

# Chapter 7

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## *Environmental Management Master Plan*

## 7 Environmental Management Master Plan

This chapter presents the improvement plans for the BCE/SCE in different environment fields that are covered by them. Each section below consists of sub-sections that describe where the BCE/SCE should go by 2010, what has to be done, and what will be the required size of investment for achievement.

### 7.1 Air Protection

#### 7.1.1 Directions

##### a. Point Sources (factories etc.)

The SCE will develop policy and legislation, whilst the BCE will monitor and control the polluting activities in Baku, as they do at present. By 2010, The BCE should:

- control pollution sources in a systematic and efficient way with documents provided by the sources and a revised inspection system;
- not only penalise pollution sources but encourage them positively to introduce environmentally friendly operation;
- not only control pollution sources but pay attention to overall ambient air quality.

##### b. Mobile Sources

The SCE will develop policy and legislation. The BCE will monitor air pollution from mobile sources.

The environmental impacts of mobile sources result from the poor condition of vehicles and the stagnation of traffic flow. The former is controlled by Ministry of Internal Affairs and the Police, whilst the latter is a matter of city planning in the responsibility of the BEP.

The SCE, (or MOEP after the reform of government including SCE and Hydromet) and the BCE should understand the scale of environmental impacts caused by car exhaust and work out necessary policies that will be followed by the relevant authorities mentioned above.

#### 7.1.2 Strategies

BCE/SCE	Other Organisations	
Work	Work	Organisation
<b>PHASE I: 2001 - 2003</b>		
1. To improve the inspection of factories by referring to documents. 2. To strengthen the inspection of factories with large environmental impacts. 3. To encourage factories to introduce anti-pollution measures and CPT by developing financial and technical support systems.	1. To start to introduce anti-pollution measures and CPT following the BCE/SCE's recommendation. 2. To formulate a traffic improvement plan for smooth traffic flow. 3. To assist vehicle owners to equip vehicles with exhaust pollutant reduction devices.	Factories Relevant Ministries BEP Road Police Relevant Organisations

BCE/SCE Work	Other Organisations Work Organisation	
4. To strengthen the inspection of mobile sources. 5. To establish a new monitoring station to monitor air quality influenced by car exhausts. 6. To support Hydromet to review its monitoring system. 7. To raise computer skills of department staff for GIS data input and data presentation.	4. To review a system obliging vehicle owners to periodically obtain an official approval of mechanically and environmentally satisfactory vehicle conditions. 5. To rearrange the air monitoring system.	Police       Hydromet
<b>PHASE II: 2004 – 2006</b>		
1. To present practical recommendations to all factories if necessary. 2. To promote air pollution control industry 3. To revise the fines on polluting vehicles.	1. To extend anti-pollution measures and CPT following the BCE/SCE's recommendation. 2. To introduce the license issue process for vehicle repair shops. 3. To implement the traffic improvement plan.	Factories Relevant Ministries Relevant Organisations BEP
<b>PHASE III: 2007 - 2010</b>		
1. To apply the emission standards strictly to existing factories which are changing or expanding their operations. 2. To abolish fines on polluting vehicles. 3. To restructure the air monitoring system.	1. To extend anti-pollution measures and CPT following the BCE/SCE's recommendation.	Factories Relevant Organisation

The works to be done by the BCE/SCE are explained in detail below.

### Phase I.

#### *Point sources:*

1. The BCE should monitor the pollution sources and the source documents. The SCE/BCE should establish a system in which all the pollution sources are obliged to submit three copies of an environmental passport and normative documents. After approval, one of them will be kept at the SCE, another at the BCE and the other will be returned to the factory.

The GIS established at the BCE contains the information on environmental passports. It should be updated with new data obtained through monitoring.

2. In order to utilise limited resources at the BCE efficiently, the BCE should focus on inspection of major polluters. A revised inspection scheme will be as in **a.1** of Section 3.1.3.
3. The BCE should present proposals to reduce environmental impacts at factories which are significantly polluting (Groups A and B, see below). The expertise of Academy of Sciences, Oil Academy, universities and other relevant institutions should be involved. Using the Environmental Fund and/or Oil Fund as capital, the BCE should introduce a soft loan scheme in

which factories can borrow funds to equip themselves with anti-pollution facilities and/or cleaner production technology.

***Mobile sources:***

4. The control of mobile sources must be strengthened by starting with imported vehicles. The SCE should work for the enforcement of existing legislation which prohibits the importation of vehicles not complying with the car exhaust standards. The BCE should also work with other bodies to ensure that vehicle maintenance standards are enforced to minimise the emissions and their effects.
5. The existing air monitoring stations monitor the ambient air quality that is influenced by point sources and mobile sources. A new air monitoring station which specifically monitors the impacts caused by car exhaust must be established. Items to be monitored include NO<sub>2</sub>, SPM, HC and CO.

***General:***

6. The present air monitoring approach by Hydromet requires improvement in terms of measurement accuracy, even at the expense of lowering the scale of monitoring. The replacement of measurement equipment, reduction of the number of monitored items and monitoring stations, and reduction of monitoring frequency should be examined. The BCE has to assist the Hydromet to review its monitoring system.
7. The staff must obtain computer skills to use and update data in the GIS.

