This environmental management authority must have enough power and influence to balance the needs for socioeconomic development and environmental protection and conservation goals to achieve sustainable development.

In the longer term after 2010, it is recommended that a new authority with a broad mandate for environmental conservation, protection and management be created.

The proposed organizational structure for the Quang Ninh Environmental Management Authority (QNEMA) has the following seven separate divisions or offices.

- Environmental inspection division,
- Industrial pollution control division,
- Environmental management division,
- Environmental research and monitoring station,
- Ha Long Bay World Heritage area conservation office,
- Office of licensing and collections, and
- Tidal flats protection division

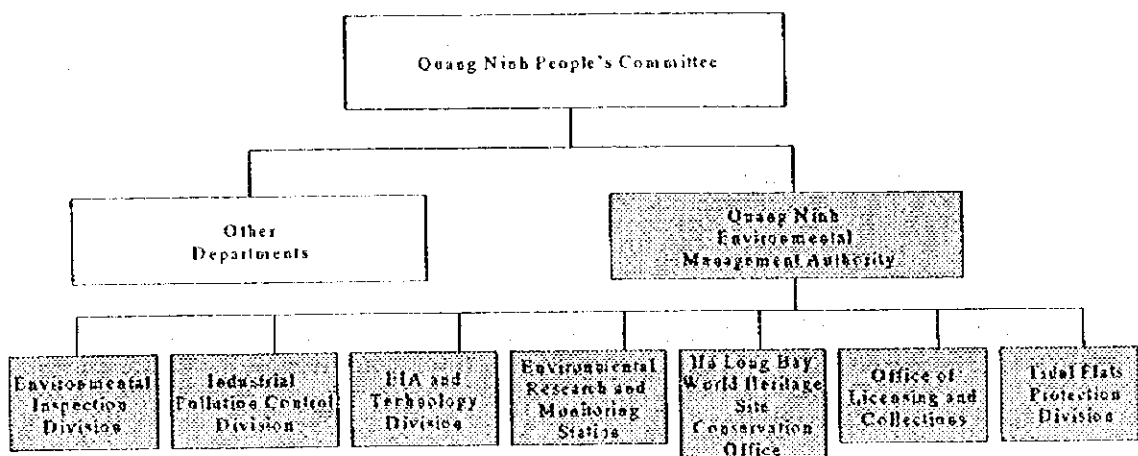


Figure 21.2.2 Organizational Chart of the Environmental Management Authority

This authority would be elevated to a separate agency directly under QNPC. As a separate agency, it will have more influence and power and may ultimately become a Department of Environment of QNPC. QNEMA would be given the state environmental management responsibilities of DOSTE and the land management responsibilities for tidal flat protection. The environmental management and conservation responsibilities of HLMB would become part of this agency. The responsibilities for solid waste management would remain with the sanitation companies and the planning agencies such as DPI and DOC.

The future creation of a powerful agency for environmental conservation and protection in Quang Ninh province will counter balance the pressure for rapid socioeconomic development. This agency will provide for integrated decision making with respect to environmental protection and conservation in Ha Long bay.

At present, it will be very difficult to implement the necessary changes to the existing institutions to create such an authority. For example, HLMB (currently equivalent to provincial level government department) will be relegated to lower level within QNEMA. This problem may be lessened if the dual responsibilities of HLMB to operate a tourist business and protect the World Heritage site are divided. Responsibility for the environmental management and protection of the World Heritage site could be assumed by QNEMA.

Institutional changes at the national level will likely be required before QNEMA can be brought into existence. Currently there are proposals to elevate NEA to the level of a General Department of Environment within MOSTE. Should this occur, the stature of the environment will be greatly raised throughout Vietnam and it will be much more likely that provincial level agencies or departments of environment will be created.

21.2.3 Timeline for Development of Agencies Responsible for the EMP

The timeline for development of agencies responsible for the EMP is shown in Figure 21.2.1. IC should be created by the year 2000. It is responsible for

implementation of the EMP until the period which QNEMA will be established after 2010.

The functions of EMD of DOSTE will be divided among three agencies, the existing EMD and two new organizational units, IPCU and ERMU, to be created by 2000. These new units along with the existing inspection division, environmental management division, and the licensing function of DOSTE will be strengthened up to 2010.

The responsibility of DARD for management and protection of tidal areas and mangroves will be given to TFPU which will be created by 2000 under the direction of DARD. It along with the environmental management functions of HLMB will be strengthened to the period of 2010. The Forest Protection Agency (FPA) will continue to have responsibility for management and protection of upland forests throughout the implementation of the EMP, while the Department of Fisheries will manage fish and shellfish resources throughout the implementation of the EMP. In future, all of these agencies will be combined into QNEMA.

21.3 Market Oriented Incentives

It is GOV's policy to move towards market oriented incentives in pollution control and environmental management. One proposed scheme to provide funding for future environmental management activities is the creation of charge for pollution. As yet, there are no pollution charges programs in Quang Ninh province. In Vietnam, there is a legal mandate for such programs and there are a number of ways in which it might be introduced.

21.3.1 Vietnamese Legislation and Policies Related to the Incentives

(1) The Law on Environmental Protection (LEP)

Article 7 clearly states the financial responsibilities of industries, government, and individuals. It stipulates that:

- a) Organizations and individuals that use the environment for production or business purposes shall, if necessary, contribute to environmental protection.

- b) The government shall regulate the circumstances, levels and modalities for financial contributions required from industries and businesses.
- c) Individuals and organizations that damage the environment shall compensate for said damage according to regulations.

(2) Government Decree No. 175/CP on Guidance for Implementation of LEP

This states that all industries and businesses governed by LEP shall be responsible for "contributing finance for environmental protection, making compensation for damages of environment according to the provisions stipulated by the law". In addition, this decree specifies design options for the Vietnamese charges program and includes the guidelines for NEA environmental charges program. Article 35 of the decree states the government shall allocate finances for environmental protection to the following activities:

- a) Surveys of environmental factors,
- b) Pollution surveys,
- c) Urban and industrial environmental protection,
- d) Eco-system conservation projects, and
- e) Capital construction projects for environmental protection.

(3) General Regulations on Management of Fees and Other Charges, and Circular 48TC/TCT on Registration and Collection of Fees and Charges

Decision 276 passed on July 28, 1992, specifies that all fees and charges collected by government agencies must be registered at the tax department and that the generated revenue should contribute to the general budget. Fee rates should both cover collection and administration fees and contribute to the state budget. Circular 48, passed in September 1992, provides guidelines for fee management. It states that:

- a) The taxation department must approve all decisions about fee collection made after July 28, 1992.
- b) The amount remitted to the state budget must be equal to the amount of fees collected minus fee collection expenses approved by the tax department.

- c) Collection agencies have the right to keep a maximum of 10% of the revenue as staff bonuses for those who collect the fees.

Article 22 of the circular provides a list of 21 environmental standards with which industries and businesses must comply. Article 32 specifies that finance for environmental protection shall come from three sources: the state budget, charges for the evaluation of EIAs, and other revenues such as penalties and donations. Article 34 states that environmental protection charges shall be paid by:

- a) Industries, organizations and individuals who exploit oils, gas and other natural resources;
- b) Airports, seaports, bus, and railway stations;
- c) Motorized vehicles or other means of transport; and
- d) Other pollution-causing businesses or production plants, including those from foreign countries.

Lastly, the regulation states that the fees and charges for environmental protection will depend on the severity of the environmental impact of business and production. MOSTE and the Ministry of Finance will decide on the collection and use of revenue from fees and charges.

(4) Proposed Program for Environmental Charges

A program for environmental charges was proposed in 1995 by a contractor working for the National Environmental Agency under support from Canadian International Development Agency. This proposed program has five key elements, namely:

- a) Who should pay,
- b) The basis for determining chargeable payable,
- c) The amount of charges to be paid,
- d) Exceptions to the schedule of charges, and
- e) Collection and management of environmental charges paid.

Any proposed program of environmental charges will likely be implemented at the national level and QNPC will have to follow the national program.

(5) General Environmental Fund

MOSTE is in the process of establishing a General Environmental Fund for Vietnam. Contributions to the Fund are to originate from environmental tax revenue, fines for breaches of the Law on Environmental Protection, domestic funding from Ministry of Finance, for overseas development assistance, international development banks, and the private sector. This fund will be directed at environmental improvement. This fund may be a potential source of funding for the environmental management plan.

