6.9 Measures for Projects for Integrated Environmental Management

6.9.1 Reinforcement of Environmental Management Organization

(1) Reinforcement of Hanoi DOSTE

There are two main measures proposed for strengthening of the Hanoi DOSTE:

1. upgrading of the current environmental management division to the level of an environmental management agency; and
2. decentralization of some environmental management functions to the district level.

1) Necessity and Scope of Reinforcement

The Hanoi Master Plan to 2020 has been approved and the detailed plan is being implemented. The Master Plan sets broad goals for cultural and socio-economic development. Appropriate measures must be put into place to control adverse environmental impacts that may be caused by the planned industrial growth and urban development. The responsible environmental management agency, the Hanoi DOSTE, does not sufficient staff, resources, and influence to effectively manage to reduce or prevent the potential environmental impacts. The Director of the Hanoi DOSTE has proposed the creation on an environmental agency to replace the existing Environmental Management Division (EMD). The establishment of the environmental agency will provide the following benefits:

- its separate legal status and budget will facilitate more effective operations
- it will have the ability to employ more environmental management staff and to contract professionals and high level experts
- it will have it own seal and account – it will not have to obtain day- to-day approvals from the DOSTE director
- it will be able to acquire more equipment for environmental management
- it will be easier to co-operate directly with international organizations

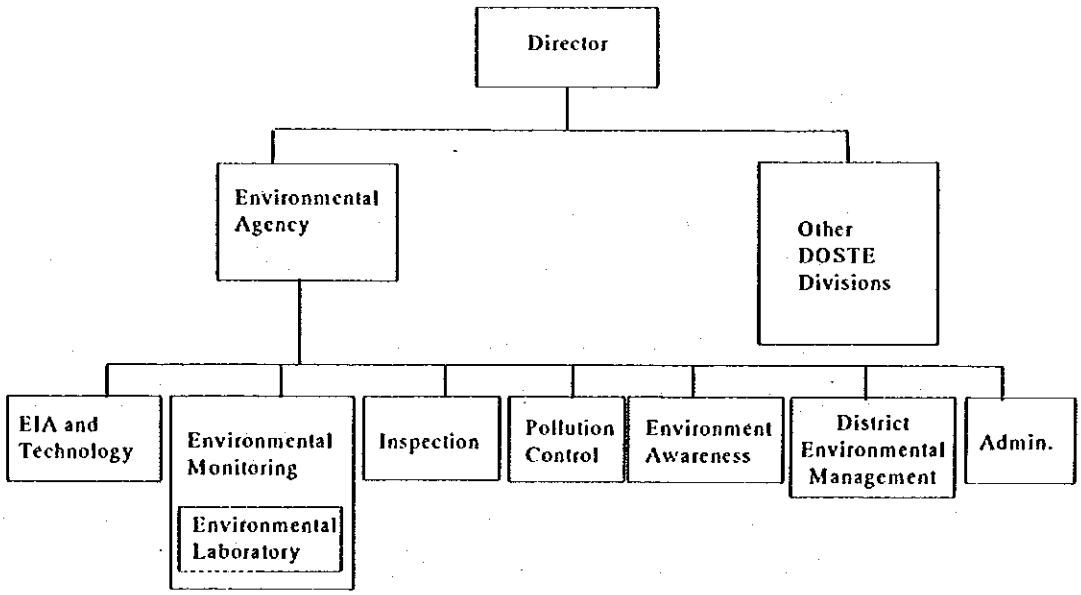
With increased stature in the Hanoi City government, and with more and better-qualified staff, this new agency will be better able to fulfil the DOSTE's responsibilities for environmental management. The environmental agency will be similar in organizational status to the Standardization, Metrology, and Quality Control Division of the DOSTE. The DOSTE Director will only approve the general plan and annual budget of the environmental agency. The day to day operations will be left to the head of the environmental agency.

2) Option 1: Upgrading of Environmental Management Division of Hanoi DOSTE to Environmental Agency

(a) Functions, Duties and Organization of the Proposed Environmental Agency

The new environmental agency will be under the direct management control of the DOSTE and under the professional guidance and inspection of NEA of MOSTE. The new agency will have the following duties and authorities:

- to research and develop strategy and detailed environmental policy for submission to DOSTE and HPC for approval
- to conduct research on environment protection and sustainable development
- to prepare the draft of legal documents and proposals for pollution prevention to gradually reduce the pollution problems in Hanoi
- to conduct environmental monitoring and operate Hanoi's environmental monitoring center and laboratory
- to conduct the environmental review and appraisal of EIA reports of investment projects and socioeconomic development plans
- to conduct environmental inspection and control in the operating facilities and prepare proposals on the measures to overcome pollution
- to conduct environmental education and training activities and improve people's awareness of environmental protection and sustainable development



Proposed Environmental Agency Organizational Structure

The new environmental agency will need seven organizational units (see Table below) to discharge these environmental management functions.

Proposed Divisions for New Environmental Management Agency

Division	Environmental Management Functions
1. EIA and Technology	▪ Appraisal and Review of EIA Reports ▪ Administration of the EIA Process ▪ Assessment of the appropriateness of technology ▪ Conducting environmental research in association with other agencies
2. Environmental Monitoring	▪ Environmental monitoring stations ▪ State of Environment Reporting ▪ Environmental information systems and databases ▪ Laboratory analysis of environmental data
3. Inspection	▪ State environmental inspection as mandated by EPLaw ▪ Handling complaints and disputes
4. Pollution Control	▪ Industrial pollution control and management ▪ Solid Waste Management ▪ Hazardous Waste Management
5. Public Relations and Environmental Awareness	▪ Environmental education and awareness ▪ Public relations
6. District Level Environmental Management	▪ Supervision and leadership of regional district environmental management teams
7. Administration	▪ General administration ▪ Finance ▪ Services (driver, night watchman)

(b) Institutional Strengthening

a) Pollution Control Division

The pollution control division will be strengthened to allow it to work with industry to:

- control and manage industrial wastewater
- control and manage industrial solid waste
- clarify and publicize existing environmental regulations for key economic sectors
- to develop plans to bring each industrial facility into compliance with environmental regulations
- monitor progress towards each facility's implementation

This division will need trained environmental engineers and sufficient equipment and financial resources to work effectively with the industrial facilities.

b) Environmental Inspection Division

Without strengthening the environmental inspection function it will not be possible to provide a fair and firm process for enforcing the Law on Environmental Protection. Without the capability to enforce, the

implementation of the environmental master plan will have to place great reliance on voluntary participation by all stakeholders. Presently, inspection is undertaken at the DOSTE level and involves primarily administrative inspection, although, some environmental inspections are being undertaken. The proposed re-organization will create a separate environmental inspection division within the environmental management agency.

c) Strengthening environmental monitoring and laboratory analysis.

Without reliable results from environmental monitoring programs, it will not be possible to evaluate the effectiveness of the EMP. The achievement of many of the objectives of the EMP will be measured in terms of air and water quality and other environmental indicators. Without reliable time series data from systematic monitoring programs, it will not possible to evaluate success towards achievement of these goals. The analysis of sample data by qualified laboratories is an important element in the environmental monitoring system. Without reliable laboratory analysis of sample data, it will not be possible to accurately assess environmental quality or the degree of seriousness of environmental pollution problems.

The environmental monitoring system and program will require significant resources to increase capacity to conduct reliable environmental monitoring and reporting. There are many areas that need assistance:

- the provision of monitoring equipment and laboratory equipment
- technical training in environmental sampling
- technical training in data analysis; and
- development of environmental data information system including design, software, hardware, and user training

d) Strengthening EIA and Technology Division

The EIA and technology unit is responsible for administering the EIA process. From time to time, it may draw upon the scientific and engineering experience from the other units in the environmental agency. No specific requirements for new staff and equipment have been identified. This may change as the workload increases as the pace of socioeconomic development increases. However, specific training in various aspects of EIA will be required to allow staff to increase their skills and become knowledge about new methods and approaches to EIA. The Hanoi DOSTE will continue to benefit from the EIA technical and training being provided by the VCEP project.

e) Developing Programs for Environmental Awareness

A small environmental awareness and public relations division will be needed in the new environmental agency structure. This unit will have responsibility for public relations, but will also be responsible for environmental awareness. This unit will develop programs on environmental awareness to be implemented with other partners. Examples of the types of projects that should be considered are:

- Specific public awareness programs conducted by NGOs (e.g. Women's Union, Youth Union, Fatherland Front, and other mass organizations)
- Awareness raising for Business and Industry conducted by DOSTE-EMD, DOI, and MOI, Vietnam Chamber of Commerce
- Demonstration projects targeted at the district level

Funding will need to be provided for projects to be conducted with various partners.

f) District Environmental Management Unit

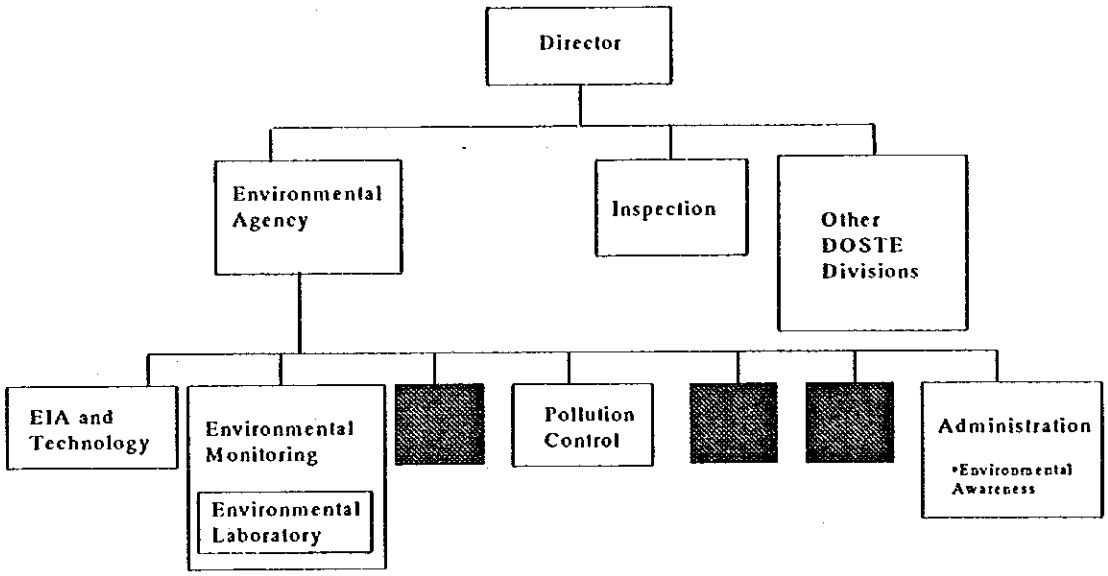
A district environmental management unit will be needed to supervise and provide leadership for the establishment of environmental management at the district level. A detailed description of the options for implementing district environmental management is described in a later section.

(c) Institutional Barriers

Current MOSTE regulations require that inspection be conducted by a separate division of the DOSTE. This means that the administrative and professional inspection functions are combined in one division. Thus a change in the implementing regulations for inspection is needed before an environmental inspection division can located within an environmental agency.

There is also a perception that the environmental agency should be created with a relatively small number of divisions. It may be easier to get approvals or support from the HPC and the central level agencies (GCOP, MOSTE, MOF, and OOG) if the environmental agency has a simpler organizational structure. If it not possible to have Environmental Awareness and Public Relations as a separate office, then this function can be incorporated into the Administration Division of the environmental agency. If it not possible to have environmental inspection in a separate division in the environmental agency then this function may remain with the Inspection Division at the DOSTE level. If is not desirable to create a separate unit for district environmental management, the supervision and leadership of the district

environmental management staff will have to distributed over the senior environmental staff in the remaining divisions of the environmental management agency. This leaves the environmental agency with four divisions.

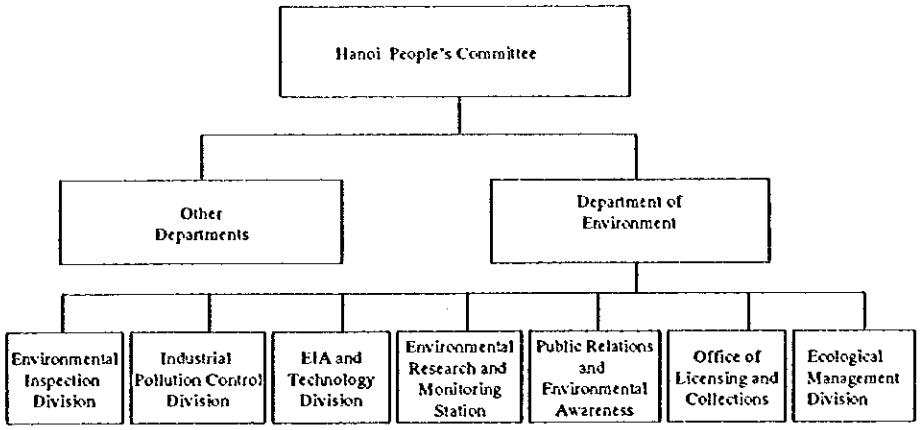


Proposed Environmental Agency - Four Divisions

3) Option 2: Upgrading of EMD in DOSTE to Department of Environment

In the longer term it will be necessary to create a separate Department of the Environment (DOE) to effectively implement State management of environmental protection. The DOE will have all functions to the proposed environmental management agency but will have at least two additional divisions:

1. Office of Licensing and Collections which will have responsibility for:
   - issuing environmental licenses
   - collection of pollution fees and other environmental levies; and
2. Ecological Management Division which have responsibility for
   - management and protection of the ecology of Hanoi's lakes, rivers, and streams
   - protection of green space.



Organization Structure for Department of Environment

While this option is desirable, it will depend on changes at the national level, both in terms of the stature of Environment within MOSTE, and the resolution of overlapping responsibilities between MOSTE and MARD with respect the management of ecological resources.

4) Recommended Option and Implementation Timeframe

(a) Short Term (2000 - 2005)

In short term, an environmental management agency should be created within the DOSTE. This change has been anticipated and is expected to take place in 2000. The final set of responsibilities of the agency and the number of technical and management personnel is still undecided. It is recommended that the new environmental management agency have all seven of the proposed divisions and all the necessary staff. During the period up to 2005, the emphasis should be on building capacity in terms of number of staff, training, and equipment in all agencies responsible for environmental management. This will provide the knowledgeable and experienced staff that will be needed for the new environmental agency.