**Phase II.**

***Point sources:***

1. The BCE will make suggestions to reduce environmental impacts given by factories in Group C (see below), if necessary.
2. The BCE should encourage some of the machinery factories in Azerbaijan to produce pollution control facilities, although there will be difficulties in terms of technology and patent which can be very expensive when they are imported. Furthermore, law enforcement by the BCE should promote market demand for pollution control facilities for the development of such industry.

***Mobile sources:***

3. The exhaust tests of the team revealed that a great number of vehicles emit CO more than 2% of exhaust, not complying with the standard. There is little incentive for the offenders to improve exhaust since fines are too low. The SCE must raise fines to encourage car owners to improve exhaust or to refrain from driving polluting cars. These fines should be increased regularly at a rate greater than domestic price inflation to act as an increasing deterrent.

**Phase III.**

***Point sources:***

1. In cases where existing point sources are changing or expanding their operation and will not comply with the normative permissible emission standards, the BCE should force them to change their plans or close them.

**Mobile sources:**

2. The current exhaust control system obliges the car owners to have exhaust test once or twice a year and to pay fines on violation. The BCE/SCE, together with Ministry of Internal Affairs, should revise this system to oblige all the vehicle owners to have an exhaust test once a year. If violation is found, the SCE/BCE gives the owner a warning, instead of imposing fines, and the car must not be used on receiving three warnings.

**General:**

3. As the establishment of the MOEP is expected by this phase, the monitoring system currently executed by Hydromet comes under the MOEP and will need restructuring.

### 7.1.3 Monitoring

Monitoring, in a broad sense, is of two types. One is the inspection of pollutants at pollution sources and the other is monitoring in a narrow sense to see whether the air quality is good enough for human health and the environment.

**a. Point Sources (factories, etc.)**

**a.1 Inspection of Point Sources**

Emissions to air must in principle, be controlled by factories. Inspections by the BCE will have two schemes: one for major polluters and the other for minor polluters.

According to the factory survey undertaken by the team, there are 9 major factories which emit high volume gas, SO<sub>x</sub>, NO<sub>x</sub> or Dust, and 38 factories which give some impact to the environment by emission of air pollutants. Therefore those 9 factories are regarded as major polluters in the city and categorised in Group A and 38 factories are in Group B. Others will be in Group C.

This categorisation of factories should be reviewed every year.

Group	Definition
A	9 factories with large environmental impacts
B	38 factories with some environmental impacts
C	Others

**a.1.1 Inspection at Factories in Group A and B**

Factories in Group A and B will be obliged to update data and control emission themselves. The BCE will visit factories in Group A twice a year and factories in Group B once a year and inspect their operations, their data keeping practices, conformity to the emission standards and, if necessary, their processes of emission measurement. If it is proved that a factory does not control emission properly, BCE brings equipment into the factory and practically measures concentration of emission gas. On the result of measurement, BCE may order the factory to improve the management of emission control.

If the factories do not possess measuring equipment to prepare their data of emission, they should request that the BCE or other organisations that are approved by the SCE/BCE measures emission gas at the company's expense.

#### **a.1.2 Inspection at Factories in Group C**

Factories in Group C will be inspected once in three years referring to the environmental passports and normative documents, which are revised every three years. Additional inspection will be made in cases where an environmental accident takes place or the BCE receives enquiries from the factory or residents.

#### **a.2 Monitoring of Ambient Air Quality**

Until Hydromet's monitoring operations are integrated within the SCE (MOEP), the BEC/SCE must develop a system to obtain, on a regular basis and free of charge, the monitoring data obtained by the Hydromet.

#### **b. Mobile Sources**

##### **b.1 Inspection of Mobile Sources**

The Ministry of Internal Affairs and the Police are responsible for controlling and inspecting mobile sources. The BCE should request that the Ministry of Internal Affairs ensures it conducts appropriate exhaust tests at the same time as they conduct the regular vehicle inspections. Consolidated results should be sent to the BCE so that the BCE understands the significance and impact of exhaust problems.

##### **b.2 Monitoring of Mobile Sources**

The impacts given by car exhausts are monitored at the newly established monitoring station (item 5 of Phase I).

#### **7.1.4 Law Enforcement**

Any system of legal sanction or control will require accurate and consistent measuring practices, judged against relevant and appropriate standards. The BCE lacks the necessary equipment to conduct the full range of measures.

It is also important not to apply different standards to ostensibly similar operations, for example by placing a heavier burden on new installations than apply to the old ones. Costs of retro-fitting to prevent air quality damage are often three to five times higher than the cost of new equipment. A system of financial incentives, backed by enforcement measures would be appropriate (i.e. if a company receives financial support, it must then maintain the emissions within the agreed limits or face higher sanctions).

The BCE should work closely with the SCE and the Ministries of Finance and Economy to prepare new legislation based on an integrated approach which promotes the use of cleaner production techniques, requires polluter self monitoring and requires all new pollution sources to be licensed. This must be undertaken in parallel with corporate sanctions which enable the BCE to issue suspension orders pending adjudication by a competent court to prevent ongoing pollution.

### 7.1.5 Data and Information Management

Information in the currently available environmental passports has already been entered into the GIS. The results of factory inspections must be added to the database and the BCE should be able to trace the past record of each factory.