21.3.2 Economic Incentives for Environmental Protection

Underlying causes of environmental degradation in the Ha Long bay area can be largely categorized into the next three phenomena:

- 1) Individuals are unaware of the environmental problems they are causing,
- 2) Individuals do not know of alternatives to environmental degradation, or
- 3) Individuals see the personal costs of environmental protection outweighing the personal benefits.

Taking the whole society of the study area, the term "individual" has to be broadened to include the full range of decision-making units whose activities impact the environment. These include families, industrial sectors (coal mining, tourism, fishery, agriculture and so on), government agencies and others. Among these underlying causes, a typical example of 3) is that developers and investors in the study area may come to regard the EIA process as too costly, yielding little benefit. And in environmental policy formulation, local policy makers in Quang Ninh province need to take explicit account of the fact that environmental degradation can incur significant economic costs (e.g. water- or air-related health problems, and reduced productivity of natural resource-based activities such as fishery and tourism), understanding how the economy and environment interact is critical in designing effective environmental policies.

In general, there are two basic functions of institutional framework for environmental management such as to provide assistance to all decision-making

units and to regulate and monitor these units. As for the underlying cause 3) above, the institutional tasks like in the next table have to be considered in this context. Establishment of appropriate economic incentives is thus an important instrumental factor to deal with this underlying cause.

Tasks of Institutional Framework for Environmental Management

Underlying Causes of Environmental Degradation	Functions of Institutional Framework	
	Provide Guidance & Assistance	Ensure Regulation & Monitoring
Personal costs of environmental protection outweigh benefits	<ul style="list-style-type: none"> - Establish appropriate economic incentives - Institute appropriate macro-economic policies - Invest in research and development 	<ul style="list-style-type: none"> - Develop legislation - Enforce legislation - Sanction offenders

(1) Institutional Instruments Based on Economic Incentives

After environmental baseline data have been collected and analyzed so that priorities can be identified, the next essential step in the EMP is the development of an operational system of institutional management. As consumers, producers and service providers, people make decisions and take actions in their personal and working lives that directly or indirectly impact on the environment. People's behavior and attitudes can be modified through the three kinds of institutional instruments such as 1) regulatory instruments, 2) economic instruments, and 3) self-regulatory instruments.

1) Regulatory instruments

The regulatory instruments include measures of laws and sanctions, where enforcement mobilize socially acceptable actions. These instruments are employed through a complementary approach of direct controls enforced through a system of fines and sanctions, serving to internalize pollution prevention and abatement costs.

2) Economic instruments

Economic instruments, where self-interest of polluters mobilize socially acceptable actions, are employed also through a complementary approach of economic incentives that operate through market signals to reduce producers' and consumers' pollution propensities influencing polluters' behavior. Economic

instruments thus provide individual decision makers with freedom to determine the most economically efficient solution to environmental requirements, and are normally designed to internalize residual damage in addition to pollution prevention and abatement costs. Two broad categories of economic instruments are a) price-based instruments (such as taxes and subsidies), and b) quantity-based instruments (such as tradable discharge permits), as listed in Table 21.3.1. Emission charges and water user fees are sorts of price-based economic instruments. Very often, resources are priced below the full cost of private supply, and social costs associated with their use are not internalized. Details, including levels and means of payment, are to be established through a joint effort of MOSTE and MOF. Environmental subsidies are not generally consistent with the polluter-pays principle.

3) Self-regulatory instruments

In order to effect a fundamental and sustainable change in people's behavior and attitudes, their initiatives must be complemented by the development of self-regulatory instruments (environmental education and awareness). While facilitating the enforcement of national legislation, these self-regulatory instruments can also impact strongly on market signals through influencing consumer choices. Environmental education programs, implemented through the conventional education system and non-formal community networks, can lead to the development of a more environmentally literate society. This in turn can increase the demand for a more environmentally sound exploitation and management of natural resources. Such demands will be reflected in individual consumer choices which will tend to favor environmentally-friendly goods and production practices. Self-regulatory instruments can, therefore, provide major incentives for producers to incorporate environmental considerations into investment decision-making.

(2) Combination Usage of Regulatory and Economic Instruments

In general, achieving environmental quality objectives is increasingly being pursued through a mixed approach which combines direct regulatory instruments and indirect economic instruments. Figure 21.3.1 presents an example of how

regulatory and economic instruments can be applied in combination. In the example, a discharge standard is applied for BOD concentration and load in a firm's wastewater. If the firm exceeds the standard, then it is subject to a charge, known as non-compliance fee, on each unit of excess discharge. The regulatory body may also choose to levy a punitive charge (i.e. penalty) if the effluent level is too far above standard.

If the pollution tax is set too low, polluters may prefer to pay the tax than to reduce pollution such that governments may have difficulty achieving the ambient quality standard. Some firms may save money by reducing pollution and avoiding the charge, while others may save money by paying the charge rather than investing in abatement. If the charge is set at the right level, the net effect of all the individual firms' decisions should be to reduce pollution enough to achieve the ambient quality standard, and to do so at minimum cost to the firms as a group.

On the other hand, the adoption of the economic instruments need not await for the full implementation of the regulatory instruments. Many economic instruments are well suited for use in the absence of effective enforcement and compliance systems and are especially well suited for encouraging small-scale industries to adopt more environmentally-friendly practices.

The combination of regulatory and economic instruments permits the following objectives to be pursued simultaneously:

- 1) promoting cost-effective ways for achieving acceptable levels of pollution,
- 2) providing flexibility in the choice of environmental technologies for the polluting industries,
- 3) stimulating the development of pollution control technologies and expertise in the private sector,
- 4) providing the government with an added source of revenues to finance environmental expenditures and sustainable development, and
- 5) decreasing the need for the government to generate and collect industry-specific economic and environmental information pertaining to all point-sources.

(3) Applicability of Institutional Instruments with Economic Incentives to the EMP

The "polluter pays principle" is now an accepted approach to pollution prevention and control in Vietnam and it would be feasible to consider its use for environmental protection in the Ha Long bay watershed. Given the relatively recent international development and application of economic instruments, and some of the difficulties experienced to date internationally in their implementation, it will also be necessary to strengthen the regulatory instruments used.

Among the various types of instruments, the "emission/effluent charges" and "environmental tax or fee" are most applicable or to be strengthened because they are simple and precise using the existing tax system in Vietnam. However, it will be difficult to directly apply them to the study area of the EMP without a strong institutional support and political decision of such central agencies as MOSTE, MOF and taxation authorities. This is because direct introduction to only a local area, not the whole country, significantly hampers potential development of that local society by weakening economic competitiveness.

(4) Proposed Regulation on Environmental Protection Fees for Wastewater

The Ministry of Finance and MOSTE proposed a regulation on payment, collection, and management of environmental protection fee for wastewater in 1998. In this case, the environmental protection fee is a compulsory financial payment by manufacturing and business facilities to encourage them to reduce pollution and improve the environment. Any domestic and foreign individual or organization which is discharging pollutants or disposing of waste into the environment will be required to pay the fee.

1) Basis of calculation of the amount to be paid

Based on the proposed regulation, the environmental protection fee is to be calculated as function of the following:

- a) Total pollution loadings, such as BOD₅, COD, TSS and Heavy Metals, estimated based on actual discharge volumes and permitted or licensed discharge concentrations,

- b) Degree of hazard associate with the pollution type,
- c) Vietnam's industrial wastewater standard, TCVN 5945-1995,
- d) Differential fee structures for facilities established before or after the passage of LEP, and
- e) The physical, chemical, and ecological characteristics of the receiving environment.

2) Environmental protection fee collection and payment management

The proposed arrangements for fee collection and payment management are as follows. DOSTE will be responsible for collection of the fee. Individuals and organizations will calculate the fee according guidelines provided by state environmental protection agencies and remit payment every quarter to DOSTE. DOSTE will provide the necessary receipts, keep proper records, and submit the environmental protection fee to local department of taxation.