(b) Mid Term (2005 – 2010)

However, the capacity of the existing Hanoi City 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. There are some serious environmental problems that must be addressed over the next ten years. Priority areas require improvement (e.g., industrial pollution control, environmental inspection, environmental monitoring, and ecological management). During period to

2006 to 2010, the emphasis should be placed on designing, developing, building institutional support and ensuring adequate funding for the new Department of Environment.

(c) Long Term (2011 – 2020)

In short term and middle term up to the year 2010, it is best to work within the existing government framework and support the development of the environmental agency. In the future as the socio-economic 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 the current socioeconomic development strategy, it is anticipated that a Department of Environment (DOE) will be needed by the year 2011 to effectively implement State environmental management. This DOE will have broad responsibilities for conservation and protection of natural resources, environmental and land use planning, and control of pollution and waste. This DOE must have enough power and influence to balance the needs for socioeconomic development and environmental protection and conservation goals to achieve sustainable development.

The following table summarizes the implementation schedule for improving environmental management.

Implementation Time Schedule

Time	Organizational Development Event
2000	▪ New Environmental Management Agency
2000	▪ District Environmental Management Unit at DOSTE Level
2006	▪ Increase staff in Environmental Management Agency ▪ Office of Science Technology and Environment at District Level
2011	▪ Department of Environment at the DOSTE Level ▪ Office of Environment at District Level

5) Cost Estimate

(a) Implementation Agencies

The project will be implemented by the Hanoi DOSTE in conjunction with MOSTE and the Government Committee on Organization and Personnel.

(b) Personnel Requirements

The current EMD of the Hanoi DOSTE is loosely organized around three main units: EIA, Industrial and Urban Pollution Management, and

Environmental Monitoring (including the laboratory). The EMD also has one accountant. The head of the EMD is also a vice-director of the DOSTE. While there is some specialization, it is necessary for each staff members to perform many different environmental management roles.

Staff in the current EMD will be incorporated into the new environmental agency. It is expected that many of the new positions will be more specialized and more highly skilled. Additional staff will be required to fill the new positions that will be created. Table 6.9.1 shows the functional responsibilities of the staff in each division.

a) Administration

Staff in the administration unit will include: a chief, finance and accounting (2), and support staff (1).

b) EIA and Technology Division

It is expected that four staff will be drawn from the current EMD staff to form this division. This may change as the workload increases as the pace of socioeconomic development increases. The staff chosen for work in the division should have experience in preparation of State of Environment Reports, preparation of terms of reference for EIA reports, review and appraisal of EIA reports, and environmental planning.

c) Environmental Monitoring Division

Staffing requirements for the environmental monitoring division are: one (1) chief and laboratory manager, one (1) senior environmental monitoring scientist, one (1) monitoring technician; one (1) monitoring technician/ information system specialist, and two (2) laboratory technicians. It is expected that staff for this division may be drawn from the existing environmental monitoring and laboratory unit. However, it may be necessary to recruit the laboratory manager and the senior environmental monitoring specialist from outside the existing EMD to ensure that the division has the necessary scientific and technical leadership.

d) Pollution Control and Management Division

This unit will need trained environmental engineers and sufficient expertise to work effectively with the industrial facilities. Staffing requirements are: a chief, three (3) environmental engineers with specific expertise (e.g. textile industry, electronics industry or agro-processing; and one (1) information system specialist. Existing staff in the pollution control unit with strong engineering backgrounds and experience will be chosen to staff this division.

e) Environmental Inspection Division

If environmental inspection is included in the new EA, the two (2) staff should be transferred from the existing Inspection Division in the DOSTE; and two (2) new inspectors with training in environmental engineering will be required. It may be possible to retrain existing EMD staff to work in these positions.

f) Public Relations and Environmental Awareness

Staffing requirements include a Chief, a public Relations Officer and Environmental Awareness Coordinator. While, these skills may be available within existing staff, it will likely be necessary to undertake outside recruitment to find people with suitable training in skills in environmental communications and public relations.

g) District Environmental Management

Four (4) senior environmental specialists will be needed to lead and supervise the regional district environmental management teams. These senior environmental specialists will need to have broad backgrounds in environmental management. They will also need specific skills and experience in environmental impact assessment, environmental education and awareness, environmental inspection, complaint and dispute resolution, and the procedures for assessing fines and other administrative penalties for violation of EPLaw.

(c) Summary of Short, Middle, and Long Term Staffing Requirements

The table below summarizes the short term, middle term, and long term staffing requirements. In the middle term it is estimated that some additional staff will be required: EIA and Technology (2), Environmental Monitoring (2), Pollution Control (2), and Inspection (1), and Public Relations and Environmental Awareness (1).

The long-term estimate assumes that a Department of Environment will be created and that ten (10) additional staff will be added for new divisions.

Summary of Personnel Requirements at the DOSTE Level.

	Short Term (2000-2005)	Middle Term (2006-2010)	Long Term (2011-2020)
Organizational Development Status:	Environment Agency	Environment Agency	Department of Environment
Division:			
Directors Office	3	3	3
Administration	4	4	4
EIA and Technology	4	6	6
Environmental Monitoring	6	8	8
Pollution Control	5	7	7
Inspection	4	5	5
Public Relations and Environmental Awareness	3	4	4
District Environmental Management	4	4	4
New Divisions			10
Total	33	41	51

(d) Costs

The costs for the upgrading of the DOSTE-EMD to an environmental agency are divided into the following categories:

1. Recurrent Costs
   - 1.1 Salary and overhead, which that is all salary and general overhead related to operating of the environmental agency;
   - 1.2 Annual Operating Costs, which are all costs for operating the specific programs of each to the DOSTE divisions. These costs are further divided into general, sampling, laboratory, outside programs (contracts) and training;
2. Non Recurrent Costs
   - 2.1 Capital Costs, which are all costs for computer equipment, sampling equipment, laboratory equipment, and vehicles; and
   - 2.2 Technical Assistance, which includes all costs for technical assistance and training programs provided by ODA.

The cost estimate is based on the following assumptions:

- environmental monitoring, pollution control, and inspection divisions will all have programs that involve environmental monitoring and laboratory analysis. The environmental agency laboratory will conduct laboratory analysis but the environmental agency will have to contract out some specialized laboratory analysis

- in the short term, two new vehicles will be required: one for the monitoring division and one that will be shared by the pollution control and inspection divisions
- technical assistance and training will be need to raise the capability of the existing and new staff to conduct the functions of environmental monitoring pollution control, and environmental inspection
- the purchase of equipment and vehicles should not occur unless the technical assistance and training is also undertaken.

A detailed estimate of the costs is provided in Table 6.9.2 (short term), Table 6.9.3 (middle term), and Table 6.9.4 (long term). A summary is provided below.

Summary of Cost for Environmental Management at the DOSTE Level

	Short Term (2000-2005)	Middle Term (2006-2010)	Long Term (2011-2020)
Organizational Development Status:	Environment Agency	Environment Agency	Department of Environment
1. Recurrent Costs			
1.1 Salary and Overhead	$22,400	$33,600	47,600
1.2 Operating Costs	$82,000	$82,200	$116,200
TOTAL Recurrent Costs	$104,400	$115,800	$163,800
2. Non Recurrent Costs			
2.1 Capital Costs	$50,000	$20,000	$60,000
2.2 Technical Assistance and Training	$200,000		
TOTAL Non Recurrent Costs	$250,000	$20,000	$60,000

(2) Establishment of Environmental Management at the District Level

1) Existing Conditions and Need for Reinforcement

The ever- increasing workload at Hanoi City level makes it desirable to delegate environmental management functions to the district level. For example, it is not possible for the Hanoi DOSTE to control pollution from the large number of SMEs. And the DPCs have better understanding of the local issues and have greater ability to resolve conflicts.

However, there are some limitations to the delegation of responsibilities. While, Government Decree 175/CP, October 18, 1994 regarding Guidance on the implementation of the Law on Environmental Protection assigns some responsibilities to the district level, it also specifies that these responsibilities are to be undertaken with the assistance of the DOSTE. Enterprises owned by the Central Government and the Hanoi City Government are beyond the jurisdictions of district level governments. Thus it will not be possible for the

district level government to control all projects occurring in their districts. Decree No 26/CP dated April 26, 1996 of the Government "Regulation on Punishment for administratively violating environmental protection legislation" limits the authority of the District Level Peoples' Committees to assess fines and penalties. The District PCs are limited to assessing fines of up to 2,000,000 VND. This relatively low level of fines will likely be ineffective in changing the behavior to reduce pollution.

(a) Current Environmental Management in Districts

At present there are no Offices of Science Technology and Environment at the district level. Environmental management functions are being discharged by others offices (e.g. the Planning Office, Economics Office). However, there are few staff who have specific responsibilities for environmental management.

(b) Scope of Environmental Management at District Level

It is desirable to delegate some environmental management functions to the district level. These functions include:

- environmental impact assessment of new construction projects or renovation projects
- environmental education and awareness
- environmental inspection of enterprises to verify compliance with environmental regulations and standards of the State
- complaint and dispute resolution
- assessing fines and other administrative penalties for violation of EPLaw.

2) Measures for Strengthening District Level Environmental Management

(a) Strategy

The basic strategy involves:

- designation of specific staff to work at the district level to conduct specified environmental management functions
- creation of a unit or office within the Hanoi DOSTE to oversee district level environmental management or creation of an environmental management office at the district level

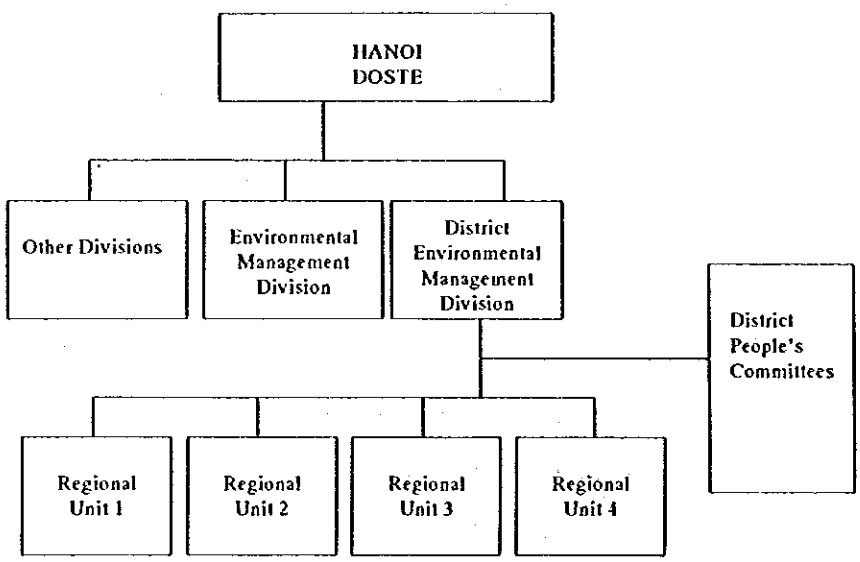
(b) Contemplated Options

a) Option 1A: District level Environmental Management Unit within the EMD of DOSTE

Under this option, a district environmental management unit will be created within the Environmental Management Division of the DOSTE. Staff in this unit will report to the EMD director and will be organized into regional team or groups to conduct specific environmental management functions within a set of districts.

b) Option 1B: District Environmental Management Division at the DOSTE Level

Under this option, a district environmental division will be created at the DOSTE level. The director of the district environmental management division will report directly to the DOSTE director. This division will be organized into regional team or groups to conduct specific environmental management functions within a set of districts.



Option 1B: District Environmental Management Division at the DOSTE Level

i) Regional Organization and Staffing

Under both options 1A and 1B, division director will supervise four regional units with staff drawn from the EMD of the DOSTE and from the district level of government.

Proposed Regional Units for District Environmental Management

Regional Unit	Districts Included	Staffing Levels
Region 1	Ba Dinh, Hoan Kiem, Hai Ba Trung, Dong Da, Thanh Xuan, Cau Giay	• 1 senior staff from EMD • 12 staff from DPCs (2 from each of the 6 districts)
Region 2	Ho Tay, Tu Liem, Thanh Tri	• 1 senior staff from EMD • 4 staff from DPCs (2 from Ho Tay; 1 each from Tu Liem and Thanh Tri)
Region 3	Gia Lam	• 1 senior staff from EMD • 2 staff from DPC
Region 4	Dong Anh, Soc Son	• 1 senior staff from EMD • 2 staff (1 from each DPC)
Total		• 4 senior staff from EMD • 20 staff from DPCs

ii) Regional Organization According the Environmental Master Plan Zones

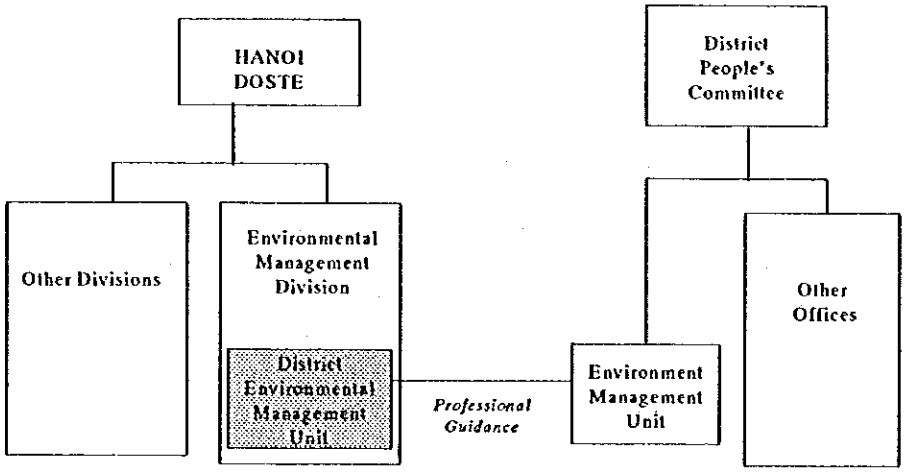
One alternate approach is to group and organize the district level environmental management according the environmental zones defined in the environmental master plan. In this case, it is proposed that the four regional offices or units be:

1. Region 1 which will include environmental zone 1 – Old City Center;
2. Region 2 which will include environmental zones: 2 - Red River Bank Northwest, 3 - Red River Bank South; 7 – Ho Tay;
3. Region 3 which will include environmental zone 3 – Gia Lam; and
4. Region 4, which will include environmental zones: 4 - Dong Anh and 6 – Suburban areas.