The GIS also contains the air monitoring data, which should be updated and added to with data from a newly established station.

### 7.1.6 Investment Plan

- Office equipment such as a personal computer, etc.
- Air quality monitoring station.
- Personal computers.
- Equipment for the inspection works such as vehicles, sampling tools, etc.
- Computer training for the staff; may need to hire instructors. Foreign experts may need to be dispatched.

### 7.1.7 Personnel Plan

	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Inspection	9	8	8	8
Data/information management	0	1	1	1
Total	10	10	10	10

## 7.2 Water Resources Protection

### 7.2.1 Directions

#### a. Industrial Wastewater

It is currently the policy that industry is responsible for treating its own wastewater, and this should continue. According to the Wastewater M/P, by 2015 all industrial wastewater should be discharged to the city sewerage and treated at the wastewater treatment plant, together with domestic wastewater. Therefore the industry is obliged to treat its wastewater to an extent that is acceptable to the city sewerage.

The fundamental roles of the SCE and the BCE will not change. The SCE must develop policy and legislation, and lead the wastewater dischargers toward environmentally friendly operation. The BCE acts locally to monitor and control the polluting activities in Baku. By 2010, the BCE should:

- control pollution sources that discharge their wastewater to public water bodies (other than sewerage) in a fair, systematic and efficient way with revised discharge standards, documents provided by the sources, and a new inspection system that focuses on main polluters;

- not only penalise pollution sources, but encourage them positively to introduce environmentally friendly operation;
- cooperate with the sewerage authority, which controls wastewater discharge to the sewerage, by fair control over all the wastewater dischargers, paying attention to the overall water quality protection.

**b. Domestic Wastewater**

In the Wastewater M/P all domestic wastewater should be treated by the sewerage authorities and discharged to the Caspian Sea by 2015. The sewerage authority has responsibility to implement projects proposed in the Wastewater M/P. The SCE/BCE should facilitate its implementation.

**c. Water Resources Protection**

ARWC (Absheron Regional Water Company) will play a main role for water resources protection by putting the Water M/P into practice. The SCE/BCE should assist ARWC in the reduction of water consumption in Baku, which relies on water supply from other regions.

The protection of the Jeirantaban reservoir is crucial for the city. By the target year of 2010, the safe water supply from the reservoir should be ensured by the Committee of Amelioration and Water Farm (CAWF) and ARWC, with policy support by the SCE/BCE.

**7.2.2 Strategies**

BCE/SCE	Other Organisations	
Works	Works	Organisation
PHASE I: 2001 - 2003		
1. To improve the inspection of factories.	1. To make a water pollution abatement plan consistent with the wastewater legislation.	Each pollution source
2. To strengthen the inspection of factories with large environmental impacts.	2. To implement the priority projects in the wastewater M/P.	BEP
3. To encourage wastewater dischargers to introduce anti-pollution measures and CPT by developing financial and technical support systems.	3. To implement the priority projects in the water M/P.	ARWC
4. To set wastewater discharge standards for each discharge type.	4. To formulate the watershed protection plan for Jeiranbatan reservoir and implement the urgently needed projects.	ARWC and CAWF
5. To support the implementation of the projects planned in the wastewater M/P.		
6. To promote the formulation of a watershed protection plan for the Jeiranbatan reservoir.		
7. To encourage the implementation of priority projects of the water M/P.		
8. To raise computer skills of department staff for GIS data input and data presentation.		



BCE/SCE	Other Organisations	
Works	Works	Organisation
PHASE II: 2004 – 2006		
1. To apply the new discharge standards to new factories. 2. To present practical recommendations to all factories if necessary. 3. To promote the full implementation of the watershed protection plan for Jeiranbatan reservoir. 4. To assist and supervise activities of other organisations for water resources protection.	1. To start to implement the water pollution abatement plan. 2. To implement the priority projects identified in the wastewater M/P. 3. To implement the priority projects identified in the water M/P. 4. To fully implement the watershed protection plan for Jeiranbatan reservoir.	Each pollution source BEP ARWC ARWC and CAWF
PHASE III: 2007 - 2010		
1. To apply the new discharge standards to existing factories which are changing or expanding their operations. 2. To raise awareness concerning the importance of water resource protection among the general public and encourage such actions as the minimisation of water consumption and grey water recycling.	1. To fully implement the water pollution abatement plan. 2. To implement the wastewater M/P. 3. To implement the water M/P.	Each pollution source BEP ARWC

The works to be done by the BCE/SCE are explained in detail below.

### **Phase I.**

#### ***Industrial Wastewater:***

1. The BCE should monitor the pollution sources and the source documents. The SCE/BCE should establish a system in which all the pollution sources are obliged to submit three copies of an environmental passport and normative documents. After approval, one of them will be kept at the SCE, another at the BCE and the other will be returned to the factory.

The GIS established at the BCE contains the information on environmental passports. It should be updated with new data obtained through monitoring.

2. In order to utilise limited resources at the BCE efficiently, the BCE should focus on inspection of major polluters. A newly introduced inspection scheme will be as in Section 7.2.3(a).
3. The BCE should present proposals to reduce environmental impacts at factories, which may be significantly polluting (Group A, see Section 7.2.3(a) below). The expertise of Academy of Sciences, Oil Academy, universities and other relevant institutions should be involved. Using the Environmental Fund and/or Oil Fund as capital, the BCE should introduce a soft loan scheme in which factories can borrow funds to equip themselves with anti-pollution facilities and/or cleaner production technology.