3) Uses of environmental protection fees

The proposed usage of the revenues generated by environmental protection fees are:

- a) Administrative costs associated with collection of fees,
- b) Environmental data collection and sampling,
- c) Assistance to state environmental management (organize professional training and supervise, control, research and implement environmental projects),
- d) Bonuses for staff who perform well and reach a high level of achievement in environmental protection management, and
- e) Other expenditures

All of these expenditures must be properly accounted for in annual financial plans and budgets.

(5) Wastewater Effluent Charges for Funding the EMP

The EMP has the goal of controlling area wide pollution load. In the long term, the implementation of the EMP will require controls to restrict the total pollutant loadings. This means industrial discharge standards will have to be based on pollutant loadings from individual facilities. The proposed implementation of a wastewater effluent charge will provide an incentive to keep individual discharges within permitted levels and hence control the area wide pollution load from industrial facilities.

The proposed water effluent charge is also a potential source of funding for some of the environmental management programs of the EMP. It is recommended that the charge system be implemented to ensure a provide revenue to the provincial level. The system will first be applied to industrial facilities and not to the mining industry. There is another proposal for to set up a fund for environmental management of mining activity.

1) Base charge

Base charge system can be done by establishing discharge standards for each facility. The license or permit for the facility will contain:

- the expected concentration (C) of pollutants (kg/m^3) in the wastewater discharge; and
- the permitted level of allowable discharge (D) (m^3/month).

The permitted monthly loading (X) in kg/month can be calculated by multiplying C times D. The actual loading (L) will be estimated from the actual discharge multiplied by the permitted concentration C.

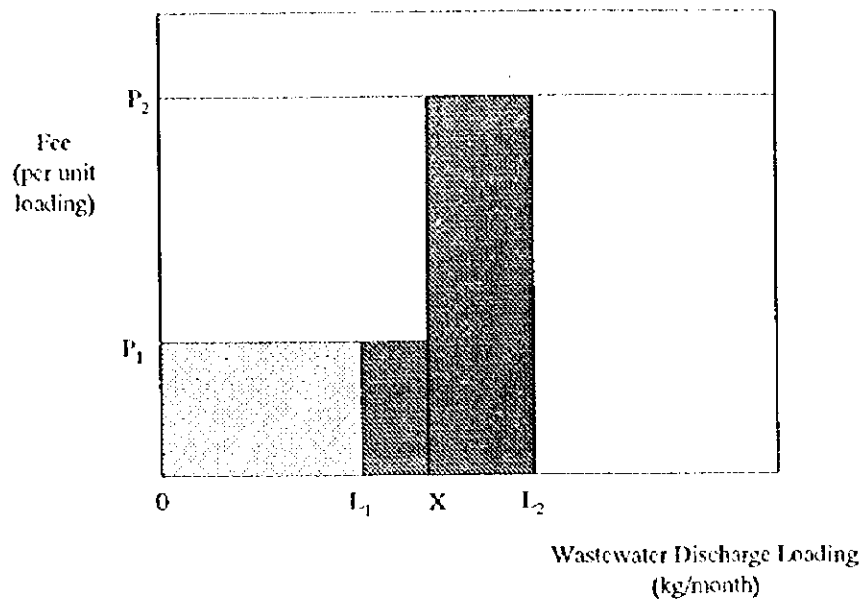


Figure 21.3.2 Wastewater Effluent Charge

The monthly rate of P_1 per kg will be charged for actual loadings less than or equal to X . In Figure 21.3.2, the lighter shaded area (P_1 times L_1) represents the total monthly charge for a loading of L_1 . As long as industrial facility is operating normally, this should generate a reasonably reliable base of revenue.

2) Loading in excess of permitted levels

A monthly rate of P_2 per kg loading will be charged for loadings greater than the permitted level X . In Figure 21.3.2, all of the shaded area ($(P_1 \text{ times } X) \text{ plus } ((L_2 - X) \text{ times } P_2)$) represents the total monthly charge for a loading of L_2 . The rate, P_2 should be set very high to discourage discharges beyond the permitted levels.

21.4 Voluntary Participation and Involvement of Stakeholders

The successful implementation of the EMP will require the cooperation of many stakeholders including industry, government agencies, and the people of Quang Ninh province. Both government regulators and the various stakeholders will have to work together to achieve the goals of the environmental management plan. The main stakeholders are:

- Mining industry,

- Existing and proposed industrial facilities,
- Planned industrial zones,
- Ports and shipping,
- Tourism industry,
- Coastal communities,
- Fishing community, and
- Mass organizations.

Methods to encourage voluntary participation and involvement of stakeholders aim at internalising environmental awareness and responsibility into individual decision making by applying pressure and/or persuasion directly or indirectly. The approaches include education, information extension, training, social pressure, and negotiation.

21.4.1 Role of Industrial Facilities and the Mining Industry

The following voluntary programs are recommended for use in the EMP:

(1) Continuation of the Pollution Inventory

A pollution inventory survey was prepared and sent to 127 facilities and the response rate was approximately 78%. It is recommended that the pollution inventory should be updated periodically. End of pipe sampling programs will be necessary to verify the information being provided in the pollution inventory surveys.

(2) Voluntary Agreements

Voluntary agreements reached on the basis of negotiations between environmental agency and private sector, or between industry and a community can be an effective means of reducing pollution. These agreements give industry and communities a voice in determining pollution reduction targets and offer facilities flexibility in how to comply with targets. Voluntary agreements are flexible and may involve little bureaucracy. Moreover, the affected community can be effective at enforcing the agreement.

1) Proposed VINACOAL cooperative agreement

It has been proposed by UNDP project that VINACOAL enter into a cooperative agreement with QNPC for environmental improvement. This agreement would formally establish VINACOAL Environmental Fund by setting aside 1% of VINACOAL's annual revenue for the purposes of environmental improvement. The fund would be used for i) environmental improvements in its operations and properties, ii) environmental restoration projects located outside its properties, and iii) contributions to QNPC for general environmental management activities. It is expected that this fund will be used for make specific improvements such as treatment of wastewater, land reclamation, and dust control and prevention.

2) Compliance agreements with industrial facilities

The proposed IPCU will work with industrial facilities to establish compliance agreements. These compliance agreements will mandate a schedule of environmental improvements designed to bring the facility into compliance with environmental laws and regulations. The essence of these agreements is that the industrial facility undertakes to execute defined tasks by certain dates in exchange for freedom from punishment, except in cases of gross negligence or carelessness.

Compliance agreements can be mandated by applying Article 17 of the Environmental Protection Law. Article 17 requires that an EIA report of existing facilities be prepared and that plans for undertaking remedial action be prepared and executed. The basic steps in a program to bring an industrial facility into compliance with wastewater discharges standards over the period 2000 to 2010 are shown below:

Phase I: Audit and Evaluation may start with the energy, water use and waste materials audit. Most industrial facilities have wasteful practices that have become part of the basic operations. To identify and stop as many sources of economic loss due to wastefulness, it is usually necessary to conduct careful audits of the use of energy, water, and raw materials. The audits may find problems that can be easily rectified. These can be done immediately.

Phase II: Energy and Water Conservation and Waste Minimisation involves the implementation of the energy and water conservation programs as well as the focus on waste minimisation. During this phase detailed reports on water discharges should be prepared. A study should be undertaken on the financial viability of the enterprise in general and its ability to ultimately comply with environmental laws and regulations.

Phase III: Wastewater Treatment Control involves the designing and installing wastewater treatment equipment and programs. These programs may require fundamental changes to provide a cleaner process.