Staff levels will reflect the district involved in each zone as well as the environmental management workload.

c) Option 2A: Environmental Management Unit under the District Level People's Committee

Under this option, a new environmental management unit is created under the District Level People's Committees. This unit will be responsible for specific environmental management functions. It will be under administrative control of the DPCs and the professional guidance of the EMD of the Hanoi DOSTE.



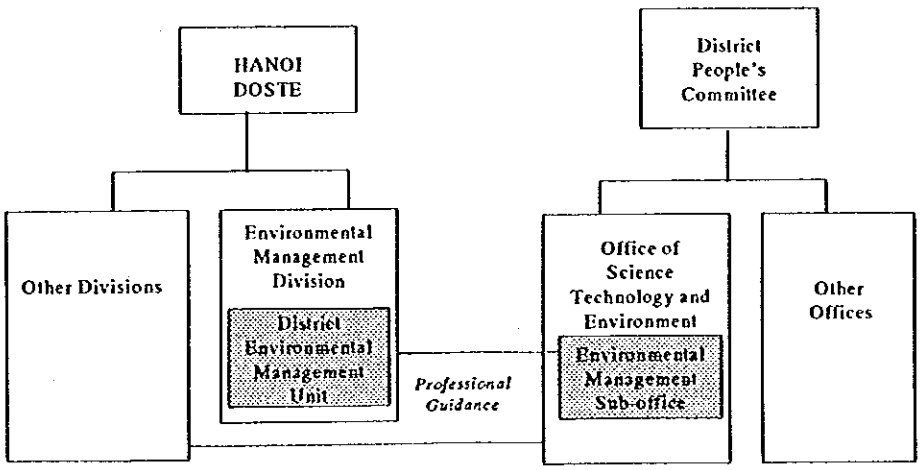
Option 2A: District Environmental Management Responsibility in District Environmental Management Unit

i) Staffing and Relationship to Hanoi DOSTE

It is proposed that the new district environmental units have four (4) staff plus a chief. The environmental management division of the DOSTE will provide professional guidance. The EMD will also help with education and training including inviting district staff to participate in training courses and seminars organized by GOV and international Donors. The EMD in the Hanoi DOSTE will have to reorganize itself to provide guidance to the district level. It may be necessary to create a district environmental management unit. Effective implementation may require that staff be organized along the regional basis described in Option 1A.

d) Option 2B: Office of Science Technology and Environment under District Level People's Committee

Under this option, a new office of Science Technology and Environment is created under the District Level People's Committees. This office will be responsible for specific environmental management functions. It will be under administrative control of the DPCs and the professional guidance of the Hanoi DOSTE.



Option 2B: District Environmental Management Responsibility in District Office of Science Technology and Environment

i) Staffing and Relationship to Hanoi DOSTE

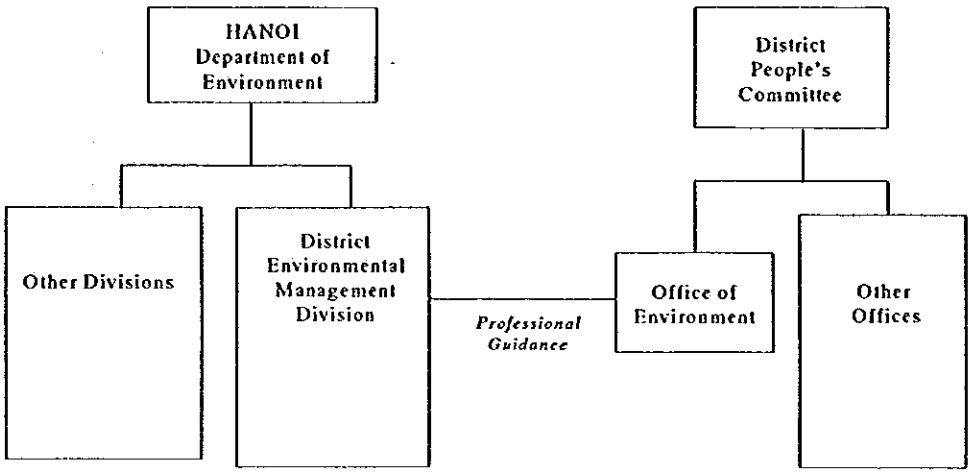
It is proposed that the Office of Science Technology and Environment have about four (4) staff for environment, one (1) for science, and one (1) for technology plus a director. The corresponding divisions of the DOSTE will provide professional guidance. The EMD will also help with education and training including inviting district staff to participate in training courses and seminars organized by GOV and international Donors. The EMD in the Hanoi DOSTE will have to reorganize itself to provide guidance to the district level. It may have to create a unit for district environmental management guidance. Effect implementation may require that staff be organized along the regional basis described in Option 1A. This district environmental unit in the EMD at the DOSTE level will provide guidance directly to an environmental management sub–office in each district office.

e) Contract Staff

Given the current policy of GOV of Vietnam towards reduction in size of the public service, it may be necessary to consider using contract staff as a practical means for implementing environmental management at the district level. Contract staff may be used with any of the options. However, it will be still be necessary to have permanent government staff in managerial and senior positions.

f) Option 3: District Environmental Management System if a Department of Environment is created

In this case, an Office of Environment would be created at the district level. A district environmental management division would be needed at the Hanoi City level to provide the necessary professional guidance to the district level.



Option 3: District Environmental Management Responsibility in District Office of Environment

h) Comparison of Options

Comparison of Options

Option	Implications at DOSTE Level	Implications at District Level
Option 1A: District Environmental Management Unit in EMD	▪ increased staff devoted district environmental management concerns ▪ reorganization of existing staff to focus some staff on district level environmental management ▪ leadership role in regional district management units	▪ increased staff for environmental management ▪ district staff to work under the supervision of DOSTE staff
Option 1B: District Environmental Management Unit in DOSTE	▪ creation of new division and division director position for district environmental management ▪ increased staff devoted to district environmental management concerns ▪ reorganization of existing staff to direct effort on district level environmental management ▪ leadership role in regional district management units	▪ increased staff for environmental management ▪ district staff to work under the supervision of DOSTE staff
Option 2A: Environmental Unit in DPC	▪ designation of staff positions for provide professional guidance to district Environmental Unit ▪ training and education programs for district environmental management staff	▪ increased staff for environmental management ▪ management responsibility (chief) for Environment Unit
Option 2B: Office of Science of Technology and Environment in DPC	▪ designation of staff positions for provide professional guidance to district Science Technology and Environmental Management Offices ▪ training and education programs for district environmental management staff	▪ increased staff for science, technology and environmental management ▪ management responsibility (chief or director) for Science Technology and Environment Office
Option 3: Office of Environment in DPC	▪ same as Option 2B, except that Environment is sole function	▪ same as Option 2B, except that Environment is sole function

3) Recommended Option and Implementation Timeframe

It is recommended that a three-stage approach be taken.

1. The first stage (by 2000) is to reorganize the EMD or the new environment agency to include a unit responsible for district environmental management(Option 1A); and
2. The second stage (by 2006) is to create an Office of Science Technology and Environment at the District Level (Option 2B).
3. The third stage (by 2011) is to create an Office of Environment district level when a Department of Environment is created at the Hanoi City level (Option 3).

4) Implementation of Recommended Option

(a) Implementing Agencies

The implementing agencies will be the DOSTE, District Level People's Committees, and Government Committee on Organization and Personnel (GCOP) and Hanoi Department of Organization and Personnel (DOP).

The reorganization of the EMD in the DOSTE to include a unit responsible for district environmental management is relatively straightforward step and can be accomplished without seeking approvals outside of the DOSTE or perhaps the HPC. However, agreements will have to be made with the District People's Committees to provide staff to work as part of the regional teams. The best approach is to use contract staff hired by the DPC and to provide these staff to work with the EMD team leaders. However, each DPC should make its own decision with respect to staffing. This approach can be implemented incrementally. And the approach can be implemented one district at a time.

The middle term proposal (2006) to create of an Office of Science Technology and Environment as the District level will require approval at higher levels (i.e. DOP, GCOP).

The long-term proposal (2011 - 2020) is dependent on creation of a Department of Environment. However, this will require a major organizational change within the GOV.

(b) Training and Technical Assistance

A number of new staff will need to be hired and trained. Perhaps some simple equipment will need to be provided at the district level. In addition, training will be required for the senior staff at the DOSTE who will be assigned to the district level environmental management unit. They may require both environmental training and supervisory training.

5) Cost Estimate

(a) Staffing

Summary of Personnel Requirements at the District Level.

	Short Term (2000-2005)	Middle Term (2006-2010)	Long Term (2011-2020)
Organizational Development Status:	District Environment Management Unit in DOSTE	Office of Science Technology and Environment	Office of Environment
DOSTE Level	4	4	4
District Environmental Management Staff	20	48	48

(b) Cost

A detailed estimate of the costs is provided in Table 6.9.5 (short term), Table 6.9.6 (middle term) and Table 6.9.7. A summary is provided below.

Summary of Cost for Establishing District Environmental Management

Cost Element	Short Term (2000-2005)	Middle Term (2006-2010)	Long Term (2011-2020)
1. Recurrent Costs			
1.1 Salary and Overhead	$24,000	$57,600	$57,600
1.2 Operating Costs	$39,000	$42,720	$39,160
TOTAL Recurrent Costs	$63,000	$100,320	$96,760
2. Non Recurrent Costs			
2.1 Capital Costs	$40,000	$50,000	$60,000
2.2 Technical Assistance and Training	$40,000	$40,000	$60,000
TOTAL Non Recurrent Costs	$80,000	$90,000	$120,000

6.9.2 Upgrading the Coordination and Decision-Making Mechanism for Effective Environmental Management

The agencies that will be responsible for the implementation of the EMP produced by the Project must have the responsibility and capability to perform the following functions:

- Industrial Pollution Control and Management
- Environmental Monitoring
- Solid Waste Management
- Economic Instruments for Pollution Control
- Environmental Education and Awareness
- Integrating environmental concerns into spatial planning
- Integrating environmental concerns into socioeconomic development planning

- Water Resource Management of Hanoi, Lakes, Rivers, and Streams
- Green Trees and Parks Management

The main agencies that must be involved in the EMP implementation are listed below. Both Hanoi City and national level agencies must be involved. In addition, the activities of the planing agencies, environmental management agencies, implementing agencies, and operational agencies will have to be coordinated.

The main agencies that must participate implementation of the EMP.

Plan Element	Hanoi City Agencies	National Agencies
Industrial Pollution Control and Management	Department of Science Technology and Environment, Department of Industry	Ministry of Science Technology and Environment, Ministry of Industry, Vietnam Industrial Zones Authority
Environmental Monitoring	Department of Science Technology and Environment	Ministry of Science Technology and Environment
Solid Waste Management	URENCO, Transport and Urban Public Works Service	Ministry of Construction
Economic Instruments for Pollution Control (e.g. Environmental Fund)	Department of Science Technology and Environment, Department of Finance and Pricing	MOSTE, Ministry of Finance
Environmental Education and Training	Department of Science Technology and Environment, other Hanoi level agencies	MOSTE, Ministry of Education and Training, other national agencies
Integrating environment into spatial planning	Chief Architect's Office	Ministry of Construction, National Institute for Urban and Rural Planning
Integrating environment into socioeconomic development planning	Hanoi Authority for Planning and Investment	Ministry of Planning and Investment
Water Resource Management	Hanoi Sewage and Drainage Company Hanoi Department of Agriculture and Rural Development	Ministry of Agriculture and Rural Development

(1) Coordination between the Central and HPC Levels

1) Coordination between Hanoi DOSTE and NEA/MOSTE

Closer coordination is required between the Hanoi DOSTE and the National Environmental Agency. The most obvious areas within which the NEA should be providing more professional guidance are 1) environmental monitoring; 2) environmental impact assessment; 3) industrial pollution control and management; and 4) inspection.

However, the first priority is for the NEA to increase it policy coordination role with respect to all DOSTEs. As the NEA becomes stronger and more effective in its ability to develop and promote technical policy, it will be

more effective in coordinating with the Hanoi DOSTE. In the short term, it will have to rely on ODA through programs like SEMA and VCEP to provide the professional guidance that is need by the Hanoi DOSTE.

Helping the NEA in improving policy formulation and developing new regulations will improve the NEA's ability to coordinate with the Hanoi DOSTE. Wherever possible the Hanoi DOSTE should participate directly in these policy and regulation making activities.

2) Others

The new Water Resources Law (1998) gives the Ministry of Agriculture and Rural Development broad responsibilities for State management of water resources. However, the People's Committees of the provinces and cities directly under the Central Government are also responsible for conducting for conducting State management of water resources within their localities. With respect to protection of water resources this will mean that there will need to be greater coordination between the HPC and its departments and the Ministry of Agricultural and Rural Development in a number of areas:

- water quality and water quality monitoring
- conducting a basic inventory of water resources
- participation in the watershed planning activities for the Red River Basin
- the issuing and revoking permits for exploitation and use of water resources
- inspection activities related to discharges to water bodies

(2) Coordination among HPC Departments and PMBs

1) Interdepartmental Coordination

In the general, the Vietnamese Government's decision making structure is based on the separation of the responsibilities for planning, project implementation, and operations. To operate effectively, there must be coordination and sharing of information and expertise. Unfortunately, this coordination and sharing of information is often lacking, unless there is a positive incentive to do so.

Fragmentation of responsibilities is the most complex problem. Gaps in regulation often make it unclear which agency is responsible. But sometimes the regulations set up a system of fragmented responsibilities that make it difficult to practice sound environmental management. The new regulation on waste management is Hanoi is a good example. The responsibility for

planning and siting of waste management facilities belong to the Chief Architect's office and the Land Administration Department. TUPWS is responsible for managing the construction of the facilities once the siting decisions are made and the facilities are planned. According the regulation, URENCO only has responsibility once the facilities are constructed. However, major facilities will also require approval at the National level. At least three groups have responsibility for enforcement of the regulations (TUPWS, the Hanoi Police and People's Committee's at all levels). The Hanoi DOSTE's responsibility is limited to propagandizing the regulations.

2) Project Management Boards

When new construction or other projects are approved, a project management board (PMB) is created to oversee the planning and implementation of the project. While these PMBs perform an important administrative function, they often lack the technical expertise necessary to effectively manage the project. The PMBs are often either unconcerned or ignorant of the environmental and other regulations that may impact on their project. They may be similarly unconcerned or ignorant of the roles and responsibilities of other agencies with respect to their projects.