4. The present wastewater discharge standards are specifically set for every factory. Such complexity makes individual factory control difficult. The standards should be revised and be set for type of industries. The SCE should form a committee, involving experts from the government, industry and academics, to set practical discharge standards for point sources.

***Domestic wastewater:***

5. The SCE/BCE should provide the sewerage authority responsible for implementing the Wastewater M/P with policy support, putting an emphasis on the prevention of wastewater discharge to the Jeiranbatan reservoir.

***Water Resource Protection***

6. The SCE/BCE should support the CAWF and ARWC to formulate the Jeiranbatan reservoir water quality protection plan promptly and implement the urgent improvement of interceptive canals and the existing pumping station which pumps wastewater out of the watershed. Based on the environmental zoning map proposed by the team, the BCE must restrict development activities that may possibly pollute the reservoir and promote appropriate land use in its watershed in the EIA process.
7. The SCE/BCE should support the implementation of the Water Loss Control Plan by the ARWC planned in the Water M/P. The support will include the political input to facilitate the implementation and enforcement of water meters installation at new buildings and houses in the EIA process.

***General:***

8. Staff must obtain computer skills to use and update data in the GIS.

***Phase II.***

1. When new point sources are being established, the new water discharge standards, which are set for every discharge type, should be applied.
2. The BCE will make suggestions to reduce environmental impacts given by factories in Group B (see below), if necessary.
3. The BCE should promote the full implementation of the Jeiranbatan reservoir water quality protection plan (See item 6 above). The plan may include the construction of interceptive canals and the construction of a new pumping station, which will pump wastewater out of the watershed. The BCE should also further strengthen land use restriction in the Jeiranbatan watershed.
4. The excessive domestic water consumption in Baku is due to water being wasted by consumers. Water wastage is a result of a lack of respect for the natural asset. It is a region-wide environmental problem that is beyond the power of ARWC to resolve alone. The SCE/BCE should act towards water wastage prevention in various ways such as public awareness and control of illegal water connection, as well as the enforcement of meter installation by EIA.

### Phase III.

1. In cases where existing point sources are changing or expanding their operations and will not comply with the new standards, the BCE should be able to compel them to change their plans or close them.
2. The arid Absheron peninsula draws water from some hundreds of kilometres away. The real cost of water supply in Baku is more expensive than is generally realised by the population or industry. Water consumption should be further reduced not only by water wastage prevention, but also by the promotion of water saving, grey water recycling, and other methods for water resources conservation. The SCE/BCE should raise public awareness of water resources issues.

### 7.2.3 Monitoring

#### a. Industrial Wastewater

Wastewater discharge must in principle, be controlled by factories. Inspections by the BCE will have two schemes: one for major polluters and the other for minor polluters.

According to the factory survey undertaken by the team, about 60% of factories directly discharge wastewater to the public water bodies. They are grouped in Group A. Group A also includes factories whose wastewater is received and treated at the wastewater treatment plant but whose wastewater quality can affect the performance of the treatment plant due to the large volume of wastewater. The rest will be in Group B.

Group	Definition
A	<ul style="list-style-type: none"><li>• Factories which directly discharge wastewater to the public water bodies (approx. 60%).</li><li>• Among factories whose wastewater is treated at the wastewater treatment plant (approx. 33%), factories which discharge large volume of wastewater.</li></ul>
B	Others

It is to be noted that the BCE should carry out additional studies in order to categorise 7% out of 250 factories covered by the factory survey and other factories not covered by the factories survey.

#### a.1 Inspection at Factories in Group A

Factories in Group A will be obliged to update data once a year and control wastewater discharge themselves. The BCE will visit them once a year and inspect their operations, their data keeping practices, conformity to the discharge standards and, if necessary, their processes of wastewater measurement.

If they do not possess measuring equipment, they should request that the BCE or other organisations that are approved by the SCE/BCE measures discharged wastewater at the company's expense.

#### a.1 Inspection at Factories in Group B

Factories in Group B will be inspected once every three years referring to the environmental passports and normative documents, which are revised every three years. Additional inspections will be made in cases where an environmental accident

takes place, the BCE receives enquiries from the factory or residents, or has other legitimate concerns.

#### **b Domestic Wastewater**

The sewerage authority is accountable for the quality of treated wastewater. The BCE should be received (free of charge) data on treated wastewater quality, which are to be entered to the GIS.

#### **c. Water Resources Protection**

Water quality of the Jeiranbatan reservoir is under the control of the CAWF and ARWC. Their monitoring results should be sent to and compiled by the Absheron Committee for Ecology (ACE). The BCE should receive the data from the ACE, enter them to the GIS and assist the ACE.

### **7.2.4 Law Enforcement**

As with other aspects of environmental enforcement, the over-arching objective is to ensure environmental conformance, rather than to punish organisations which breach the law. However, this should not be avoided in appropriate cases.

The BCE public relations and education department should work with major industry groups to educate them in suitable pollution control and mitigation techniques.