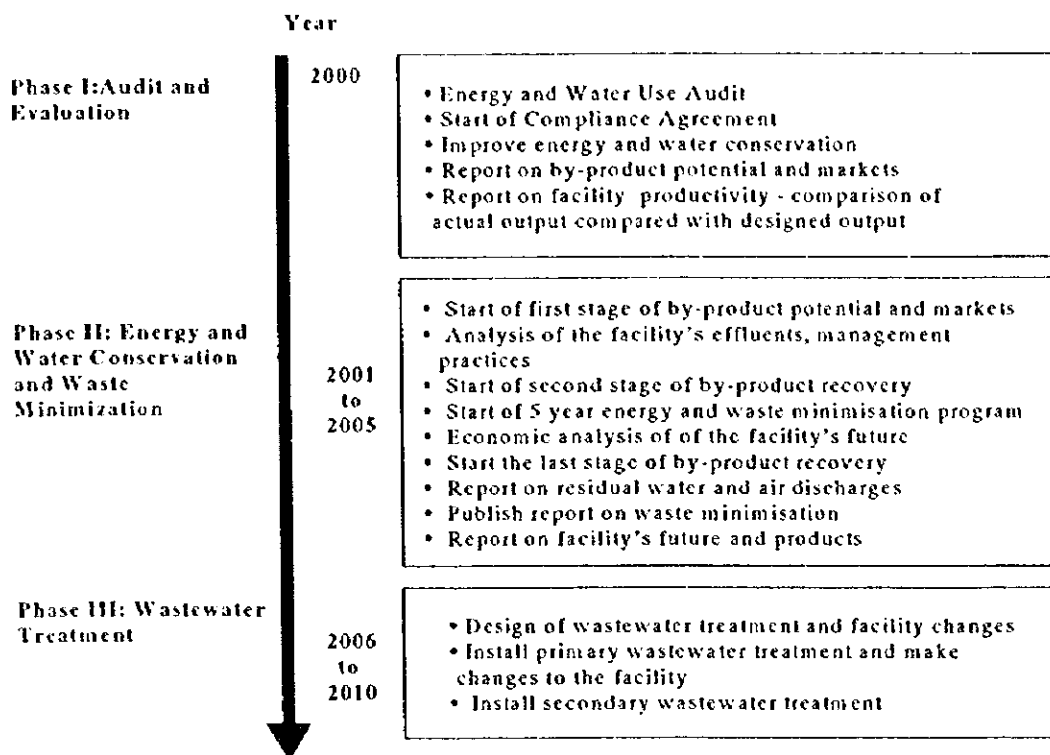


Figure 21.4.1 Schedule of Compliance Agreements with Industrial Facilities

21.4.2 Ports and Shipping

The major ports in the EMP area are under the control of the QN Port Authority.

The major port systems are:

- 1) Ha Long City System, which includes the coal port (owned by VINACOAL), B-12 oil port (PETROLIMEX), and Cai Lan Port 1 (Vietnam Maritime Corporation), and
- 2) Cam Pha Port System, which contains the coal port and the floating port near Hon Net island.

Their primary environmental management responsibility is controlling ship-based pollution including oil and chemical spills. In the event of any oil spill, the Director of QN Port Authority is in charge. But the individual port management must conduct the response and clean up. The individual ports are also responsible for environmental management of their facilities. Those agencies responsible for environmental protection (i.e. DOSTE, and the Quang Ninh Port Authority) do not have sufficient capacity, technical staff or financial resources to fulfil their responsibilities with respect to the environmental management of ports.

Implementation of the EMP will require commitment by the QN Port Authority to the development of the environmental management of the Ha Long City port system, through i) recruitment of qualified staff, ii) specific training in environmental management of ports, iii) provision of necessary facilities and staff to ensure navigation safety, and iv) provision of the necessary plans, staff, and equipment to respond effectively to major oil spills and the risk of accidents.

21.4.3 Tourism Industry

The environmental concerns with respect to tourism are threefold such as, i) increased solid waste and wastewater pollution from hotels and other tourist facilities, ii) increase solid waste and wastewater pollution from tourist boats using the World Heritage site, and iii) increase demand for coastal lands for development.

Tourism companies and hotel operators have stake in maintaining the environment of Ha Long bay. In addition to their responsibilities for wastewater treatment and proper solid waste management, they should act as powerful advocates for maintaining environmental quality. Tourist boat operators have a similar interest in maintaining environmental quality through proper wastewater treatment and

control of littering from their boats. Local associations of hotel operators and tourist boat operators should adopt specific environmental policies for their members. They should also become active in promoting the environmental protection goals of the EMP.

21.4.4 Communities Role in Protecting the Environment

(1) Coastal Communities

Residents of coastal communities contribute to environmental pollution in Ha Long bay through the daily discharge of domestic waste. Some households are connected to the municipal system but many dump domestic waste directly into the Ha Long bay without treatment. Most residents have little understanding of the solid waste problem. Littering and indiscriminate disposal of solid waste are common. Measures are required:

- to improve public awareness of the value and benefits of environmental protection,
- to foster an understanding of environmental stewardship in people (i.e. to help them understand that it is their responsibility to care for land upon which they all depend), and
- to improve the living conditions of women in the family because of the important role that they play in environmental protection at the family level.

(2) Fishing Communities in Ha Long bay

The fishermen living in the coastal communities and living on and amongst the islands in Ha Long bay have similar interest in the protection of the environment. These communities must take more responsibility for protecting the ecology of Ha Long bay to issue sustainable use of fish and other ecological resources. Many fishermen regard these resources as a common property resources and as a consequence wish to maximise their catch without regard to sustainable use. Many illegal fishing methods (e.g. dynamiting, electro-fishing, illegal nets) that are destructive to the ecology in general, and the habitat in particular, are in use. In addition, the practice of extensive shrimp culture in mangrove areas has resulted

in the degradation and destruction of the mangroves swamps. Measures are required:

- to educate and enhance public awareness of ecological environmental protection through training and propaganda,
- to discourage further destruction of mangroves and coral reefs,
- to assign use rights to residents to encourage stewardship over ecological resources, and
- to provide incentives to local people to exert social pressure to ensure that laws and regulations are obeyed.

The fishing communities in Ha Long bay have a vital interest in protecting the marine ecological environment. As they are local residents, they are the first to incur the environmental consequences and economic losses (reduction in annual catch). Proper determination of the role of the community and individuals in protecting ecological environment of Ha Long bay will contribute significantly to reduction of environmental degradation.

21.4.5 Dissemination of Environmental Information

(1) Necessity of Public Awareness

The leadership in Vietnam is dissatisfied with progress on the implementation of environmental management, environmental protection, and environmental awareness programs. On June 25, 1998, the Central Committee of the Vietnam Communist Party issued a strong directive on the promotion of environmental protection during the industrialization and modernization of Vietnam. This directive stated that:

- environment has deteriorated and serious pollution exists in some areas,
- environmental protection policies have not been rigorously implemented, and
- environmental awareness in the public has remained at a low level.

This directive attributes the cause of the low level of environmental awareness to the fact that propaganda and education designed to enhance the sense of environmental protection for the Party and People have not been heeded. The

directive also states that the role of social and political organisations, People's associations and people's movements in promoting environmental protection has not been fully mobilised. Promotion of environmental awareness by key agencies such as the Board of Propaganda and Education, Department of Education and Training, the Women's Union, and Fatherland Front is needed:

- to improve the awareness of the need for environmental protection by the party and authorities at all levels in Quang Ninh province,
- to integrate the awareness of environment into other activities and socioeconomic activities in order to lay the ground for sustainable development in the industrialisation and urbanisation process, and
- to disseminate environmental information for the community to improve the awareness of environmental protection and introduce environmental education in the school.

(2) Establishment of a Visitor Center in Ha Long Bay Area

Considering the importance of the public awareness on environmental protection, it is recommended to establish a visitor center in the study area.

The main purposes and functions of the proposed visitor center are:

- to disseminate environmental information,
- to open monitoring data to the public,
- to exhibit natural and environmental resources to be protected,
- to demonstrate a simulation data,
- to collect an entrance fee from tourists,
- to enhance environmental awareness, and
- to provide data and information for environmental education.

The proposed visitor center mainly consists of display and observation corner, exhibit and study corner, video theater, library, and experimental tidal flat. Necessary facilities and equipment of the visitor center are listed in Table 21.4.1. A conceptual layout and development scale of the proposed visitor center is shown in Figure 21.4.2, and its location could be in the existing reclaimed land of Hung Tang.

21.5 Justification and Authorization

The implementation of the EMP will require commitments and undertakings at both the national and provincial level.

(1) National Level

While the primary environmental management responsibility for the EMP is at the provincial level, there are number of actions that must occur at the national level. These include:

- implementation of pollution charge system at the national level by MOSTE and the Ministry of Finance,
- approval of increases in the full time staffing levels within DOSTE and other agencies by the Government Committee on organization and personnel,
- approvals and funding to be given at the national level to allow the implementation of the proposed EMP programs for national level agencies (i.e., VINACOAL, Quang Ninh Port Authority and national level ports, and industrial zones and industrial facilities under the control of the Central Government),
- approval by MPI of any official development assistance programs provided by donor agencies, and
- support from MOSTE to provide equipment and training to support environmental monitoring and inspection activities.