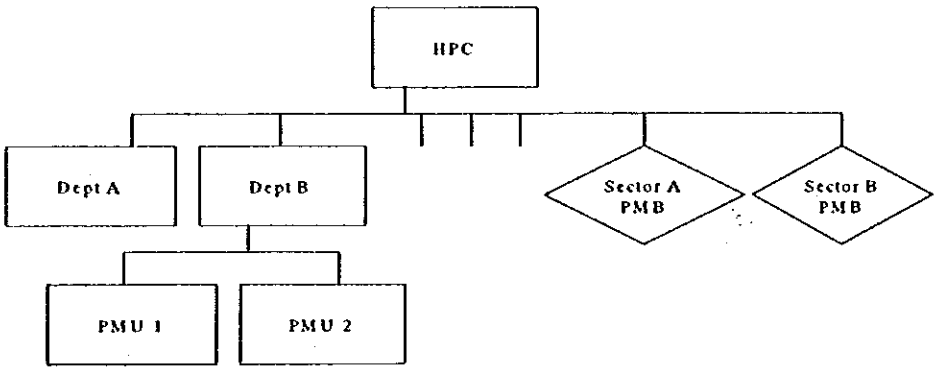
There are number of areas where PMBs must make stronger efforts to coordinate with other agencies:

- consulting with DOSTE on how to fulfill the requirements of the environmental impact assessment process
- consulting with the HCAO on official plans (e.g. Hanoi Master Plan to 2020) with regard to siting of facilities
- consulting with local People's Committee on the concerns of the people in areas that might be affected by the proposed project
- consulting with the departments and companies that will ultimately be responsible once the facilities are constructed.

(a) Proposed New Arrangements for Project Management Boards

Hanoi Department of Organization and Personnel and the Government Committee on Organization and Personnel for reorganization of project management boards (PMBs) are currently considering a proposal. Currently, PMBs are formed for projects within each sector department. Under the new system (see figure below), PMBs will be formed for each major sector but will report directly to the HPC. Boards will be created for transport, infrastructure (e.g. drainage), environmental improvement (e.g. solid waste, water), and other sectors. These new sector Boards will only be responsible

for large projects and new investment projects. For example, the new PMB for the Urban Transport for Infrastructure Development project is already directly under the HPC. The project management units (PMUs) within the sector departments will still implement smaller projects. This new system is expected to be in place by 2000. As these new sector PMBs will need strong leadership, it is desirable that each of the sector PMBs be headed by a vice-chairman of the HPC.



Proposed new arrangements for Project Management Boards

(3) Clear Cut and Speedy Decision Making Mechanism

To ensure effective implementation of the EMP, a simplified decision making structure will be required. The existing regulations on waste management outline the general responsibilities of each of the agencies for waste management. However, in practice they create a decision making structure that is inefficient. For many other aspects of the environmental master plan (i.e., industrial pollution control and management, ecological management of Hanoi's lakes, rivers and streams, and environmental education and training) it is unclear which agencies have the key decision making responsibilities. It is even less clear, which agencies have responsibilities for the implementation of activities and programs.

The implementing GOV or HPC decision or directive that mandates implementation arrangements of Environmental Master Plan should ensure that clear direct decision making authorities are given to agencies. It may desirable to designate one agency as the executing agency for the implementation of the EMP and create a special secretariat within this agency to support the EMP implementation.

6.9.3 Establishment of Implementation Mechanism for the Environmental Master Plan

(1) Authorization of Environmental Master Plan (EMP)

The implementation arrangements for the EMP have three main considerations: 1) what formal status will the EMP have? 2) how will the priority projects of the EMP be included into socioeconomic development plans?, and 3) which agency or body will have responsibility for implementation of the EMP.

1) Finalization of JICA EMP and preparation of HPC's EMP

The JICA study is developing a preliminary EMP. This will be completed in March 2000 and presented the Project Steering Committee for the Study. Once accepted by the Project Steering Committee, then the responsibility for the EMP is to be transferred to HPC.

2) Authorization of Initial EMP

The HPC will have to make arrangements to adopt the EMP as is or make the necessary amendments prior to adoption as the official EMP for Hanoi City. A review and appraisal committee will need to be created to evaluate the EMP. This Committee will make recommendations on how to improve and finalize the EMP. After the necessary revisions are made the plan will be submitted for approval to the HPC.

(2) Establishment of Environmental Coordination Committee and Revision of the EMP

1) Authorization of the Procedure for Revision of the EMP

The HPC and/or the GOV should promulgate a decision or instruction to define the legal mandate for the EMP. The plan should have formal legal status and should be considered alongside the Hanoi General Urban Plan to 2020 and Socioeconomic Development Strategy to 2020. The decision should outline the responsibilities and authorities of the various agencies and the detail the implementation arrangements for the EMP. The Hanoi People's Committee will also have to allocate the necessary funding for the EMP implementation and work with the Committee for Organization and Personnel to ensure that the staff positions are created within the agencies responsible for EMP implementation.

The legal mandate should require that the EMP be revised every five years to take account of new challenges and opportunities. Procedures and

responsibilities for developing the revised EMP will also need to be specified.

2) Establishment of the Environmental Coordination Committee

The implementation of the EMP will require one or more priority projects to be executed by various agencies. In some cases, structural measures will be required to improve existing infrastructure. In other cases, institutional changes and capacity building measures will be required to create or strengthen environmental management and planning systems. Both Hanoi City and national level agencies must be involved. In addition, the activities of the planing agencies, environmental management agencies, implementing agencies, and operational agencies will have to be coordinated.

It is proposed that an Environmental Coordination Committee (ECC) be formed to coordinate the implementation of the EMP.

Environmental Coordination Committee (ECC) is an Advisory Body
The proposed new ECC does not have the same role or function as the old Environmental Committee that existed prior to the formation of the Department of Science Technology and Environment. The primary function of the new ECC will be to coordinate those agencies that have activities and responsibilities with respect to EMP implementation. The DOSTE will continue to be responsible for state environmental management.

(a) Option A: Creation of the Environmental Coordination Committee under the Hanoi People's Committee

Under this option, the ECC will be authorized to coordinate the activities of the Hanoi City Level Agencies.

a) Objectives

The objectives of the ECC are:

- to formally submit the EMP to the HPC for approval;
- to ensure the EMP's priority projects and activities are included in socioeconomic development plans;
- to ensure the environmental objectives of the EMP are incorporated in Hanoi General Urban Plan;
- to coordinate the implementation of projects and activities of the EMP; and
- to coordinate the amendment of the EMP every five years.

b) Legal status, responsibilities, powers

The HPC should promulgate a decision or instruction to define the legal mandate for the EMP. The decision should provide for establishment of an Environmental Coordinating Council (ECC).

c) Composition of ECC

(i) Chairmanship

The Chairman of HPC or a vice-chairman of the HPC will chair the ECC. HAPI and DOSTE will be the lead implementing agencies. The Directors of HAPI and DOSTE will be co-deputy chairmen.

(ii) Membership

The members of the ECC will be:

- Chairman of Hanoi Peoples Committee or his Designate - Chairman
- Director of DOSTE - Deputy Chairman
- Director of HAPI - Deputy Chairman
- Director of Transportation and Urban Public Works Service
- Chief Architect, Chief Architects Office
- Director of Department of Agriculture and Rural Development
- Director of Department of Industry
- Director of Department of Health
- Director of Department of Finance and Pricing

(iii)Secretariat

A Secretariat to EEC will be formed to conduct the following administrative activities: 1) preparation of plans and budgets; 2) preparation of reports on EMP activities, and 3) making meeting arrangements and taking minutes of meetings. The members of the secretariat should be drawn from HAPI, the DOSTE, and Department of Finance and Pricing. HAPI will be lead agency on the Secretariat.

(iv)Technical Sub-Committee

A technical subcommittee will be created to undertake special studies and projects. The technical subcommittee will provide professional and technical direction to consultants and contractors undertaking the studies. The DOSTE Director or his designate will chair the subcommittee. The subcommittee members will be drawn from professional and technical staff of agencies represented on the ECC. Outside experts may be asked to participate in the Technical Subcommittee. The technical

subcommittee will have expertise in industrial pollution control, waste management, sanitation, education and environmental awareness, environmental conservation, and information systems.

d) Meetings and Operating Procedures

(i) ECC

The ECC Council will meet once every quarter. Every meeting agenda will include:

1. Review of progress during previous quarter
2. Report on and discussion of problems and difficulties to be overcome
3. Review of work plan for the next quarter - instruction to the concerned Ministries and Departments to complete their activities.

Each year there will be an annual meeting to approve the annual work plan and budget.

(ii) Technical Subcommittee

The technical subcommittee will meet as necessary to accomplish their work. However, they will hold at least one monthly meeting with the following agenda:

1. discussion of terms of reference for special studies and projects
2. consultant selection for special studies and projects
3. progress reports on special studies and projects
4. plans for overcoming difficulties and problems

Once a year the technical subcommittee will prepare a plan and budget for special studies and projects for submission to the ECC for approval.

(b) Option B: Creation of the Environmental Coordination Committee at the Central Government Level

Under this option, the ECC is authorized to coordinate the activities of both Central Government and Hanoi City Level agencies responsible for implementation of EMP.

a) Objectives and responsibilities

The objectives of the ECC are:

- to formally submit the EMP to the Prime Minister for Approval;
- to ensure the EMP's priority projects and activities are included in socioeconomic development plans;

- to ensure the environmental objectives of the EMP are incorporated in Hanoi General Urban Plan;
- to coordinate the implementation of projects and activities of the EMP; and
- to coordinate the amendment of the EMP every five years.

b) Legal Status and Powers

Because Hanoi is the cultural, scientific, and political capital of Vietnam and because of the strong role of the Central Government in Hanoi's affairs, it may be desirable to establish the Environmental Co-ordination Council by a GOV Decision at the central level.

c) Composition of ECC

(i) Chairmanship

A deputy Prime Minister responsible for science, education, and environment will chair the Council. Various central and Hanoi level agencies will participate. The Ministry of Planning and Investment, Ministry of Science Technology and Environment, and the Hanoi People's Committee will act as co-deputy chairs.

(ii) Membership

Membership at the Central Level is:

- Deputy Prime Minister, Science, Education, and Environment - Chairman
- Minister, Ministry of Science Technology and Environment – deputy chair
- Chairman of Hanoi Peoples Committee - deputy chairman
- Vice-minister, Ministry of Planning and Investment -deputy chairman
- Vice-minister, Ministry of Industry
- Vice-minister, Ministry of Construction
- Vice-minister, Ministry of Transportation
- Chairman, Vietnam Industrial Zones Authority
- Vice-minister, Ministry of Agricultural and Rural Development
- Vice-minister, Government Committee on Organization and Personnel
- Vice-minister, Office of Government
- Vice-minister, Ministry of Finance
- Director of the National Environmental Agency
- Membership at the Hanoi City is:

- Director of DOSTE
- Director of HAPI
- Director of Transportation and Urban Public Works Service
- Director of Department of Construction
- Chief Architect, Chief Architects Office
- Director of Department of Agriculture and Rural Development
- Director of Department of Industry
- Director of Transportation and Urban Public Works Service

(iii)Secretariat

The Director of Science, Education and Environment, of MPI should lead the secretariat to EEC. The secretariat will conduct the following administrative activities: 1) preparation of plans and budgets; 2) preparation of reports on EMP activities, and 3) making meeting arrangements and taking minutes of meetings

(iv)Technical Subcommittee

A technical subcommittee will be created to undertake special studies and projects. The technical subcommittee will provide professional and technical direction to consultants and contractors undertaking the studies.

The subcommittee will have expertise in industrial pollution control and management, waste management, sanitation, education and environmental awareness, environmental conservation, and environment information systems. The Director of the National Environment Agency or his designate will chair the subcommittee. Subcommittee membership will be drawn from professional and technical staff of agencies represented on the ECC. Outside experts may be asked to participate in the Technical Subcommittee. At the central level, staff will be drawn from the Departments of Science, Technology, and Environment or their equivalent within the Central agencies. At the Hanoi level, staff will be drawn from the various Hanoi City departments.

d) Meetings and Operating Procedures

(i) ECC

The ECC Council will meet once every quarter. The meeting agenda will include:

Review of progress during previous quarter

1. Report on and discussion of problems and difficulties to be

overcome

2. Review of work plan for the next quarter - instruction to the concerned Ministries and Departments to complete their activities.

Each year there will be an annual meeting to approve the annual work plan and budget.

(ii) Technical Subcommittee

The technical subcommittee will meet as necessary to accomplish their work. However, they will hold at least one monthly meeting with the following agenda:

1. discussion of terms of reference for special studies and projects
2. consultant selection for special studies and projects
3. progress reports on special studies and projects
4. plans for overcoming difficulties and problems

Once a year the technical subcommittee will prepare a plan and budget for special studies and projects for submission to the ECC for approval.

c) Option C: Environmental Coordination Council under the Hanoi People's Committee with Mandated Participation of Central Agencies

Under this option, the HPC provides the leadership for the ECC and the central agencies are required to actively participate in EMP implementation.

a) Objectives and responsibilities

The objectives of the ECC are:

- to formally submit the EMP to the Prime Minister for Approval;
- to ensure the EMP's priority projects and activities are included in socio-economic development plans;
- to ensure the environmental objectives of the EMP are incorporated in Hanoi General Urban Plan;
- to coordinate the implementation of projects and activities of the EMP; and
- to coordinate the amendment of the EMP every five years.

b) Legal Status

A GOV decision will mandate the HPC to establish the ECC. The decision will mandate the HPC as chairman of ECC and require the participation of the both the Central level and Hanoi level agencies. The GOV decision will give the HPC authority to direct implementing departments in the Central agencies with respect to the implementation of the activities of the EMP.

c) Composition of ECC

(i) Chairmanship

The Chairman of HPC or a vice-chairman of the HPC will chair the ECC. HAPI and DOSTE will be the lead implementing agencies The Directors of HAPI and DOSTE will be co-deputy chairmen.

(ii) Membership

At central level membership will be:

- Chairman of Hanoi Peoples Committee - Chairman
- A senior representative from Ministry of Planning and Investment - deputy chairman
- A senior representative from Ministry of Industry
- A senior representative from Ministry of Construction
- A senior representative from Ministry of Transportation
- A senior representative from Vietnam Industrial Zones Authority
- A senior representative from Ministry of Agricultural and Rural Development
- A senior representative from Government Committee on Organization and Personnel
- A senior representative from Office of Government
- A senior representative from Ministry of Finance
- A Vice-Director of the National Environmental Agency

At the Hanoi City level membership will be:

- Director of DOSTE
- Director of HAPI
- Director of Transportation and Urban Public Works Service
- Director of Department of Construction
- Chief Architect, Chief Architects Office
- Director of Department of Agriculture and Rural Development
- Director of Department of Industry
- Director of Transportation and Urban Public Works Service

Members from central level agencies may be drawn from their Departments of Science Technology and Environment or equivalent agencies. However, they need to have sufficient influence to implement EMP activities that are relevant to their agencies. A good example is the EMP activities directed a controlling and reducing pollution in Hanoi. This will require that key ministries such as Ministry of Industry, Ministry of Transportation, and Ministry of Construction support and

implement pollution control programs in their sectors.