In any event, the laws relating to water pollution need to be clarified to ensure that there is clear separation of regulatory and control functions. The law should specify that the SCE (through its regional branches) is the body clearly and solely responsible for bringing prosecutions where necessary to ensure conformance.

It is also necessary for discharge standards to be specified by the SCE/BCE, where appropriate in conjunction with the Academy of Sciences, the relevant sectoral ministries and industry representatives.

Where the BCE believes that other methods have failed and a prosecution is required, it should be able to instigate this, in the appropriate way, without reference to other state bodies.

Penalties should allow for clean up, change of production or other practice, financial penalty to the organisation and to individual managers and directors where they are found to be negligent.

### **7.2.5 Data and Information Management**

Information in the currently available environmental passports has already been entered into the GIS. The results of factory inspections must be added to the database and the BCE should be able to trace the past record of each factory.

The GIS also contains the water monitoring data, which should be updated and added.

### **7.2.6 Investment Plan**

- office equipment such as a personal computer, etc.;
- equipment for the inspection works such as a vehicle, sampling tools, etc.;

- computer training for the staff; may need to hire instructors. Foreign experts may need to be dispatched.

### 7.2.7 Operation and Maintenance (Personnel) Plan

	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Inspector	10	9	9	9
Data/information management	0	1	1	1
Total	11	11	11	11

## 7.3 Land Protection and Waste Control

### 7.3.1 Directions

#### a. Municipal Solid Waste Management

The BEP and District EPs will keep bearing the responsibility for municipal solid waste management (MSWM). There will need to be careful and rational consideration to decide whether the operation of MSWM is to be partly or fully contracted out to the private sector. Therefore, there is an urgent need to develop a M/P for MSWM in which a number of options including privatisation are examined. The formulation of the M/P rests with the BEP and District EPs, while the BCE/SCE is responsible for encouraging, supervising and supporting them in the smooth formulation and implementation of the M/P.

The team consider that the following five issues must be taken into account for MSWM M/P formulation:

- because of severe financial restrictions, the improvement of MSWM must be a phased process;
- the main focus of the short- and middle-term improvement must be on (i) the provision of sufficient waste collection service throughout the city, (ii) the prevention of city environment degradation due to illegal waste dumps, and (iii) the execution of sanitary disposal of all collected waste;
- meanwhile, there is a strong need to re-establish waste recycling systems (which hardly function after the collapse of FSU), particularly those for used paper and steel scrap;
- the introduction of intermediate treatment technology for municipal solid waste such as incineration and composting should be carefully examined from the long-term viewpoint. The introduction of treatment facilities for toxic waste and medical waste must be a priority;
- to enable and support the privatisation of MSWM, it will be necessary to develop legislation to promote, supervise and control the private sector, and to strengthen the governmental institution and financial base.

## **b. Hazardous Waste Management**

Industrial waste is divided into two types: non-hazardous and hazardous. The former should be covered by the MSWM M/P, while a regulatory framework for the latter is being studied in the sub-component of the UEIP “Technical Assistance for Development of a Hazardous Waste Management System” (UEIP HWM Study) which commenced in July 2000 and will finish in June 2002. Following the UEIP HWM Study, a HWM M/P of the study area will be formulated by the SCE while feasibility study for construction of HW treatment and disposal facilities will be conducted by organisations to be determined by the M/P.

That HW generators are responsible for disposal (from collection to final disposal) is the fundamental principle at present and for the future. The SCE must develop national policy, legislation and have a planning function, following the UEIP HWM Study, whilst the BCE will supervise and controls the facilities for HWM. Recognising that there are no HW treatment and disposal facilities available to HW generators outside their premises (e.g. factories), the following must be the critical issues for proper HWM.

1. establishment of appropriate HW control and disposal systems within factories;
2. establishment of HW management systems including collection, transport, treatment and final disposal of HW discharged from factories, particularly establishment of HW disposal executing bodies;
3. establishment of the governmental structure to promote, supervise and control the above mentioned.

Whether an implementing body for point (2) above will be private or governmental must be one of the most difficult questions. It is an established international practice to leave it to the private sector. However, certain types of governmental intervention will be inevitable in order to promote private enterprises of HW treatment and disposal, as there are absolutely no such enterprises in Azerbaijan at present.

## **c. Medical Waste Management**

The “Sanitary Regulations for Maintenance of Residential Areas, SanPiN 42-128-4690-88” prohibit medical waste disposal (infectious/hazardous from medical institutions) at a landfill without treatment. According to the Opinion Survey for Medical Institutions conducted by the team, some of medical institutions discharge their medical wastes without treatment and those wastes are disposed of at landfills with municipal waste. A M/P for medical waste management is therefore urgently needed. The M/P has to be developed by the BEP and Ministry of Health, while the BCE/SCE will be responsible for encouraging, supervising and supporting the M/P formulation in order to execute its overall responsibility for environmental management.