(2) Provincial Level

Many of the proposed institutional changes can occur at the provincial level and can be brought into being by QNPC. These include:

- creation of the Implementation Committee of the EMP by a directive or instruction by QNPC,
- creation and funding of ERMU, IPCU, and TFPU,
- regulations on land use in tidal flats promulgated by QNPC,
- capacity building in the provincial level agencies that is done without donor assistance,

- raising of environmental awareness amongst communities and mass organizations, and
- implementation of natural resource programs to protect ecological resources.

The EMP will need to be supported by funding from QNPC. QNPC will also have to support the hiring of more environmental staff in DOSTE.

21.6 Operational System

21.6.1 Command and Control

(1) Appropriate Discharge Standards for All Facilities

The establishment of an effective system of pollution control will require that discharge standards be set for industrial facilities and mining operations in Quang Ninh province.

Discharge standards for emissions and effluents from facilities define the maximum acceptable quantity of pollutants which may be discharged into the ecosystem, area or region. Discharge standards must be set for specific pollutants, and often are stated as concentrations, or as discharge rates to incorporate the time dimension. They usually are specific to an area or ecological zone, and may be set for specific industries.

Facility specific discharge standards should be based on the amount of a pollutant that may be discharged without causing the violation of water quality conservation criteria of the EMP. For this to be done, the receiving environment (i.e. the current water quality conditions) for the pollutant must be characterised in terms of existing levels. Predicted changes in ambient concentrations resulting from the additional discharges should be compared against water quality conservation criteria.

(2) Compliance Agreements to Gradually Reach Discharge Standards

Existing pollution control regulations are not fully enforced because of insufficient enforcement capability of DOSTE. In addition, full compliance with

the regulations will create economic hardship for existing enterprises. Furthermore, penalties, when considered appropriate are not always applied. At this time, it is neither practical nor possible to introduce strict discharge standards as that might force many facilities to cease operating. Instead, progressive discharge standards should be introduced with a specified timetable for implementation so that polluters have time to plan and prepare for the gradual modification of their operations to reduce effluent without severe economic hardship. This approach is to be incorporated into compliance agreements.

(3) Penalties and Fines

The GOV's regulation on punishment for administratively violating environmental protection legislation outlines the forms of punishment and the responsibilities and authority for enforcement. The various articles provide for warnings and fines for violations for all large number of violations of LEP and supporting regulations. Unfortunately, fines are set at levels too low to act as disincentives to potential polluters. In addition, DOSTE inspection division has limited authority over national level industrial facilities and mining operations. For example, the Chief Inspector in DOSTE can not revoke a permit issued by the national level.

The system of administrative punishments should be reviewed. Higher fine levels and other forms of punishment should be considered. The proposed institutional strengthening of the Inspection Division is designed to increase the enforcement capability. This combined with more severe punishments will provide for stronger means for investigating, prosecuting, and punishing serious polluters.

21.6.2 Pollution Charges

The command and control measures, discharge standards backed up by penalties and fines may not be completely effective. In many parts of the world regulators are increasingly becoming aware of the limitations of command and control approach. The major weaknesses of laws and regulations are their failure to take into account the changing environment and their tendency to be biased against

technological innovation. While pollution licenses are in effect for a specified time period, abatement technology and environmental conditions are constantly changing. Once a license has been issued for a specific length of time, the polluter has little incentive to adapt to new economic, environmental or technological conditions or to control pollution beyond the level required.

Enforcement problems and skepticism about compliance with direct regulation have raised questions about the effectiveness and efficiency of imposing further regulation. GOV is proposing to introduce mandatory pollution fees on wastewater discharges to create an incentive to reduce pollution. The introduction of pollution fees on wastewater discharges will greatly increase the likelihood of the attainment of the EMP's objective to control area wide pollution.

21.6.3 Environmental Impact Assessment (EIA) System

(1) EIA of Existing Facilities

The Law on Environmental Protection requires that EIA reports are to be prepared for existing facilities. These reports are essentially inspections and audits of the current environmental impacts associated with existing operations. Where these facilities fail to meet environmental standards, they are required by the law to undertake remedial measures to reduce the environmental impacts. Few existing industries have the financial resources to conduct EIA of their operations, and fewer still have the resources to undertake remedial actions. However, these industries are a serious cause of existing pollution and are a target for substantial improvement in environmental protection or they may face closure.

The EMP proposes to use the requirements for existing facilities to produce an EIA report to ensure that compliance agreements are prepared to gradually bring the serious polluting facilities into compliance with existing laws and regulations. For example, over 30 existing mines have completed EIA reports including plans to provide solution to existing environmental problems. These plans will provide the basis for development of compliance agreements.

(2) EIA of New Facilities

All new projects are subject to the Vietnamese EIA process. Major projects require a detailed EIA report which must include a description of the project, a description of the environment, anticipated impacts, proposed mitigation measures, and environmental monitoring requirements. The EIA process for new development will continue to play a major role in development planning in the EMP area. It is anticipated that most, if not all, of the proposed projects in the socioeconomic development macro frame will undergo a detailed environmental impact assessment.

The EMP will be of great assistance in setting the overall context within which individual development projects can be assessed in detail under the EIA process.

(3) EIA of Regional and Master Plans

Article 9 of Government Decree 175/CP requires that overall strategies for regional development, strategies and plans for development of provinces and cities under the central government and strategies for urban and population development must have an assessment of environmental impacts. More consistent application of the EIA process to these planning activities will greatly improve the environmental aspects of these plans. However, application of the EIA process to regional planning activities is only one measure and may come late in the planning process after key decisions have been made. New approaches are required to ensure that environmental concerns will be considered in future development planning.

(4) Linking EIA Requirements to Inspection Activities and Compliance Monitoring

The end result of the EIA process is a list of mitigation measures to protect the environment and a list of monitoring requirements to test to effectiveness of the mitigation measures. Surveillance and monitoring is usually required during construction. A critical check is required at the end of the construction phase prior to the operations. An inspection by DOSTE should be made to ensure that all of

proposed mitigation measures have been implemented as designed and are in working order. This should be followed up by a second inspection six to twelve months later to verify that the mitigation measures are still in working order.

21.7 Required Staff for the EMP

(1) Required Staff Number

The basic principle of developing staff capability to implement the EMP is to increase labor efficiency by assigning appropriate number of staff and to provide intensive training for skill development. The future manpower requirement is estimated based on allocated tasks by divisions and units under the Implementation Committee (IC). The following points are considered prior to examining the manpower needed for the EMP.

- a) subcontractors will be fully utilized for works such as design and construction,
- b) cooperative will be utilized for housekeeping works such as cleaning and maintenance of buildings, and supporting tasks such as securities and drivers, and
- c) each staff will be expected to perform more than one task as needed.

Based on the working volumes, the estimated staff numbers that will be needed for each unit and division for the implementation of the EMP under IC is shown below.

Estimated Number of Manpower Required for the EMP in 2010

Department and Board	Units and divisions	Current conditions	Future (2010)	Increment
DOSTE	EMD	5	10 ^{*1}	5 ^{*1}
	ERMU	0	25 ^{*2}	25 ^{*2}
	IPU	0	5	5
	ID	2	8	6
	STAMQ	3	3	0
	STAD	9	9	0
HLMB	-	91	91	0
DARD	TFPU	0	5	5
FPA	-	na	na	2
DOF	-	na	na	8
Total		-	-	56

Note: *1) includes staff of the proposed visitor center.

*2) ERMU consists of four sections such as general affairs, water quality, ecology, and analysis sections. Detailed number of staff needed is discussed in Chapter 20.

As for HLMB, it is expected that their working volume will be increased to satisfy the allocated responsibilities. Considering current condition and staff of HLMB, however, the expected future work can be managed by the current staff number by providing intensive skill training to them.

(2) Training Program

1) Type of training program

The purpose of training is to development general and technical skills for sector as well as managerial skills. For efficient and effective skill development, the training program should match with the individual needs and organizational goals. Thus, two types of training programs are recommended, namely, intensive training program and routine training program. An intensive training program focuses on the proposed new units that should be strengthened as early as possible. The following intensive training programs should be provided:

- skills of mandatory operations on laws and regulations,
- basic engineering skills of the EMP and activities concerned, and
- basic administrative skills of the EMP.