(iii)Secretariat

A Secretariat to EEC will be formed to conduct following administrative activities: 1) preparation of plans and budgets; 2) preparation of reports on EMP activities, and 3) making meeting arrangements and taking minutes of meetings. The members of the secretariat should be drawn from HAPI, the DOSTE, and Department of Finance and Pricing. HAPI will be lead agency on the Secretariat

(iv)Technical Subcommittee

A technical subcommittee will be created to undertake special studies and projects on behalf of the ECC. The technical subcommittee will provide professional and technical direction to consultants and contractors who are undertaking the studies. The Director of the DOSTE or his designate will chair the subcommittee. The subcommittee membership will be drawn from professional and technical staff of those agencies represented on the ECC. Outside experts may be asked to participate in the Technical Subcommittee. The technical subcommittee will have expertise in industrial pollution control and management, waste management, sanitation, education and environmental awareness, environmental conservation, and environment information systems.

d) Meetings and Operating Procedures

(i) ECC

The ECC Council will meet once every quarter. Every meeting agenda will contain the following items:

1. Review of progress during previous quarter
2. Report on and discussion of problems and difficulties to be overcome
3. Review of work plan for the next quarter - instruction to the concerned Ministries and Departments to complete their activities.

Each year there will be an annual meeting that will approve the annual work plan and budget for the coming year.

(ii) Technical Subcommittee

The technical subcommittee will meet as necessary to accomplish their work. However, they will hold at least one monthly meeting with the following agenda:

1. discussion of terms of reference for special studies and projects
2. consultant selection for special studies and projects
3. progress reports on special studies and projects
4. plans for overcoming difficulties and problems

Once a year the technical subcommittee will prepare a plan and budget for special studies and projects for submission to the ECC for approval.

3) Comparison and Recommended Option

(a) Comparison

Table 6.9.8 provides a comparison of the three options based on: 1) mandate, 2) objectives and responsibilities, 3) chairmanship, 4) membership, 5) secretariat, technical subcommittee, 6) operating procedures, 7) financial and 8) personnel requirements.

(b) Recommended Option

In principle, the creation of a strong ECC at a high level within the Central Government is the best option as it ensures the full participation of key national level agencies. However, in practice it may not be effective for the following reasons:

- The time and attention of a deputy Prime Minister is limited and while this committee may be effective politically and in the making of policy, it may not be effective in implementation.
- The Hanoi level agencies will be the key implementing agencies for many of the projects implemented during the EMP and HPC needs to have a prominent and perhaps the dominant role in the ECC.
- Creation of the ECC at too high a level may diffuse effort and attention from Hanoi's priorities and make it more difficult to implement specific activities.
- The complexities of the implementation arrangements for the committee may make it difficult to operate and monitor progress.
- Therefore, the recommended option is Option C: Environmental Coordinating Committee under the HPC with participation by the Central agencies.

4) Cost Estimate

Two additional staff are proposed to support the ECC's activities. One person will be required in HAPI to operate the Secretariat and one person in the DOSTE to operate the Technical Subcommittee. Monies should be made available for hiring Vietnamese Consultants to special studies and projects

with related to EMP implementation. It is estimated the total budget for studies funded under the direction of the technical subcommittee will be $100,000 per year.

Most of the funding should come from the HPC. Recommended funding sources include: 1) HPC annual budget, 2) industrial facilities in Hanoi, 3) voluntary contributions, and 4) a system of pollution charges.

Summary of Costs for Operation of the Environmental Coordination Committee

Cost Element	
1. Recurrent Costs	
1.1 Salary and Overhead (2 staff)	$2,800
1.2 Operating Costs	
1.2.1 Meetings	$4,000
1.2.2 Contract Research	$100,000
Total Operating Costs	$104,000
TOTAL Recurrent Costs	$106,800

6.9.4 Incorporation of Environmental Considerations into Socioeconomic and Spatial Planning

(1) Need for Integration of Environmental Concerns into Planning

To date environmental considerations have not been well integrated into development planning. There are a number of reasons: the capacity of the environmental agencies (i.e. the NEA and the DOSTEs) is not well developed and they can not participate effectively in the socioeconomic development and spatial planning activities GOV policy and strategy have focussed on industrialization and urbanization and has not placed sufficient emphasis on environmental protection sector development planning in key Ministries (e.g. Ministry of Industry (DOI)) has not placed sufficient emphasis on environmental protection environmental policies and plans produced under the direction of MOSTE and the DOSTE have not had sufficient authority to influence the planning activities of MPI and MOC and the Hanoi city level (HAPI and HCAO) environmental information being produced by environmental management agencies (e.g. DOSTE) is not being used effectively by the planning agencies in HAPI and HCAO.

The challenge is to develop effective mechanisms to integrate environmental considerations into planning in Vietnam. The first goal is to ensure:

- effective participation of environmental professionals from the DOSTE in both socioeconomic development planning undertaken by HAPI , spatial planning activities undertaken by HCAO, and the industrial development planning undertaken by MOI and DOI; and

- effective participation of socioeconomic planners from HAPI and spatial planners from HCAO in environmental planning activities undertaken by DOSTE.

The second goal is to ensure environmental policies and plans produced under the direction of DOSTE have sufficient authority to influence the planning activities of HAPI, HCAO and DOI.

The third goal is to ensure that environmental information generated by the DOSTE and MOSTE is used by spatial planners in the spatial planning process and by MOI/DOI planners.

The second and third goals will take a much longer time to achieve. In general, the necessary institutional changes will require a closer integration of the environmental management activities lead by MOSTE and the DOSTEs, the socioeconomic development activities lead by HAPI, the spatial planning activities lead by HCAO, the industrial development planning lead by MOI/DOI.

(2) Incorporation into Socioeconomic Planning

1) Relocation Policy Formation in the Ministry of Planning and Investment and the Hanoi Authority for Planning and Investment

At the National level, MOSTE through the NEA has responsibility for policy and strategy input into the Socioeconomic Development Strategy. Because of it overall responsibility for the Strategy, the Ministry of Planning and Investment (MPI) has significant overall the direction and financial and human resources directed to the implementation of environmental policy. At the Hanoi City level, the Hanoi Authority for Planning and Investment (HAPI) has a similar level of influence.

There are many aspects of policy that influenced are by MPI and HAPI. One area that needs immediate re-examination is the industrial relocation policy. The industrial relocation policy is an integral part of the socioeconomic development strategy and Hanoi Master Plan to 2020. As such the planning agencies HAPI and HCAO are responsible. However, the industrial relocation policy flows from the national level and as such the MPI is the lead agency. In making assumptions about future levels of industrial pollution in Hanoi, it is important to take account of the practical difficulties associated with the relocation strategy. For example, the environmental zoning for the EMP will be based, in part, on targets for ambient environmental quality. If these targets are set based on unrealistic assumptions about reductions in pollution loadings due to the relocation of industry, it may not be possible to achieve the environmental objectives and

targets within a given environmental zone.

(a) Policy Analysis Study of Industrial Relocation Policy

The policy analysis is required immediately to provide input into the National and Hanoi Socioeconomic Development Strategy to 2010. In addition to the planning agencies (MPI, HAPI, and HCAO), the Ministry of Industry, Department of Industry, Industrial Zones Board, and the Vietnam Industrial Zone Authority must be involved.

The policy analysis will be a major study to evaluate, order, and structure all the available knowledge about plans for industrial relocation. Options should be identified and detailed plans and realistic schedules should be prepared. An economic evaluation of the true costs and benefits should be undertaken.

2) Hanoi Authority for Planning and Investment (HAPI)

HAPI is the responsible for the development of the master socioeconomic plans, medium term and annual socioeconomic development plan, and development investment orientations of the sectors. Environmental protection is one of the important issues that must be taken into consideration in the development process. HAPI is struggling with the difficulties of integrating environmental considerations into its activities.

The Hanoi Authority for Planning and Investment (HAPI) is currently revising the socioeconomic development strategy for Hanoi City to make it more consistent with the Hanoi General Plan to 2020. There are opportunities for technology transfer to help better integrate environment into their current and future planning. For example, HAPI has informally requested assistance with respect to methods and approaches to economic evaluation of environmental investments.

Two technical assistance projects to introduce new approaches to planning are proposed. The experience gained in these technical assistance projects will be used to design and develop a new environmental evaluation unit in HAPI.

(a) Technical assistance in environmental aspects of socioeconomic development planning in Hanoi.

The technical assistance will involve:

- an in depth institutional analysis of current approaches to socioeconomic development planning including an assessment of current capacity of staff to deal with environmental considerations

- introduction of new approaches to planning to integrate environmental considerations
- seminar and training course on new approaches
- case studies to test the effectiveness of new approaches
- development of guidance manuals

(b) Technical assistance to introduce new methods and approaches to economic evaluation of environmental projects.

The technical assistance will involve:

- review of evaluation procedures in developed and ASEAN countries
- development of methodology appropriate to the needs of HAPI
- case studies to test the new methods and approaches in practice
- development of guidance manuals
- training courses

(c) Strengthening the Capacity of HAPI

HAPI needs to increase its capability in both economic evaluation and environmental assessment of plans and investment projects. Capacity building is needed at both the senior managerial levels and at the technical level. As a first step, HAPI needs to develop better methodological approaches to evaluation of investment projects. In the medium to long term, HAPI will need an environmental evaluation unit. The functions of this unit will include:

- guidance to sector planners in the consideration of environmental factors in sector plan development
- evaluation of the environmental consequences of sector plans
- economic evaluation of environmental improvement projects

This environmental evaluation unit will assist planners in HAPI and other departments in:

- environmental impact assessment
- economic evaluation
- ecological analysis of natural resources
- social impact assessment
- financial analysis

(3) Incorporation into Spatial Planning

1) Hanoi Chief Architect Office (HCAO)

The HCAO does not have any environmental positions, environmental

trained staff or landscape architects. This must be remedied to ensure successful integration of environmental considerations into the master plans and day-to-day planning functions of the HCAO. The spatial planning capability of the HCAO needs to be upgraded through provision of trained staff and modern computer based spatial planning systems.

(a) Increase Environmental and Spatial Planning Capacity of HCAO.

There are four potential key areas of institutional strengthening:

1. the addition of environmental specialists to the staff of the HCAO office in the Planning Management Division;
2. the addition of environmental staff in Hanoi Planning Institute to participate in master planning activities;
3. development of the spatial planning capacity through introduction of geographic information systems to the Hanoi Planning Institute or some other body; and
4. technology transfer on the methodology of environmental master planning.

(b) Technical assistance for the next amendment of Hanoi Master Plan to 2020.

Goverment Decree 91/CP sets out the general requirements for urban planning. This Decree requires that all general urban plans be amended every five years. One potential avenue for inclusion of the EMP into the Hanoi General Urban Plan to 2020 is through incorporation of results of EMP during the next amendment process. The necessary institutional arrangements to allow the incorporation of the results of the EMP into the process for amending the Hanoi Master Plan to 2020 are part of the mandate of the ECC. A technical assistance project is proposed to assist with the preparation of the next amendment to the Hanoi Master Plan to 2020. This technical assistance will include:

- seminar or training courses in methodologies and approaches to environmental master planning
- case studies application - amendment of the Hanoi Master Plan to 2020 to test the methods and approaches in practice
- development of guidance manuals

(4) Implementation Schedule

The following schedule lists the key dates for organizational development.

Implementation Time Schedule

Time	Organizational Development Event
2000	▪ Technical assistance in environmental aspects of socioeconomic development planning (HAPI) begins
2001	▪ Spatial Planning Unit created in HCAO ▪ Technical assistance on new methods and approaches to economic evaluation of environmental projects (HAPI) begins
2002	▪ Environmental Evaluation Unit created in HAPI
2003	▪ Technical assistance in developing the next amendment of Hanoi Master Plan to 2020 (HCAO) begins
2006 - 2020	▪ Continued development of Spatial Planning Unit (HCAO) ▪ Continued development of Environmental Evaluation Unit (HAPI)

(5) Cost Estimate

1) Staffing

(a) HAPI

The staffing requirements for the environmental evaluation unit in HAPI are:

- one (1) environmental impact assessment specialist
- one (1) environmental planner
- one (1) environmental economist
- one (1) natural resource management specialist

(b) HCAO

The staffing requirements are:

1. one (1) new environmental specialist in HCAO Planning Management Division
2. two (2) additional environmental specialists in the Hanoi Planning Institute; and
3. two (2) GIS application specialists in the Hanoi Planning Institute

2) Cost

A detailed estimate of the costs is provided in Table 6.9.9 (short term), Table6.9.10 (middle term), and Table 6.9.11 (long term). A summary is provided below.

Summary of Costs for Integrating Environmental Considerations into Planning

Cost Element	Short Term (2000-2005)	Middle Term (2006-2010)	Long Term (2011-2020)
HAPI			
1. Recurrent Costs (annual)			
1.1 Salary and Overhead	$5600	$5600	$5600
1.2 Operating Costs	$5160	$3800	$4000
TOTAL Recurrent Costs	$10,760	$9400	$9600
2. Non Recurrent Costs			
2.1 Capital Costs	-	-	-
2.2 Technical Assistance and Training	$250,000	-	-
TOTAL Non Recurrent Costs	$250,000	-	-
HCAO			
1. Recurrent Costs (annual)			
1.1 Salary and Overhead	$7000	$7000	$7000
1.2 Operating Costs	$12,800	$3000	$3000
TOTAL Recurrent Costs	$19,800	$10,000	$10,000
2. Non Recurrent Costs			
2.1 Capital Costs	-	-	-
2.2 Technical Assistance and Training	$250,000	-	-
TOTAL Non Recurrent Costs	$250,000	-	-

6.9.5 Establishment of Environmental Monitoring System

(1) Objectives

Establishment of Environmental Monitoring System is considered as important tool for the achievement of many of the objectives of the EMP. The main objectives of the environmental monitoring system are as follows.