The team considers that the M/P for medical waste management must take the following into account:

- the amount of medical waste generated in the study area is small. The team surveyed 40 medical institutions and estimated based on the survey results that total amount of medical waste from 239 medical institutions in the study area was 12.9 ton/day in 1999 and would be 15.0 ton/day in 2010. Therefore, the strict

separation of medical waste from general municipal waste at all the generation sources is a key prerequisite for the establishment of proper medical waste management;

- the next question is whether medical waste is to be treated at source or collected for centralised treatment. For the latter, the introduction of a medical waste collection system that is independent from a municipal solid waste collection system will then be needed. It is to be noted that small incineration facilities for medical waste treatment are nowadays being phased out in many countries, as it is a major source of dioxins<sup>1</sup>;
- because medical waste generation amount is small, the introduction of a toxic waste incinerator or incineration at cement kilns will be the appropriate option.

#### **d. Illegal Dump Control**

The BEP and each District EP will control illegal dumps, as they do at present. They should work out an illegal dump control system with consideration of the following conclusions, which were drawn from a pilot cleanup at the site behind the Sport Palace and a public awareness campaign.

1. the cost for illegal dump cleanup is beyond the affordability of the BEP and District EPs considering their current financial situation. Their limited finance should be, therefore, first concentrated on the prevention of new illegal dumps arising;
2. the most urgently needed preventive measure is to provide an adequate waste collection service to the whole city;
3. public awareness campaigns must be repeated, following which the illegal dump control system with public participation will be strengthened.

The details of the illegal dump control system will be investigated in the MSWM M/P. Based on experience learnt from the pilot project, the BCE/SCE needs to help the BEP and District EPs to obtain public cooperation. In addition, it should integrate information on severe illegal dumps on the GIS and provide some of useful information to the public and governmental bodies.

#### **e. Contaminated Land Restoration**

The restoration of oil contaminated land should be undertaken by relevant organisations following the on-going two projects: onshore oil field cleanup within UEIP by the WB and oil contamination cleanup by Tacis. The SCE/BCE will organise a national work group in co-operation with other organisations in order to facilitate the restoration of oil contaminated area cleanup.

Land contaminated from other sources should be restored, based on the “polluter pays” principle. However, the field investigation of land contamination is expensive and polluters are unlikely to study their land unprompted. The BCE/SCE, with the cooperation of other research agencies, should focus on land which is so contaminated that significant environmental impacts are anticipated, as at the site contaminated with

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<sup>1</sup> In general a small incinerator does not work continuously and is not equipped with an emission gas treatment facility for dioxins. Discontinuous operation is difficult to avoid combustion temperature of 300 to 400 °C, in which temperature dioxins generate.

mercury in Sumgait. When a new development activity is planned, the BCE/SCE should oblige the developer to carry out a land contamination study (“the baseline survey”), to assess the positive or any adverse impacts on the land contamination after development, and to take necessary measures to avoid environmental impacts including project cancellation (where that would be detrimental to the environment). The BCE/SCE should evaluate the EIA reports prepared by the developers recognising that the acceptable level of land contamination depends on type of development activity (e.g. land should be less contaminated with volatile toxic substances if housing development is planned than if the site is required for new industrial building construction).

The BCE will be the centre for contaminated land information in Baku. Since researching and collecting soil quality data of contaminated land represents large workloads and considerable cost, it will involve many other organisations including the State Land Committee, Institute of Soil Science and study teams of UEIP by the WB and of Oil Contaminated Cleanup project by Tacis as it does at present. The BCE should then integrate the data and information, enter those into the GIS, and provide them to the public and other organisations to promote contaminated land restoration.

#### f. Mineral Resources Protection

In order to prevent public beaches and other recreation areas and eliminate a large number of pits and illegal dumpsites caused by illegal mining of sand, clay and gravel, it is necessary to strengthen the BCE's capacity to control and cope with illegal mining operations. In addition, the enforcement mechanisms should be improved in order to prevent such activity. For the enforcement coordination with police is essential.

Regarding the problems caused by authorised limestone mines, the first step of the improvement shall be establishment of the system to avoid improper mining operation. The system includes a careful evaluation of EIA for mining development plan, enforcement of proper operation that shall be the conditions for operational permit and coordination with the BEP regarding permission for the operation of it. Rehabilitation of current damaged areas by improper mining operation and recycling of associated waste shall be carefully examined and planned considering economic viability, degree of the environmental damage, social needs, etc.

### 7.3.2 Strategies

BCE/SCE	Other Organisations	
Work	Work	Organisation
PHASE I: 2001 – 2003		
<ol style="list-style-type: none"> <li>To encourage, supervise and support the formulation of an MSWM M/P.</li> <li>To strengthen legislation to control hazardous waste treatment and disposal, in accordance with the UEIP HWM Study. To assist financially and technically the construction of a HW disposal site for mercury contaminated waste.</li> </ol>	<ol style="list-style-type: none"> <li>To formulate the municipal waste management M/P. To provide sufficient refuse collection services to all districts in Baku.</li> <li>To construct the HW disposal site for mercury contaminated waste, which may be used for the disposal of other type of HW than mercury.</li> </ol>	<p>BEP and each district EP</p> <p>To be determined.</p>