A routine training program is characterized as training on a continuing basis. This program could be for new employees, and in case of modification and updating of the EMP.

2) Training method

Methods of intensive training should be selected by considering the characters of the training. Several methods of training are available, such as a lecture, attending seminar, on the job training (OJT), and training in relating institutes such as HIO, CMESRC, CBETIA, Institute of Mining Science and Technology (IMSAT), and Institute of Forestry Investigation and Planning (IFIP). A period of OJT's on site, abroad, and training in relating institutions are assumed to be two or three months, while an OJT by T/A could be about two years. Lectures and attending seminars should be done at intermittently.

Qualified instructors such as domestic and international experts, and government officials should be fully utilized. In particular, technical assistance (T/A) from bilateral and multilateral donors is strongly recommended for continuous technology transfer to Vietnamese staff. On the other hand, instructors for administrative training may be better selected from the Vietnamese legal sector where comprehensive knowledge of laws and regulation of Vietnam is required.

The intensive training programs which are required mainly at the beginning of the EMP are as follows:

Required Intensive Training Programs

Department and Board	Units and Divisions	Required training programs	Type of training
DOSTE	EMD	- the EMP management - Database (pollution source inventory) management - Visitor Center management - environmental education methods	- T/A - lecture, OJT on site, OJT abroad, training at relating institutes (HIO, CMESRC)
	ERMU	- environmental monitoring methods* - environmental research techniques	- T/A - lecture, OJT on site, OJT abroad, training at relating institutes (HIO, CMESRC)
	IPU	- operation of pollution control system - pollution reduction techniques	- T/A - lecture, OJT abroad, training at relating institutes (CEETIA, IMSAT)
	HD	- inspection methods	- lecture, OJT on site, training at relating institutes (CEETIA, IMSAT)
HLMB	-	- landscape conservation methods	- lecture, OJT on site
DARD	TFPU	- tidal flat survey and evaluation methods - mangrove management methods	- T/A - lecture, OJT on site, training at relating institute (HIO)
FPA	-	- forest coverage survey and evaluation methods	- lecture, training at relating institute (IFIP)
DOF	-	- patrol and inspection fishing - fishermen data survey methods	- lecture, training at relating institute (HIO)

Note: 1) *Detailed training programs for Environmental Monitoring plan are discussed in Chapter 20.
2) T/A means technical assistance.

A proposed implementation schedule of training programs is shown in Table 21.7.1. Intensive training is scheduled to be from 2000 to 2006, followed by the routine training. Basically, routine training will be from 2007 after completion of technology transfer to representatives of each unit of division.

21.8 Facilities and Equipment Required for the EMP

For effective implementation of the EMP, several facilities and equipment are required in each section in addition to office spaces. A computer system is an important tool for arrangement and compilation of environmental data and administration issues. The established Database provided by the JICA Study Team will be managed and updated by the Environmental Management Division (EMD) of DOSTE with a computer system. Some vehicles for daily inspection and patrol

are required in the proposed Industrial Pollution Control Unit (IPCU), Tidal Flats Protection Unit (TFPU), and the Inspection Division (ID) of DOSTE.

Major facilities required are listed below, while the office spaces are assumed to be allocated in the existing QNPC buildings except for the proposed Visitor Center.

Department and Board	Units and divisions	Required facilities and equipment	Quantity
DOSTE	EMD	- computer including necessary software	5
		- vehicle	1
		- visitor center	1
	ERMU	- environmental monitoring equipment*	*
		- computer	5
		- vehicle	1
	IPU	- computer	5
	ID	- computer	2
HLMB	-	- computer	10
DARD	TFPU	- computer	5
FPA	-	- computer	2
DOF	-	- computer	7

Note: 1) *Detailed facility and equipment required for environmental monitoring are discussed in Chapter 20.

2) It is assumed that the boats procured by JICA will be granted to DOSTE (EMD and ERMU), and existing boats of DOF can be used continuously.

21.9 Cost Estimation for Institutional Strengthening of the EMP

Table 21.9.1-3 show the estimated cost for major institutional activities under the EMP, and summarized below. It will amount to about US\$ 5.6 million up to 2010, which are scheduled to be spent for technical assistance, training, facility and equipment for institutional capacity building of the existing and new environmental agencies, including the proposed visitor center.

Estimated Incremental Costs for Institutional Strengthening

Department and Board	Units and Divisions	Cost estimation items	Total Incremental costs (x10 ³ US\$)	Remarks
DOSTE	EMD	Personnel	26.4	including visitor center
		Training	942.1	
		Facility and Equipment	3,122.0	
	ERMU ^{*1}	Facility and Equipment	80.0	
		IPU	Personnel		26.4
	Training		682.4	
	Facility and Equipment		30.0	
	ID ^{*2}	Training	48.3	
		Facility and Equipment	18.0	
Training		21.8		
RLMB	-	Facility and Equipment	30.0	
DARD ^{*3}	TFPU	Training	382.4	
		Facility and Equipment	30.0	
FPA ^{*4}	-	Training	41.2	
		Facility and Equipment	12.0	
DOF ^{*5}	-	Training	21.8	
		Facility and Equipment	42.0	
Total			5,556.8	

Note: 1) ^{*1} Costs of personnel, training and equipment for monitoring for ERMU are involved in that of the Monitoring Plan (see Chapter 20).

2) ^{*2} Costs of personnel for ID are involved in that of the Inspection Plan (see Chapter 20).

3) ^{*3}, ^{*4} and ^{*5} Costs of personnel for DARD, FPA and DOF are involved in those of countermeasures for natural environment (see Section 18.5).