- To assess the level of environmental pollution (ambient air and water quality)in Hanoi
- To evaluate attainment of Environmental Quality Target set up in the EMP.
- To evaluate the effectiveness of countermeasures to be carried out for pollution control.
- To monitor changes on environmental condition, mainly caused by increase in pollution load.

It is proposed that the Environmental Monitoring System consist of the following functions, "Surface Water Quality Monitoring", "Groundwater Monitoring" and "Ambient Air Quality Monitoring".

Several Vietnamese and international organizations have been carried out environmental surveys. The monitoring system will be operated in cooperation

with these organizations.

(2) Monitoring System and Laboratory, Equipment of Hanoi DOSTE

1) Surface Water Quality Monitoring

The objectives of the Surface Water Quality Monitoring are to monitor level of organic pollution in order to monitor the achievement of the target on "Preservation of Living Environment", and to monitor level of pollution caused by toxic material and heavy metals for consider "protection of Human Health"

(a) Activities

Major activities of the monitoring are sampling works on proposed sampling points of major surface water bodies in Hanoi, water quality analysis works and data analysis works. The monitoring points for water quality are tentatively proposed as below.

Monitoring points on Surface Water

Environmental Zone	Water Bodies	No. of sampling Points
Zone 1	To Lich River	1 points
	Lu River	1 points
	Set River	1 points
	Kim Ngưu River	1 points
	Urban Lakes (to be selected)	10 points
Zone 2	Nhue River Upper	1 points
Zone 3	To Lich River	2 points
	Kim Ngưu River	1 points
Zone 4	Van Tri Lake	1 points
	(to be selected)	1 points
Zone 5	(to be sececled)	2 points
Zone 6	Soc Song	2 points
	Dong Anh	0 - 1 points
	Gia Lam	0 - 1 points
	Tu Liem Than Tri	0 - 1 points
Zone 7	West Lake	2 points
Major Rivers	Cau River	1 - 2 points
	Ca Lo River	1 - 2 points
	Red River	2 - 3 points
	Duong River	1- 2 points
	Nhue River, lower	1 - 2 points
	Bac Hung River	1 - 2 points
Total		33 – 42 points

Vietnamese surface water quality standard covers 32 water quality items. The Study Team proposed 34 monitoring items, which are divided into three groups.

The water quality items related to "conservation of living condition" (DO, BOD, COD, SS, T-N, T-P) are selected as "Surface water Monitoring Parameter Set A", which is to be monitored once three months. In order to evaluate attainment of Water Quality Target proposed in section 5.2.1, these parameters will be measured frequently.

Typical items related directory to human health (Arsenic, Cadmium, Hexavalent Chrome, Copper, Lead, Total Mercury) are selected as "Surface water Monitoring Parameter Set B", which is to be carried out once or twice a year. In order to confirm safety condition in water bodies, these parameter shall be measured continuously, even if the values are always under the standard.

Remaining 16 items seem to be not so important on water environment in Hanoi comparing with items selected in "Surface water Monitoring Parameter Set A" and "Surface water Monitoring Parameter Set B". Those items are selected as "Surface water Monitoring Parameter Set B", to be checked occasionally for the confirmation of the level of the qualities. Proposed monitoring items are as shown below.

Monitoring Items of Surface water

	Water Quality Items
Surface water Monitoring Parameter Set A	pH, BOD, COD, DO, SS, T-N, T-P
Surface water Monitoring Parameter Set B	As, Cd, Pb, Cr, Cu, Hg, CN
Surface water Monitoring Parameter Set C	Br, Mn, Ni, Fe, Sn, F, Phenol, Oil&Grease, Detergent, Cliform, Pesticide, DDT, Total alpha unit of activity, Total beta unit of activity

(b) Necessary Equipment

Regarding water quality analysis equipment, before the procurement of water quality analysis equipment under VCEP Program, DOSTE did not have any capacity of water quality analysis. DOST has carried out water quality survey using a contractor or in cooperation with other organization. Several universities and institutes in Hanoi have own laboratories with complete sets of water quality equipment. Using contractors or cooperation with other organization is one of the option for establishment of effective monitoring system.

DOSTE has already had the capacity of water quality analysis on "Surface water Quality Standard A". The Study Team proposed that DOSTE would

has the capacity of water quality analysis on "Surface water Quality Standard A" and "Surface water Quality Standard B" For the analysis of water quality on heavy metals, Atomic-absorption Spectro-photometer and related-equipment are required for the laboratory.

2) Groundwater Quality Monitoring

The functions of Groundwater Quality Monitoring are to monitor level of groundwater quality in order to evaluate environmental condition under ground in Hanoi and to evaluate groundwater water quality as the source of drinking water sources.

(a) Activity

Monitoring Points will be distributed overall Hanoi. The monitoring points are to be selected at the existing wells. "Clean Water Supply Company" has already been monitoring groundwater quality at the wells the company has managed. Cooperation with "Hanoi Water Business Company" is necessary for effective monitoring for the groundwater. Distribution of monitoring points is tentatively proposed below.

Monitoring points on Groundwater

Environmental Zone	No. of sampling Points
Zone 1	10 points
Zone 2	10 points
Zone 3	5 points
Zone 4	3 points
Zone 5	3 points
Zone 6	
Soc Song	3 points
Dong Anh	1 - 2 points
Gia Lam	1 - 2 points
Tu Liem	1 - 2 points
Thanh Tri	1 - 2 points
Total	38 – 42 points

Water monitoring items are proposed based on Vietnamese Groundwater Quality Standard. The monitoring items are divide into two groups. Water quality items indicated in WHO standards are adopted for "Groundwater Monitoring Parameter Set A", which is proposed to be monitored frequently, once three months. The remaining parameter indicated by the Vietnamese Standard are adopted for "Groundwater Monitoring Parameter Set B", which

are proposed monitored occasionally. Proposed monitoring items are as below.

Monitoring Items of Groundwater

	Water Quality Items
Groundwater Monitoring Parameter Set A	NH_4, NO_2, NO_3, As, Cd, Pb, Cr, Cu, Hg, CN, F, Fe, Mn, Zn, SO_4^-
Groundwater Monitoring Parameter Set B	pH, Color, Hardness, TSS, Cl-, Pheuol, Se, Fecal Coliform, Total Coliform

(b) Necessary Equipment

The Study Team proposed that DOSTE would has the capacity of water quality analysis at least on the items indicated in "Groundwater Monitoring Parameter Set A". Atomic-absorption Spectro-photometer and related-equipment are required for the analysis of water quality on heavy metals in laboratory.

3) Air Quality Monitoring

The objective of Air Quality Monitoring is to monitor air ambient condition in Hanoi in order to maintain Vietnamese Air Quality Standard.

(a) Activity

Monitoring items are Sulfur Dioxide (SO2), Nitrogen (NO2), Carbon Monoxide (CO), Total Suspended Particulate (TSP), PM10, Lead (Pb), which is indicated in Vietnamese Environmental Standard. Monitoring points are to be distributed overall Hanoi.

Since the values of air qualities in Vietnamese Air Quality Standard are indicated as "1 hour average", "8 hour average", "24 hour average", "3 month average" and "1 year average", the standard requires continuous monitoring. The Study Team requests establishment of air quality monitoring station networks, in which continuous air quality analyzers are installed.

Installation plan of air quality monitoring stations

Environmental Zone	Number of Station	
Zone1	2 stations	near Industrial Zone (1) and National Road (1*)
Zone2	1 station	near Industrial Zone (1*)
Zone3	2 stations	near National Road and Industrial Zone (2)
Zone4	2 stations	near National Road and Industrial Zone (2)
Zone5	2 stations	near National Road and Industrial Zone (2)
Zone6	2 station	Soc Song, Thanh Tri, near Industrial Zone (2)
Total	11 stations	-

*) including one existing air monitoring station at CEETIA building .and one under construction station at Thuong Dinh industrial zone.

(b) Necessary Equipment

Except for two monitoring stations, one existing and one under-construction, eleven new air monitoring stations will be constructed. The "Continuous Analyzer for gases", "Continuous Analyzer for TSP and PM10", "High-Volume Sampler for Lead", "Basic Office Equipment" will be installed in the proposed air monitoring stations.

5) Others

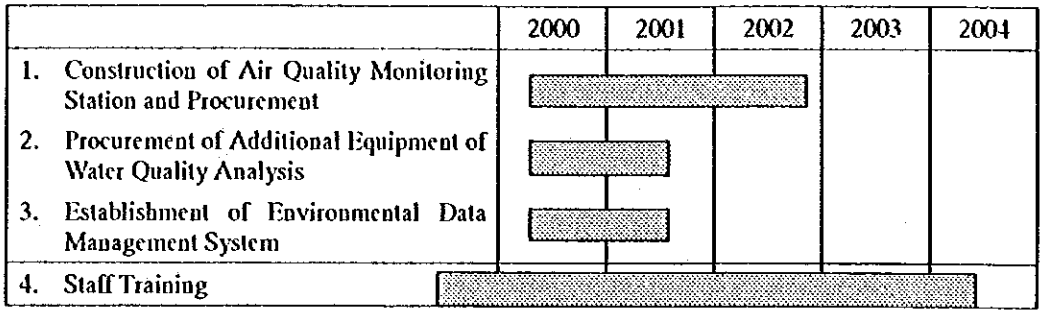
For establishment of effective monitoring system, the environmental data to be collected by proposed monitoring system should be proceeded by database system. Therefore, computer system for environmental data management is required.

(3) Implementation Program

DOSTE would have to take all responsibility for operation and maintenance of the monitoring system. For implementation of the environmental monitoring system, it is required not only procurement and construction of the monitoring system, but also DOSTE staff training program. Adequate training on "Environmental Monitoring (sampling, quality analysis, measurement)", "Environmental Data Analysis", "Operation & Maintenance of Monitoring Equipment" are required.

Implementation schedule of reinforcement of monitoring system in DOSTE are proposed below:

Proposed Schedule



6.9.6 Effective Management of Environmental Public Services (TUPWS)

(1) Existing organization and needs

The existing organization structure for TUPWS is presented in Figure 6.9.1. TUPWS is the implementing agency and project management agency for all new public works infrastructure projects. TUPWS is responsible for managing the construction of facilities once the siting decisions are made and the facilities are planned. TUPWS participates as a member of the master planning team lead by HCAO and plays a critical role in ensuring all the environmental considerations and mitigation measures that were designed into a project during the planning process are carried forward during the construction and operation.

TUPWS is involved in the following environmental management functions through its many companies:

- Inspection in conjunction with the DOSTE
- Must ensure EIAs are prepared for new projects
- Must obtain necessary licenses for DOSTE/MOSTE
- Pollution control and management have the capability to ensure that their associated with landfill sites

At present there is concern that TUPWS is unable to effectively manage its environmental management responsibilities with respect to construction and operation of urban infrastructure. Organizational problems include:

- No direct relationship to operation and maintenance companies under its responsibility.
- Inadequate planning and project management for implementation of urban infrastructure.
- No direction to companies like URENCO or HSDC on master planning for urban infrastructure.
- Inadequate integration of urban infrastructure projects e.g., water supply and sanitation.
- Inadequate budgeting for urban infrastructure development and overall lack

of coordination between investment budgets and impact on O&M budgets for utilities under its direction.

- No clear direction on tariff setting and cost recovery for the utilities it directs

In short, TUPWS acts as a middle-man and does not play a sufficiently direct role in managing the operation of utilities in its organization.

(2) Short Term: 2005

1) Proposed Institutional Arrangement with respect to Solid Waste Management

The role to be played by TUPWS is closely related to the institutional arrangement concerning solid waste management and administration. The JICA Study Team proposes:

- devolution of solid waste management responsibility from HPC level to District level
- privatization with competition (contracting out of waste collection and transport services)
- management autonomy of URENCO from HPC, and conversion to a pure service provider in a long run

2) New Role of TUPWS with respect to solid waste management

If this institutional setting is accepted by HPC, TUPWS should have a capacity in doing the following activities:

- Make a future disposal plan (deciding on location of landfill site and methods of disposal) and acquire land without delay
- Assist District Administrations in planning and discharging solid waste management responsibility
- Set policy on cost recovery and other methods for financing solid waste management costs
- Make a plan for establishing a regulatory framework (regulations and regulatory agency) in view of future privatization.

3) Project Management Board

HPC is proposing that large-scale infrastructure projects will no longer be managed by TUPWS but instead by PMBs reporting directly to HPC. This arrangement is proposed because TUPWS has apparently been unable to properly manage during project preparation and construction of the drainage project and the Nam Son landfill site. If this change takes place it will be important for TUPWS participate in project management boards as a

stakeholder to ensure coordination with operating companies during construction and a smooth transfer during commissioning.

(3) Mid-Term: 2010

(a) Role of TUPWS regarding urban environmental services

In addition to solid waste planning, TUPWS must also take a more direct role in managing environmental services such as water supply and sewerage more effectively. It is recommended that TUPWS be re-structured to integrate the management of all companies providing environmental services. As shown in Figure 6.9.2, companies operating under TUPWS can be grouped into one of three departments with the benefit of allowing a greater degree of specialization and integration for environmentally related urban services. The three new departments will be:

- Production And Commerce Department (no change)
- Environmental Services Department (water supply, sewage, drainage, solid waste & parks)
- Traffic And Urban Roadways Department (traffic works, public lighting, pavement management)

The key role for environmental management will be played by the new Environmental Services Department. It is proposed that an Engineering Division within the new Environmental Services Department provide specialized planning and engineering of all urban water supply and sanitation infrastructure. A similar Engineering Division attached to the Traffic and Urban Roadways Department can provide specialized transportation infrastructure planning and engineering.

Re-organization and specialization will strengthen environmental management by:

- Integrating planning of environmental services across sectors within one core group of environmental management professionals
- promoting a stronger link between master planning directed by HCAO and urban environment infrastructure planning provided by TUPWS
- Providing consistent environmental policies and direction for the management of operating companies.

The new Engineering Division will also provide technical assistance to support operational groups (URENCO, WSBC, HSDC, Parks Co.) providing environmental services. Each company will keep a small but specialized technical services group (engineering) who will specialize in operational planning and solving specific technical difficulties related to day to day

operations and maintenance. The Engineering Division will, through the planning process, identify required infrastructure development and renewal (e.g. sewer reticulation, water main replacements). Smaller scale capital projects for infrastructure renewal or extension of water mains and sewers will be designed and managed by the engineering division.