BCE/SCE	Other Organisations	
Work	Work	Organisation
<p>3. To encourage, supervise and support the formulation of a medical waste management M/P.</p> <p>4. To encourage, supervise and support the development of an illegal dump control system.</p> <p>5. To organise a national work group in co-operation with other organisations for oil contamination cleanup. To integrate data of contaminated land into GIS database.</p> <p>6. To strengthen the BCE's capacity to control and cope with illegal mining and improper mining operation.</p> <p>7. To raise computer skills of department staff for GIS data input and data presentation. To strengthen the department with equipment necessary to accomplish their works.</p>	<p>3. To formulate the medical waste management M/P. To strengthen primary treatment at medical institutions and separate collection.</p> <p>4. To develop a system to prevent illegal dumping.</p> <p>5. To develop cleanup method of oil contaminated land. To research soil contaminated area and develop restoration method.</p> <p>6. To develop enforcement mechanisms to prevent illegal mining and improper mining operation.</p> <p>7. To designate sites for the disposal of HW and MSW in the land use plan of the Baku city.</p>	<p>MOH, BEP and each district EP, and medical institutions</p> <p>BEP and each district EP</p> <p>WB, TACIS and others</p> <p>Police, BEP, SCMS</p> <p>BEP and each district EP</p>
<p>PHASE II: 2004 – 2006</p>		
<p>1. To encourage the implementation of the priority projects following the MSWM M/P.</p> <p>2. To formulate a HWM M/P and develop a HWM system following the results of the UEIP HWM Study. To encourage feasibility studies for the construction of HW treatment facilities.</p> <p>3. To encourage the implementation of the priority projects (separate collection and final disposal) following the medical waste management M/P.</p> <p>4. To encourage illegal dump cleanup by developing technical support systems.</p> <p>5. To encourage oil contaminated area cleanup. To enforce soil investigation in EIA for development of possibly contaminated area.</p> <p>6. To develop a control system of illegal mining and improper mining operation.</p> <p>7. To promote large waste generators (factories) to minimise waste (e.g. to introduce CPT) by developing financial and technical support systems.</p>	<p>1. To implement priority projects (sanitary landfill, strengthening recycling system, etc.) following the MSW management M/P.</p> <p>2. To conduct the feasibility study for construction of HW treatment facilities following the result of the UEIP HWM Study and the construction of the HW disposal site.</p> <p>3. To implement priority projects following the medical waste management M/P.</p> <p>4. To establish the system to monitor and prevent illegal dumping and to cleanup existing illegal dump sites.</p> <p>5. To commence oil contaminated area cleanup. To conduct soil investigation for EIA for development of possibly contaminated area.</p> <p>6. To control, supervise and enforce the control system of illegal mining and improper mining operation.</p> <p>7. To reduce waste by introduction of CPT, etc.</p>	<p>BEP and each district EP</p> <p>To be determined.</p> <p>MOH, BEP and each district EP</p> <p>BEP and each district EP</p> <p>To be determined.</p> <p>Police, BEP, SCMS</p> <p>Factories</p>

BCE/SCE	Other Organisations	
Work	Work	Organisation
PHASE III: 2007 - 2010		
<ol style="list-style-type: none"> <li>1. To encourage the introduction of waste minimisation and waste recycling systems of MSW.</li> <li>2. To encourage the construction of the HW treatment facilities.</li> <li>3. To encourage central treatment of medical waste.</li> <li>4. To further encourage illegal dumpsites cleanup.</li> <li>5. To organise a national work group in co-operation with other organisations for soil contaminated area cleanup in industrial areas.</li> <li>6. To encourage rehabilitation of damaged areas by illegal mining and improper mining operation.</li> <li>7. To further encourage factories to minimise waste (e.g. to introduce CPT and to manufacture recyclable products).</li> </ol>	<ol style="list-style-type: none"> <li>1. To implement the MSW management M/P (e.g. promotion of recycling and reduction of waste.)</li> <li>2. To construct the HW treatment facilities.</li> <li>3. To implement the medical waste management M/P (central treatment, etc.).</li> <li>4. To continue to cleanup the illegal dumpsites.</li> <li>5. To commence soil contamination cleanup in industrial areas.</li> <li>6. To examine and commence rehabilitation of damaged areas by illegal mining and improper mining operation.</li> <li>7. To minimise waste generation (e.g. by applying CPT and manufacturing recyclable products.)</li> </ol>	<p>BEP and each district EP</p> <p>To be determined.</p> <p>MOH, BEP and each district EP</p> <p>BEP and each district EP</p> <p>To be determined.</p> <p>Mining companies, BEP, SCMS</p> <p>Factories.</p>

Note: SCMS: State Committee for Mining Supervision

The works to be done by the BCE/SCE are explained in detail below:

### Phase I.

1. **MSWM:** In order to encourage, supervise and support the formulation of an MSWM M/P, the BCE/SCE will make full use of the data obtained by WACS (waste amount and composition survey) and the Survey on Recycling Activities, both of which were carried out by the team. The WACS shows that the generation rate of household waste is 245 g/person/day and that of MSW, which includes waste from households, commercial enterprises and markets but excludes construction (demolition/renovation) waste, is 294 g/person/day. The Survey of Recycling Activities suggests a high demand for recycling of scrap iron and waste paper.
2. **HWM:** The BCE is responsible for controlling hazardous waste treatment and disposal in Baku, and needs strengthened legislation and HW control systems including a clear waste classification system and technical standards for treatment and disposal. Therefore, it should actively participate in the UEIP HWM Study. A 6-ha new landfill will be developed to dispose of soil and sludge contaminated with mercury that will be generated from the mercury cleanup project under the WB's UEIP and its expansion to 50 ha is under discussion to receive other types of HW. The site could therefore be developed as the HW landfill for the study area. A demand survey for a HW landfill is necessary for its development and the Factories Survey, undertaken by the team, should provide important data for demand forecast. Making full use of the data obtained by the Factories Survey and the GIS database of the environmental passports at 288 factories, the BCE/SCE

should technically assist the UEIP HWM Study and facilitate the construction of the HW disposal site.