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TABLES

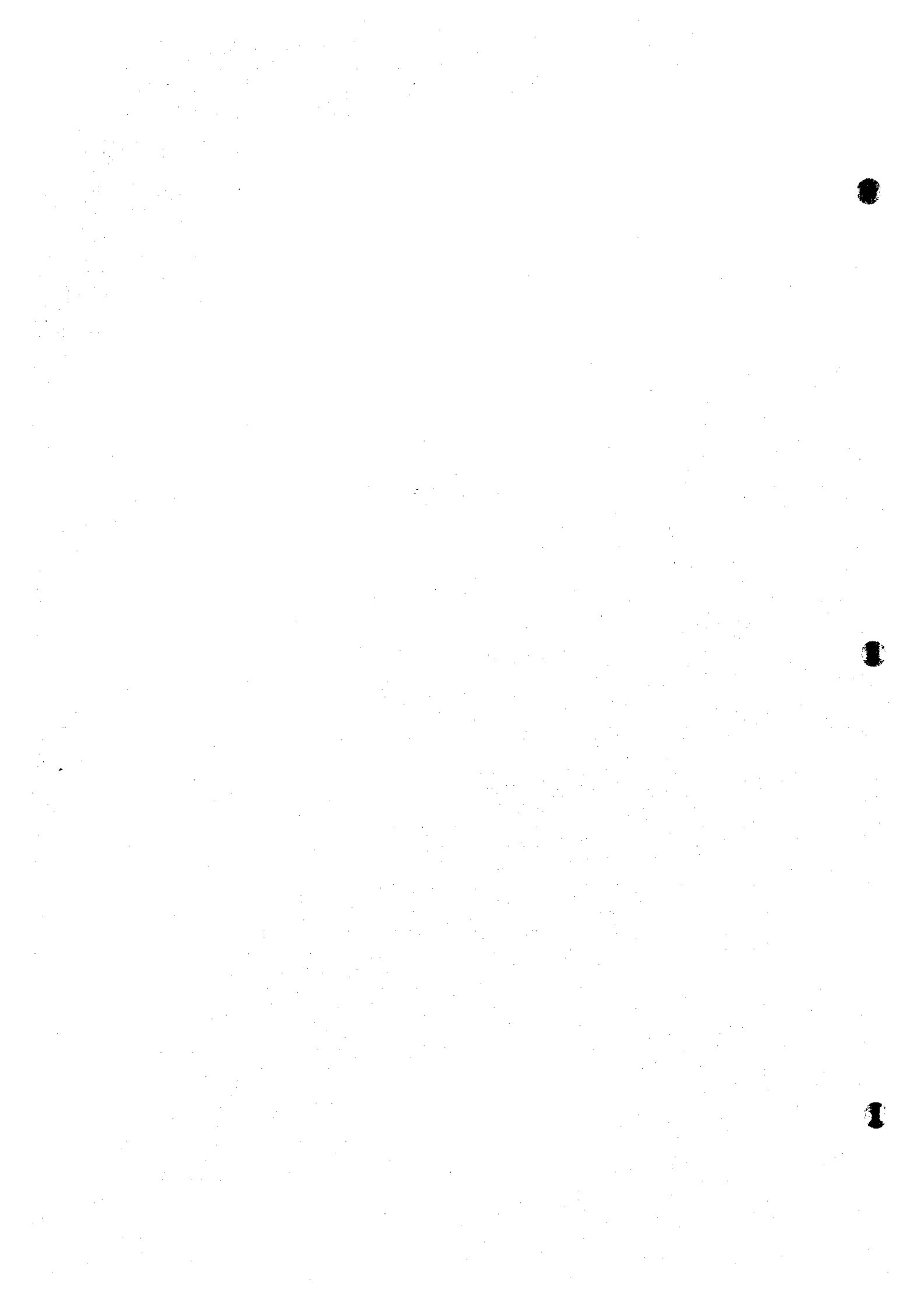


Table 21.2.1 Proposed Allocation of Responsibility under IC

Environmental Management Function	Primary Agency Currently Responsible	Agency Responsible Under IC
1. Policy, strategy, planning, and direction	• NEA • QNPC	• No change
2. Environmental standards and conservation criteria	• NEA	• <i>Conservation criteria set by QNPC, DOSTE, and HLMB</i>
3. Environmental monitoring and laboratory analysis	• NEA • EMD of DOSTE	• <i>ERMU</i>
4. State of Environment Reporting	• EMD of DOSTE	• <i>ERMU</i>
5. Environmental protection research and development	• National Research Institutions	• <i>ERMU</i>
6. Environmental impact assessment	• NEA • EMD of DOSTE	• No Change
7. Complaints and dispute resolution	• Inspection Division of DOSTE	• No Change
8. Inspection	• Inspection Division of DOSTE • Inspection Division of Provincial Departments of National Agencies	• No Change
9. Education, training, and environmental awareness	• EMD of DOSTE • Information Division of DOSTE	• EMD of DOSTE • Information Division of DOSTE • <i>ERMU</i>
10. Licensing	• Industry Licensing Division of DOSTE	• No Change
11. Pollution control	• Industrial Facilities • NEA • Other Sectoral Ministries • DOSTE	• Industrial Facilities • VINACOAL • <i>IPCU</i>
12. Supervision and collection of pollution charges	• NEA • Ministry of Finance	• <i>DOSTE</i> • <i>Department of Finance</i>
13. Solid and hazardous wastes management	• Ha Long City and Cam Pha Sanitation Companies (solid wastes) • NEA (hazardous wastes) • DOSTE (hazardous wastes)	• No Change
14. Protected area management	• Ha Long Bay Management Board (World Heritage Site) • Forest Protection Agency of Department of Agricultural and Rural Development	• No Change
15. Tidal flats and mangrove protection	• Forest Protection Agency of Department of Agricultural and Rural Development	• <i>TFPU</i>

Note: New or changed responsibilities are highlighted in italics.

Table 21.2.2 Proposed Allocation of Regulatory Responsibility at the Provincial Level

Agency Function	QNPC							
	DOSTE					HLMB	FPA	TFPU
	DIR	INSP	EMD	IPCU	ERMU			
1. Policy, strategy, planning, and direction	◆					○	○	
2. Conservation Criteria	◆					◆	◆	◆
3. Environmental monitoring and laboratory analysis					◆			
4. State of Environment Reporting					◆			
5. Environmental protection research and development					◆			
6. Environmental impact assessment			◆					
7. Complaints and dispute resolution		◆						
8. Inspection		◆						
9. Education, training and environmental Awareness			◆		○			
10. Licensing	◆							
11. Pollution Control				◆				
12. Supervision and collection of pollution charges	◆							
13. Solid waste Management			◆	◆				
14. Protected area Management						◆	◆	
15. Tidal flats protection								◆

Notes :

- ◆ : denotes primary functional responsibility
- : denotes secondary functional responsibility
- DIR : Quang Ninh People's Committee and Director of DOSTE
- INSP : Inspection Division
- EMD : Environmental Management Division
- IPCU : Industrial Pollution Control Unit
- HLMB : Ha Long Bay Management Board
- ERMU : Environmental Research and Monitoring Unit
- FPA : Forest Protection Agency
- TFPU : Tidal Flats Protection Unit

Table 21.2.3 Proposed New Institutional Arrangements

Environmental Management Function	Institutional Changes Necessary
1. Policy, strategy, planning, and direction	None
2. Environmental standards and conservation criteria	- Setting of conservation criteria by QNPC, DOSTE, HLMB
3. Environmental monitoring and laboratory analysis	- Creation and funding of ERMU
4. State of Environment Reporting	- Creation and funding of ERMU
5. Environmental protection research and development	- Creation and funding of ERMU
6. Environmental impact assessment	- Improvement in quality and increase in the funding of EIAs of new development projects - Enforcement of requirements to conduct EIA of regional development plans
7. Complaints and dispute resolution	None
8. Inspection	- Increased staff and increased training for inspection staff in both DOSTE and line departments of sectoral ministries
9. Education, training, and environmental awareness	- Creation and funding of ERMU
10. Licensing	None
11. Pollution control	- Creation and funding of IPCU - Development of programs and schedule for compliance with regulations and standards - Secure necessary funding to bring upgrading of existing industrial facilities
12. Supervision and collection of pollution charges	- Establishment of a policy and national program for collection of pollution charges
13. Solid and hazardous waste management	- Implementation of Ha long City water supply and sanitation project - Implementation of solid waste management plan
14. Protected area management	- HLMB (World Heritage Site) strengthening
15. Tidal flats protection	- QNPC regulation on conversion of tidal flats - Creation and funding of TIFPU

Table 23.3.1 Menu of Economic Instruments

Base	Type	Characteristics
Price Based	Charges - effluent or emission charges - water consumption charges - user charges - product charges or taxes (e.g. tax differentiation, fuel tax, carbon tax) - administrative charges (e.g. control & authorization fee, registration service charge)	- A price to be paid for pollution - Incentive to change behavior of the polluter - Raising of revenue
	Subsidies - grants for specific action to reduce pollution levels - soft loans for anti-pollution measures - tax allowances for certain anti-pollution measures	- Financial assistance - Incentive to change behavior of the polluter - Support to polluters facing environmental problems - Over-investment in pollution control, against PPP
	Deposit-refund systems	- A surcharge on the price of potentially polluting products - The surcharge is refunded when pollution is avoided. - For products that can be reused and recycled (e.g. batteries) - Strong influence on the behavior of both producer and user
	Financial enforcement incentives - non-compliance fees when polluters do not comply with regulations - performance bonds (payments to authorities in expectation of compliance)	- Punishment to non-compliance for economic rationale
Quantity Based	Market creation - emission trading	- Alternative to pollution charges - Needing large number of buyers and sellers
	- market intervention	- Price intervention or price guarantee - Similar to negative product charges
	- liability insurance	- A market where risks of damage penalties are transferred to insurance companies

Table 21.4.1 Necessary Equipment of the Proposed Visitor Center

	Proposed facilities	Main equipment	Area (m ²)	Remarks
Inside building	Entrance lobby	Model (diorama)	20	
	Ticket and guard office		10	
	Display and observation corner (1st floor)	Display panels	120	including stair case
	Display and observation corner (2nd floor)	Display panels	120	including stair case
	Exhibit and study corner	Telescopes, Illustrated books, Educational tool	100	
	Video theater	Video projector, Video deck system, Video tape, Video camera	140	100 guests
	Library	Reference books, Personal computers	30	
	Toilet		30	
	Corridor		10	
	Meeting and lecture room	OHP, slide projector, screen, microphone set, lectern	130	100 guests
	Cafeteria with small kitchen		120	
	Office and staff room		40	
	Director's room		20	
	Store		10	
	Common	Furniture & office supply, Air-	-	
Total floor space			900	
Outside building	Glass garden	flower boxes	10,250	
	Promenade, Sidewalk		50	
	Jetty		40	
	Parking lot		7,000	
	Guard house		10	
	Tidal flats	Experimental tidal flat.	2,200	
	Others	Monument, tree planting, sign board,	-	
	Total land space			20,000	including building space (450m^{2})