(4) Staffing, equipment and financial implications of proposed reforms

Staffing requirements are developed as part of Human Resources in chapter 6.11.3. Incremental staffing levels, investment and operating costs for the proposed reforms are presented for each year in Table 6.9.15. Program costs are summarized as follows:

ENVIRONMENTAL SERVICES DEPT.	NO. OF STAFF (at end of period)		
	2000-2005	2006-2010	2011- 2020
New staff	0	26	29
Staff seconded from existing technical depts.	0	26	63
Total Investment costs (000's USD)	0	260	1400
Annual Operating costs (000's USD)	0	36	300
HRD training investment cost (000's USD)	0	210*	5 **

* indicates total investment cost for the period, provided as technical assistance through ODA

** indicates average annual cost, transferred to HSDC operating budget

Investment costs represent the sum of all capital costs for the period including equipment replacement. Annual operating costs are for the last year of the period indicated.

Table 6.9.1 Functional Responsibilities of Staff in the New Environmental Agency

Division	Job Title (No. of staff)	Staff Responsibilities
Directors Office	• Director (1) • Deputy Director (1) • Support staff (1)	▪ Overall direction and planning for environmental agency ▪ Approval of plans and budgets
Administration	• Chief (1) • Finance (2) • Support staff (1)	▪ General administration ▪ Finance ▪ Services (driver, night watchman)
EIA and Technology	• Chief (1) • EIA Specialists (2) • Environmental Research (1)	▪ Appraisal and Review of EIA Reports ▪ Administration of the EIA Process ▪ Assessment of the appropriateness of technology ▪ Conducting environmental research in association with other agencies
Environmental Monitoring	• Chief and Laboratory Manager (1) • Senior Environmental Monitoring Specialist (1) • Monitoring Technicians (1) • Laboratory Technicians (2) • Monitoring Technician / Information Systems Specialist (1)	▪ Operation and Maintenance of Environmental monitoring stations ▪ State of Environment Reporting ▪ Environmental information systems and databases ▪ Laboratory analysis of environmental data
Pollution Control	• Chief (1) • Environmental Engineers (3) • Information System Specialist (1)	▪ Industrial pollution control and management ▪ Solid Waste Management ▪ Hazardous Waste Management
Inspection	• Chief (1) • Inspectors (3)	▪ State environmental inspection as mandated by EPLaw ▪ Handling complaints and disputes
Public Relations & Environmental Awareness	• Chief (1) • Public relations officer (1) • Environmental Coordinator (1)	▪ Environmental education and awareness ▪ Public relations
District Environmental Management	• Senior Environmental Specialists (4)	▪ Supervision and leadership of regional district environmental management teams

Table 6.9.2 Detailed Cost Estimate for Upgrading Hanoi DOSTE to Environmental Agency Short Term Costs (2000 - 2005)						
1. RECURRENT COSTS						
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)						
TOTAL SALARY	Additional Staff	16	700	$	11,200	
OVERHEAD (1 times Salary Cost)				$	11,200	
TOTAL ANNUAL SALARY AND OVERHEAD				$	22,400	$ 22,400
1.2. ANNUAL OPERATING COSTS (funded by HPC)						
EIA and Technology	General			$	3,000	
	Outside Programs			$	20,000	
Environmental Monitoring	See Environmental Monitoring System Costs					
Pollution Control	General			$	3,000	
	Contract Sampling and Laboratory			$	20,000	
Inspection	General			$	3,000	
	Contract Sampling and Laboratory			$	10,000	
District Environmental Management	See District Budget					
Public Relations and Environmental Awarene	General			$	3,000	
	Outside Programs			$	15,000	
Human Resource Development	Training			$	5,000	
TOTAL ANNUAL OPERATING COSTS				$	82,000	$ 82,000
TOTAL RECURRENT COSTS						$ 104,400
2. NON RECURRENT COSTS						
2.1. CAPITAL COSTS (for the period 2000-2005)						
EIA and Technology	Computer			$	5,000	
Environmental Monitoring	Computer	See Environmental Montoring System Costs				
	Vehicle	See Environmental Montoring System Costs				
	Sampling	See Environmental Montoring System Costs				
	Laboratory	See Environmental Montoring System Costs				
Pollution Control	Computer			$	5,000	
Inspection	Computer			$	5,000	
	Vehicle			$	30,000	
District Environmental Management	* See District Costs					
Public Relations and Environmental Awarene	Computer			$	5,000	
TOTAL CAPITAL COSTS				$	50,000	$ 50,000
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)						
EIA and Technology				$	25,000	
Environmental Monitoring				$	100,000	
Pollution Control				$	25,000	
Inspection				$	25,000	
District Environmental Management	* See District Costs					
Public Relations and Environmental Awareness				$	25,000	
TOTAL TECHNICAL ASSISTANCE and TRAINING				$	200,000	$ 200,000
TOTAL NONRECURRENT COSTS						$ 250,000

Table 6.9.3 Detailed Cost Estimate for Upgrading Hanoi DOSTE to Environmental Agency Middle Term Costs (2006 - 2010)						
1. RECURRENT COSTS						
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)						
TOTAL SALARY	Additional Staff	24	700	$	16,800	
OVERHEAD (1 times Salary Cost)				$	16,800	
TOTAL ANNUAL SALARY AND OVERHEAD				$	33,600	$ 33,600
1.2. ANNUAL OPERATING COSTS (funded by HPC)						
EIA and Technology	General			$	3,000	
	Outside Programs			$	20,000	
Environmental Monitoring	See Environmental Monitoring System Costs					
Pollution Control	General			$	3,000	
	Contract Sampling and Laboratory			$	20,000	
Inspection	General			$	3,000	
	Contract Sampling and Laboratory			$	10,000	
District Environmental Management	See District Budget					
Public Relations and Environmental Awarene	General			$	3,000	
	Outside Programs			$	15,000	
Human Resource Development	Training			$	5,200	
TOTAL ANNUAL OPERATING COSTS				$	82,200	$ 82,200
TOTAL RECURRENT COSTS						$ 115,800
2. NON RECURRENT COSTS						
2.1. CAPITAL COSTS (for the period 2006-2010)						
EIA and Technology	Computer			$	5,000	
Environmental Monitoring	Computer	See Environmental Montoring System Costs				
	Vehicle	See Environmental Montoring System Costs				
	Sampling	See Environmental Montoring System Costs				
	Laboratory	See Environmental Montoring System Costs				
Pollution Control	Computer			$	5,000	
Inspection	Computer			$	5,000	
	Vehicle			$	-	
District Environmental Management	* See District Costs					
Public Relations and Environmental Awarene	Computer			$	5,000	
TOTAL CAPITAL COSTS				$	20,000	$ 20,000
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)						
EIA and Technology						
Environmental Monitoring						
Pollution Control						
Inspection						
District Environmental Management	* See District Costs					
Public Relations and Environmental Awareness						
TOTAL TECHNICAL ASSISTANCE and TRAINING				$	-	$ -
TOTAL NONRECURRENT COSTS						$ 20,000

Table 6.9.4 Detailed Cost Estimate - Department of Environment Long Term Costs (2011 - 2020)						
1. RECURRENT COSTS						
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)						
TOTAL SALARY	Additional Staff	34	700	$ 23,800		
OVERHEAD (1 times Salary Cost)				$ 23,800		
TOTAL ANNUAL SALARY AND OVERHEAD				$ 47,600	$	47,600
1.2. ANNUAL OPERATING COSTS (funded by HPC)						
EIA and Technology	General			$ 3,000		
	Outside Programs			$ 20,000		
Environmental Monitoring	See Environmental Monitoring System Costs					
Pollution Control	General			$ 3,000		
	Contract Sampling and Laboratory			$ 20,000		
Inspection	General			$ 3,000		
	Contract Sampling and Laboratory			$ 10,000		
District Environmental Management	See District Budget					
Public Relations and Environmental Awarene	General			$ 3,000		
	Outside Programs			$ 15,000		
New Divisions	General			$ 6,000		
	Outside Programs			$ 30,000		
Human Resource Development	Training			$ 3,200		
TOTAL ANNUAL OPERATING COSTS				$ 116,200	$	116,200
TOTAL RECURRENT COSTS					$	163,800
2. NON RECURRENT COSTS						
2.1. CAPITAL COSTS (For the period 2011 -2020)						
EIA and Technology	Computer			$ 5,000		
Environmental Monitoring	Computer	See Environmental Monitoring System Costs				
	Vehicle	See Environmental Monitoring System Costs				
	Sampling	See Environmental Monitoring System Costs				
	Laboratory	See Environmental Monitoring System Costs				
Pollution Control	Computer			$ 5,000		
Inspection	Computer			$ 5,000		
	Vehicle			$ -		
District Environmental Management	* See District Costs					
Public Relations and Environmental Awarene	Computer			$ 5,000		
New Divisions	Computer			$ 10,000		
	Vechicle			$ 30,000		
TOTAL CAPITAL COSTS				$ 60,000	$	60,000
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)						
EIA and Technology						
Environmental Monitoring						
Pollution Control						
Inspection						
District Environmental Management	* See District Costs					
Public Relations and Environmental Awareness						
TOTAL TECHNICAL ASSISTANCE and TRAINING				$ -	$	-
TOTAL NONRECURRENT COSTS					$	60,000

Table 6.9.5 Cost Estimate for District Level Environmental Management Short Term (2000-2005)					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by District People Committees)					
Hanoi City Level	Included in DOSTE Budget			$ -	
District Level	Environmental Officers	20	600	$ 12,000	
TOTAL SALARY				$ 12,000	
OVERHEAD (1 times Salary Cost)				$ 12,000	
TOTAL ANNUAL SALARY AND OVERHEAD				$ 24,000	$ 24,000
1.2. ANNUAL OPERATING COSTS					
District Environmental Management Units	General	12	1000	$ 12,000	
	Training	12	250	$ 3,000	
	Contracting Sampling/Laboratory	12	2000	$ 24,000	
TOTAL OPERATING COSTS				$ 39,000	$ 39,000
TOTAL RECURRENT COSTS					$ 63,000
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2000-2005)					
District Environmental Management Units	Computer	4	2500	$ 10,000	
	Vehicle	1	30000	$ 30,000	
TOTAL CAPITAL COSTS				$ 40,000	$ 40,000
2.2. TECHNICAL ASSISTANCE AND TRAINING					
District Environmental Management Units		4	10000	$ 40,000	
TOTAL TECHNICAL ASSISTANCE AND TRAINING				$ 40,000	$ 40,000
TOTAL NON RECURRENT COSTS					$ 80,000

Table 6.9.6 Cost Estimate for District Level Environmental Management					
Middle Term (2006 -2010)					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by District People Committees)					
Hanoi City Level	Included in DOSTE Budget			$ -	
District Level	Environmental Officers	48	600	$ 28,800	
TOTAL SALARY				$ 28,800	
OVERHEAD (1 times Salary Cost)				$ 28,800	
TOTAL ANNUAL SALARY AND OVERHEAD				$ 57,600	$ 57,600
1.2. ANNUAL OPERATING COSTS					
District Environmental Management Units	General	12	1000	$ 12,000	
	Training	12	560	$ 6,720	
	Contracting Sampling/Laboratory	12	2000	$ 24,000	
TOTAL OPERATING COSTS				$ 42,720	$ 42,720
TOTAL RECURRENT COSTS					$ 100,320
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2006-2010)					
District Environmental Management Units	Computer	8	2500	$ 20,000	
	Vehicle	1	30000	$ 30,000	
TOTAL CAPITAL COSTS				$ 50,000	$ 50,000
2.2. TECHNICAL ASSISTANCE AND TRAINING					
District Environmental Management Units		8	5000	$ 40,000	
TOTAL TECHNICAL ASSISTANCE AND TRAINING				$ 40,000	$ 40,000
TOTAL NON RECURRENT COSTS					$ 90,000

Table 6.9.7 Cost Estimate for District Level Environmental Management					
Long Term (2011 -2020)					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by District People Committees)					
Hanoi City Level	Included in DOSTE Budget			$ -	
District Level	Environmental Officers	48	600	$ 28,800	
TOTAL SALARY				$ 28,800	
OVERHEAD (1 times Salary Cost)				$ 28,800	
TOTAL ANNUAL SALARY AND OVERHEAD				$ 57,600	$ 57,600
1.2. ANNUAL OPERATING COSTS					
District Environmental Management Units	General	12	1000	$ 12,000	
	Training	12	263	$ 3,160	
	Contracting Sampling/Laboratory	12	2000	$ 24,000	
TOTAL OPERATING COSTS				$ 39,160	$ 39,160
TOTAL RECURRENT COSTS					$ 96,760
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2011-2020)					
District Environmental Management Units	Computer	12	2500	$ 30,000	
	Vehicle	1	30000	$ 30,000	
TOTAL CAPITAL COSTS				$ 60,000	$ 60,000
2.2. TECHNICAL ASSISTANCE AND TRAINING					
District Environmental Management Units		12	5000	$ 60,000	
TOTAL TECHNICAL ASSISTANCE AND TRAINING				$ 60,000	$ 60,000
TOTAL NON RECURRENT COSTS					$ 120,000

Table 6.9.8. Comparison of Options A, B, and C.