Table 21.7.1 Training Schedule for Institutional Strengthening of EMP

Department and Board	Divisions and Units	Training Programs	Year																					
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010											
DOSTE	EMD	Intensive training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
		Lecture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
		OJT on site (by T/A)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
		OJT abroad	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
IPU		Training at relating institutes	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
		Routine training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Intensive training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Lecture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
ID		OJT on site (by T/A)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
		OJT abroad	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Training at relating institutes	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Routine training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
HLMB		Intensive training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
		Lecture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		OJT on site	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Training at relating institutes	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
DARD	TFPU	Routine training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Intensive training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Lecture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		OJT on site (by T/A)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
DOF	FPA	Training at relating institutes	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Routine training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Intensive training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
		Lecture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DOF		OJT on site	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
		Training at relating institutes	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
		Routine training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
		Intensive training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Note: 1) Training for ERMU staff as discussed in chapter 20.

2) ■ shows implementation of intensive training program.

3) ■■■■■ shows implementation of routine training.

4) Intensive training is to be implemented from 2000 to 2006, while routine training is to be implemented continuously when needed.

Table 21.9.1 Indicative Cost for Institutional Strengthening of EMP

Department and Board	Divisions and Units	Cost estimation items	Incremental Costs (US\$/year)													Total		
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010					
DOSTE	EMD	Personnel	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	26,400	
		Training	210,300	200,300	210,300	300	160,300	300	160,300	300	160,300	300	160,300	300	160,300	300	160,300	942,100
		Facilities	10,000					10,000										30,000
		Computer	30,000															30,000
		Vehicle			2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
		Vehicle (O&M)			2,236,000													2,236,000
		Visitor Center*	200,000	235,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	360,000
		Visitor Center (O&M)	452,700	439,700	2,490,700	44,700	204,700	54,700	204,700	44,400	44,400	44,400	44,400	44,400	44,400	44,400	44,400	4,079,500
		Subtotal						10,000										30,000
		ERMU**																30,000
IPU		Facilities	30,000														30,000	
		Computer																
		Vehicle			2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
		Vehicle (O&M)			2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
		Subtotal	40,000	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	26,400
		Personnel	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	26,400
		Training	65,600	200,300	205,300	300	105,300	300	105,300	300	105,300	300	105,300	300	105,300	300	105,300	682,400
		Facilities	10,000															30,000
		Subtotal	78,000	202,700	207,700	2,700	107,700	12,700	107,700	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	758,800
		ID																48,300
HLMB		Training	15,900	10,900	10,900	0	300	0	10,300	0	10,300	0	10,300	0	10,300	0	18,000	
		Facilities	6,000														6,000	
		Computer	30,000														30,000	
		Vehicle			2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
		Vehicle (O&M)			2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
		Subtotal	51,900	12,900	12,900	2,000	2,300	8,000	12,300	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	116,300
		Training	11,200															21,800
		Facilities	10,000															30,000
		Computer	21,200	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	51,800
		Subtotal	15,600	150,300	5,300	300	105,300	300	105,300	300	105,300	300	105,300	300	105,300	300	105,300	382,400
D/ARD		Training	10,000														30,000	
		Facilities	25,600	150,300	5,300	300	105,300	300	105,300	300	105,300	300	105,300	300	105,300	300	412,400	
		Computer	10,300	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	41,200	
		Subtotal	4,000														12,000	
		Training	14,300	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	53,200	
		Facilities	4,000														21,800	
		Computer	11,200														42,000	
		Subtotal	14,000														21,800	
		Training	25,200	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	63,800
		Subtotal	708,900	807,900	2,728,600	62,600	432,000	126,000	452,600	50,800	50,800	50,800	50,800	50,800	50,800	50,800	50,800	5,595,800

Note: 1) * Cost for the proposed Visitor Center is shown in Table 12.9.2.
 2) ** Cost for the Monitoring Plan is discussed in chapter 20.
 3) Cost for training is shown in Table 12.9.3.
 4) It is assumed that a worm computer will be replaced with a new one every five years.

Table 21.9.2 Indicative Cost of the Proposed Visitor Center

No.	Items	Quantity	Unit (US\$)	Cost (US\$)	Remarks	
1	Land acquisition	20,000	m ²	40	800,000	
2	Building	900	m ²	500	450,000	
3	Garden	10,300	m ²	10	103,000	include fence and promenade
4	Parking lot	7,000	m ²	20	140,000	
5	Jetty	1	place	3,000	3,000	
6	Model (diorama)	1	set	15,000	15,000	
7	Display panel	30	sheet	1,500	45,000	
8	Telescope	5	set	5,000	25,000	
9	Illustrated book	20	set	50	1,000	
10	Educational tool	50	set	200	10,000	
11	Reference books	1	set	5,000	5,000	
12	Video projector	1	set	15,000	15,000	include screen
13	Video deck system	1	set	7,000	7,000	include speakers
14	Video tape	1	set	200,000	200,000	with narration (Eng.&Viet.)
15	Video camera	1	set	5,000	5,000	
16	Personal computer	5	set	4,000	20,000	
17	Furniture & office supply	1	set	30,000	30,000	
18	Air-conditioner	10	set	2,000	20,000	
19	Basic design	1	L.S	-	200,000	
20	Detail design	1	L.S	-	235,000	
21	Construction supervision	1	L.S	-	160,000	
22	Contingency	1	L.S	-	169,000	10% (exclude land cost)
Total		-	-	-	2,658,000	

Table 21.9.3 Estimated Costs for Training for Institutional Strengthening of EMP

Department and Board	Divisions and Units	Training Programs	Cost (US\$)													Total				
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010							
DOSTE	EMD	Lecture	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	2,100		
		OJT on site (by T/A)	150,000	150,000	150,000		150,000												750,000	
		OJT abroad	50,000	50,000	50,000															150,000
		Training at relating institutes	10,000		10,000		10,000													40,000
		Subtotal	210,300	200,300	210,300	300	160,300	300	160,300	300	300	300	300	300	300	300	300	300	942,100	
	IPU	Lecture	600	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	2,400	
		OJT on site (by T/A)	150,000	150,000	150,000														500,000	
		OJT abroad	50,000	50,000	50,000														150,000	
		Training at relating institutes	15,000		5,000		5,000												30,000	
		Subtotal	65,600	200,300	205,300	300	105,300	300	105,300	300	300	300	300	300	300	300	300	300	682,400	
ILMB	ID	Lecture	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	900	
		OJT on site	600	600	600														1,800	
		Training at relating institutes	15,000	10,000	10,000														45,000	
		Subtotal	15,900	10,900	10,900	0	300	0	300	0	300	0	300	0	300	0	300	300	48,300	
DARD	TFPU	Lecture	300			300													900	
		OJT on site	900																900	
		Training at relating institutes	10,000			5,000													20,000	
		Subtotal	11,200	0	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	21,800	
	FPA	Lecture	600	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	2,400	
		OJT on site (by T/A)	150,000																350,000	
		Training at relating institutes	15,000		5,000		5,000												30,000	
		Subtotal	15,600	150,300	5,300	300	105,300	300	105,300	300	105,300	300	105,300	300	105,300	300	105,300	300	382,400	
	DOF		Lecture	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	1,200
			Training at relating institutes	10,000		10,000		10,000												40,000
OJT on site			10,300	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	41,200	
Subtotal			11,200	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	10,000	300	900	
	Subtotal	900																900		
	Subtotal	10,000			5,000													20,000		
	Subtotal	11,200	0	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	0	5,300	21,800		
	Total	340,100	562,100	441,800	11,800	381,200	1,200	401,800	1,200	401,800	1,200	401,800	1,200	401,800	1,200	401,800	1,200	2,140,000		

Note: 1) Training for ERMU staff is discussed in chapter 20.

2) Costs are estimated for intensive training only, since costs of routine training are included in personnel cost or negligible.