	Option A: Hanoi City Level	Option B: Central Level	Option C: HPC Leadership with Participation of the Central Agencies
1. Mandate	▪HPC Decision	▪GOV Decree or Resolution	▪GOV Decree or Resolution and HPC Decision
2. Objectives and Responsibilities	▪co-ordination of the implementation and amendment of EMP	▪co-ordination of the implementation and amendment of EMP	▪co-ordination of the implementation and amendment of EMP
3. Chairmanship	▪Chairman of HPC	▪Deputy Prime Minister for Science, Education, and Environment	▪Chairman of HPC
4. Membership	▪key implementing agencies in Hanoi Government	▪central level agencies for: environmental management of economic sectors, environment and conservation, planning, finance, and administration ▪key implementing agencies in Hanoi	▪central level agencies for: environmental management of economic sectors, environment and conservation, planning, finance, and administration ▪key implementing agencies in Hanoi
5. Secretariat	▪Hanoi Authority for Planning Investment	▪Department of Science, Education, and Environment in MPI	▪Hanoi Authority for Planning Investment
6. Technical Subcommittee	▪Chaired by DOSTE ▪Professional/technical staff drawn from Hanoi City level agencies	▪Chaired by NEA ▪Professional/technical staff drawn from:1) Depts of Science Technology and Environment in central Ministries; and 2) Hanoi City level agencies	▪Chaired by DOSTE ▪Professional/technical staff drawn from:1) Depts of Science Technology and Environment in central Ministries; and 2) Hanoi City level agencies
7. Operating Procedures	▪Quarterly meetings of ECC ▪Monthly meetings of Technical Subcommittee ▪Contracting out for special studies and projects	▪Quarterly meetings of ECC ▪Monthly meetings of Technical Subcommittee ▪Contracting out for special studies and projects	▪Quarterly meetings of ECC ▪Monthly meetings of Technical Subcommittee ▪Contracting out for special studies and projects
8. Financial and Personnel Requirements	▪No additional full-time personnel ▪Consideration time and effort needed from HAPI for Secretariat and DOSTE for Technical Subcommittee ▪Annual budget of $40,000 US	▪No additional full-time personnel ▪Considerable time and effort needed from DSEE- MPI for Secretariat and NEA for Technical Subcommittee ▪Annual budget of $100,000 US	▪No additional full-time personnel ▪Consideration time and effort needed from HAPI for Secretariat and DOSTE for Technical Subcommittee ▪Annual budget of $100,000 US

Table 6.9.9 Detailed Cost Estimate for Incorporation Environmental Considerations into Planning					
Short Term (2000 -2005)					
HAPI					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
Additional Staff (beginning 2002)		4	700	2800	
OVERHEAD (1 times Salary Cost)				2800	
TOTAL ANNUAL SALARY AND OVERHEAD				5600	5600
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
General				1000	
Training				3467	
TOTAL ANNUAL OPERATING COSTS				4467	4467
TOTAL RECURRENT COSTS					10067
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2000-2005)					0
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					
1. Policy Analysis Study on Relocation				50,000	
2. Environmental Aspects of Socioeconomic Planning				100,000	
3. Economic Evaluation of Environmental Projcts				100,000	
TOTAL TECHNICAL ASSISTANCE AND TRAINING				250,000	250,000
TOTAL NONRECURRENT COSTS					250,000
HCAO					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
Additional Staff (beginning 2001)		5	700	3500	
OVERHEAD (1 times Salary Cost)				3500	
TOTAL ANNUAL SALARY AND OVERHEAD				7000	7000
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
General				1000	
Training				9833	
TOTAL ANNUAL OPERATING COSTS				10833	10833
TOTAL RECURRENT COSTS					17833
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2000-2005)					0
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					
1. Increase Environmental Spatial Planning Capability in HCAO				150,000	
2. Developing the next amendment of Hanoi Master Plan to 2020.				100,000	
TOTAL TECHNICAL ASSISTANCE AND TRAINING				250,000	250,000
TOTAL NONRECURRENT COSTS					250,000

Table 6.9.10 Detailed Cost Estimate for Incorporation Environmental Considerations into Planning					
Middle Term (2006 -2010)					
HAPI					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
Additional Staff (beginning 2002)		4	700	2800	
OVERHEAD (1 times Salary Cost)				2800	
TOTAL ANNUAL SALARY AND OVERHEAD				5600	5600
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
General				1000	
Training				2800	
TOTAL ANNUAL OPERATING COSTS				3800	3800
TOTAL RECURRENT COSTS					9400
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS(for the period 2006-2010)					0
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					0
TOTAL NONRECURRENT COSTS					-
HCAO					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
Additional Staff (beginning 2001)		5	700	3500	
OVERHEAD (1 times Salary Cost)				3500	
TOTAL ANNUAL SALARY AND OVERHEAD				7000	7000
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
General				1000	
Training				2000	
TOTAL ANNUAL OPERATING COSTS				3000	3000
TOTAL RECURRENT COSTS					10000
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2006-2010)					0
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					0
TOTAL NONRECURRENT COSTS					-

Table 6.9.11 Detailed Cost Estimate for Incorporation Environmental Considerations into Planning					
Long Term (2011 -2020)					
HAPI					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
Additional Staff (beginning 2002)		4	700	2800	
OVERHEAD (1 times Salary Cost)				2800	
TOTAL ANNUAL SALARY AND OVERHEAD				5600	5600
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
General				1000	
Training				3000	
TOTAL ANNUAL OPERATING COSTS				4000	4000
TOTAL RECURRENT COSTS					9600
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2011-2020)					0
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					0
TOTAL NONRECURRENT COSTS					-
HCAO					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
Additional Staff (beginning 2001)		5	700	3500	
OVERHEAD (1 times Salary Cost)				3500	
TOTAL ANNUAL SALARY AND OVERHEAD				7000	7000
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
General				1000	
Training				2000	
TOTAL ANNUAL OPERATING COSTS				3000	3000
TOTAL RECURRENT COSTS					10000
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS(for the period 2011-2020)					0
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					0
TOTAL NONRECURRENT COSTS					-

Table 6.9.12 Detailed Cost Estimate for Environmental Monitoring System Short Term Costs (2000 - 2005)					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
TOTAL SALARY	Included in DOSTE Staff		$ -		
OVERHEAD (1 times Salary Cost)			$ -		
TOTAL ANNUAL SALARY AND OVERHEAD			$ -	$	-
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
Environmental Monitoring	General		$ 3,000		
	Maintenance of Monitoring Station		$ 12,240		
	Laboratory O&M		$ 10,500		
	Outside Programs		$ 30,000		
Human Resource Development	Included in DOSTE Budget				
TOTAL ANNUAL OPERATING COSTS			$ 55,740	$	55,740
TOTAL RECURRENT COSTS				$	55,740
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2000-2005)					
Environmental Monitoring	Computer	1 $ 5,000	$ 5,000		
	Vehicle	1 $ 25,000	$ 25,000		
	Air Monitoring Station				
	Laboratory		$ 200,000		
TOTAL CAPITAL COSTS			$ 230,000	$	230,000
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					
Environmental Monitoring	Included in DOSTE Budget				
TOTAL TECHNICAL ASSISTANCE and TRAINING			$ -	$	-
TOTAL NONRECURRENT COSTS				$	230,000

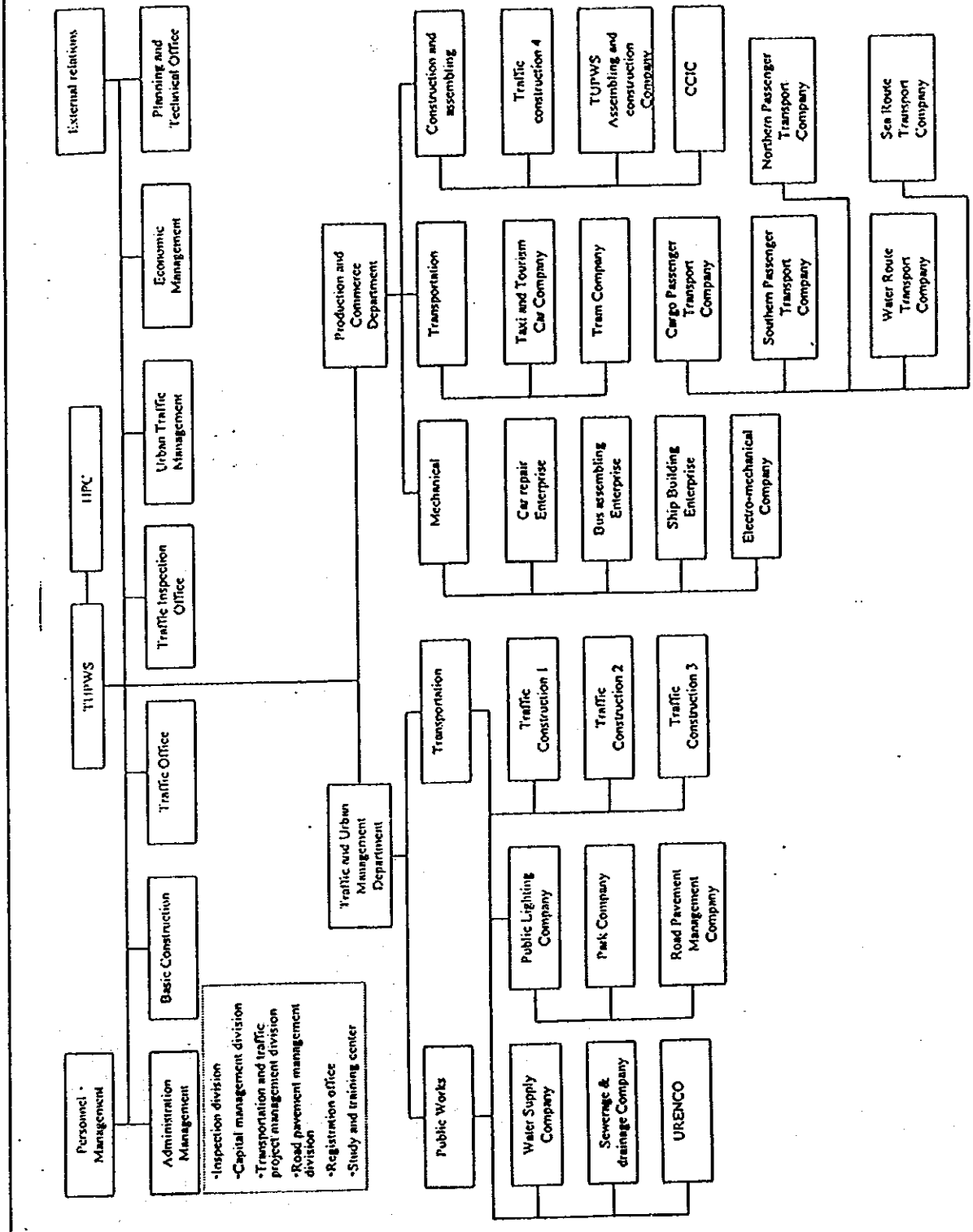
Table 6.9.13 Detailed Cost Estimate for Environmental Monitoring System Middle Term Costs (2006 - 2010)					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
TOTAL SALARY	Included in DOSTE Staff		$ -		
OVERHEAD (1 times Salary Cost)			$ -		
TOTAL ANNUAL SALARY AND OVERHEAD			$ -	$	-
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
Environmental Monitoring	General		$ 3,000		
	Maintenance of Monitoring Station		$ 55,080		
	Laboratory O&M		$ 10,500		
	Outside Programs		$ 30,000		
Human Resource Development	Included in DOSTE Budget				
TOTAL ANNUAL OPERATING COSTS			$ 98,580	$	98,580
TOTAL RECURRENT COSTS				$	98,580
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2006-2010)					
Environmental Monitoring	Computer				
	Vehicle				
	Air Monitoring Station	7 $ 274,000	$ 1,918,000		
	Laboratory				
TOTAL CAPITAL COSTS			$ 1,918,000	$	1,918,000
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					
Environmental Monitoring	Included in DOSTE Budget				
TOTAL TECHNICAL ASSISTANCE and TRAINING			$ -	$	-
TOTAL NONRECURRENT COSTS				$	1,918,000

Table 6.9.14 Detailed Cost Estimate for Environmental Monitoring System Long Term Costs (2011 - 2020)					
1. RECURRENT COSTS					
1.1 ANNUAL SALARY AND OVERHEAD (funded by HPC)					
TOTAL SALARY	Included in DOSTE Staff		$ -		
OVERHEAD (1 times Salary Cost)			$ -		
TOTAL ANNUAL SALARY AND OVERHEAD			$ -	$	-
1.2. ANNUAL OPERATING COSTS (funded by HPC)					
Environmental Monitoring	General		$ 3,000		
	Maintenance of Monitoring Station		$ 55,080		
	Laboratory O&M		$ 10,500		
	Outside Programs		$ 30,000		
Human Resource Development	Included in DOSTE Budget				
TOTAL ANNUAL OPERATING COSTS			$ 98,580	$	98,580
TOTAL RECURRENT COSTS				$	98,580
2. NON RECURRENT COSTS					
2.1. CAPITAL COSTS (for the period 2011-2020)					
Environmental Monitoring	Computer	1 $ 5,000	$ 5,000		
	Vehicle	2 $ 25,000	$ 50,000		
	Air Monitoring Station	9 $ 204,000	$ 1,836,000		
	Laboratory		$ 350,000		
TOTAL CAPITAL COSTS			$ 2,241,000	$	2,241,000
2.2. TECHNICAL ASSISTANCE AND TRAINING (provided by ODA)					
Environmental Monitoring	Included in DOSTE Budget				
TOTAL TECHNICAL ASSISTANCE and TRAINING			$ -	$	-
TOTAL NONRECURRENT COSTS				$	2,241,000

Table 6.9.15 - Annual Investment and Operating Costs for TUPWS Re-organization

	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Personnel for Environmental Services Engineering Division												
Director/brach managers	persons						5	5	5	5	5	5
planning engineers	persons						6	6	6	6	6	6
project managers/design engineers	persons						16	16	16	16	16	16
technicians	persons						9	9	9	9	9	9
CAD operators	persons						8	8	8	8	8	8
clerical support	persons						8	8	8	8	8	8
	persons						52	52	52	52	52	52
Staff costs	1000 USD						36	36	36	36	36	36
computers	1000 USD	-					52			50		52
Investment cost	1000 USD	-					260,000			50		260,000
Total costs												
Annual investment cost	1000 USD	-	-	-	-	-	260,000	-	-	50	-	260,000
Annual operating costs	1000 USD	-	-	-	-	-	36	36	36	36	36	36
Training costs (technical assistance through ODA)	1000 USD						120,000					

	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Personnel for Environmental Services Engineering Division												
Director/brach managers	persons	5	5	5	5	5	5	5	5	5	5	
planning engineers	persons	6	6	6	6	6	6	6	6	6	6	
project managers/design engineers	persons	16	16	16	16	16	16	16	16	16	16	
technicians	persons	9	9	9	9	9	9	9	9	9	9	
CAD operators	persons	8	8	8	8	8	8	8	8	8	8	
clerical support	persons	8	8	8	8	8	8	8	8	8	8	
	persons	52	52	52	52	52	52	52	52	52	52	
Staff costs	1000 USD	36.4	36	36	36	36	36	36	36	36	36	
computers	1000 USD					52					52	
Investment cost	1000 USD					260,000					260,000	
Total costs												
Annual investment cost	1000 USD	-	-	-	-	260,000	-	-	-	-	260,000	-
Annual operating costs	1000 USD	36	36	36	36	36	36	36	36	36	36	-
Training costs (operating budget)	1000 USD	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000



THE AFTERCARE STUDY ON
THE NATIONAL WATER MASTER PLAN

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 6.9.1
TUPWS existing organisation chart

THE AFTERCARE STUDY ON
THE NATIONAL WATER MASTER PLAN

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 6.9.2
TUPWS - proposed organisation chart