3. **Medical Waste Management:** In order to encourage, supervise and support the formulation of a medical waste management M/P, the BCE/SCE must fully utilise the data obtained by the Opinion Survey for Medical Institutions and the GIS database of medical institutions. The data obtained by the survey and the GIS will provide not only the medical waste generation rate but also the location and amount of waste to be collected. All these sorts of information are indispensable to set efficient waste collection routes and to design a whole waste collection service system. One of the most important issues for the M/P is the establishment of a Code of Practice for medical waste, which stipulates a principle for proper medical waste management.
4. **Illegal Dumps:** To encourage, supervise and support the development of a illegal dump control system, the BCE/SCE will fully use the experience obtained through the pilot project of the public awareness campaign conducted together with the illegal dump cleanup at Sport Palace. In this phase priority will be given to the prevention of new illegal dumps being formed, rather than cleanup of existing sites.
5. **Land Contamination:** The study on oil contaminated area cleanup by the WB and Tacis is to be finished in 2001. The SCE/BCE should organise a national work group with other organisations to facilitate actual cleanup activities based on the findings of those studies.

As for the other types of land contamination, the BCE/SCE should initiate a study to identify severely contaminated land. The GIS prepared by the team has information on land contamination, and it should be further strengthened with additional information. Information on industrial activities impact is also vital to locate contaminated land. The consideration of possible pollution of lakes, sea, and/or groundwater due to the soil condition is another key to identify the severity of contamination. Such a study is, however, time-consuming and can proceed only gradually. The BCE/SCE should also oblige a developer to investigate soil within an EIA process. The results of soil investigation will then be entered on the GIS.

6. The remediation of contaminated land should be conducted in accordance with a legislative framework to be developed by the UEIP HWM Study, which will address who is responsible for historical pollution and who should therefore pay for any cleanup.
7. **Protection of Mineral Resources:** To control and cope with illegal mining and improper mining operation the BCE needs to improve inspection capability of damaged sites by securing inspector and transportation means. However, for the enforcement of illegal mining the police shall be main actor since it requires certain tools.

As for the problems caused by authorised limestone mining, the first step is to avoid improper mining operation. For this purpose the BCE shall make full use of the EIA system. When a developer of limestone mining applies an EIA of a site, it shall carefully examine and give conditions for permission to avoid improper mining operation. The conditions include designated landfill site of wastes generated by operation and its operation method, etc. For the evaluation of

technical aspects of mining operation the BCE needs to ask cooperation of the SCMS. In addition it shall ask the BEP to inquire the BCE before giving permission to the developer of mining.

8. **GIS:** A system of proper control and management of waste and land needs various data and information, such as the generation amount of each kind of waste and the location of their sources. The team obtained such data and information and entered them into the GIS database, but they must be modified and supplemented by additional data and information. The department staff need to have computer skills to put these data into computers using the GIS software. The department will also need some basic equipment for execution of its tasks including vehicles for inspections, communication tools and personal computers.

## Phase II.

1. **MSWM:** Priority projects to be identified in the MSWM M/P will be the construction of sanitary landfills and recycling facilities, which must be licensed by the SCE together with MOH and inspected by the BCE. The BCE/SCE should encourage the implementation of the priority projects following the MSWM M/P by giving suggestions on site selection, facility design, and prevention of adverse environmental impacts.
2. **HWM:** The BCE in collaboration with the SCE will formulate a HWM M/P for the study area following the result of the UEIP HWM Study and develop a structure for HW control. The M/P will identify a specification for HW treatment facilities. The BCE/SCE will encourage a feasibility study for construction of HW treatment facilities, which may be constructed and operated by the private sector. For the success of HW treatment business the prediction of demand for the HW treatment plant is crucial. The GIS database will be a very useful tool for the demand prediction, but the BCE needs to update and supplement current HW generation data in the GIS database.
3. **Medical Waste Management:** Priority projects to be identified in the medical waste management M/P will be separate collection, treatment and disposal of medical waste. Considering the limited budgets and finances of medical institutions, however, intermediate treatment such as incineration will not be viable and priority must be given to separate collection and final disposal. To encourage the implementation of the priority projects, the BCE/SCE should provide technical information on separate collection and final disposal of medical waste. The BCE/SCE should also examine the possibility of a cheap centralised treatment method, such as incineration at cement kilns.
4. **Illegal Dumps:** The BCE/SCE will further enhance public awareness to prevent illegal dumps in the city. In addition to this, the BCE will commence encouraging illegal dump cleanup by developing technical support systems. Technical support will include the provision of site information and the suggestion of recommendable method and cleanup cost estimation.
5. **Land Contamination:** Cleanup of oil-contaminated areas is to be conducted by the private sector as far as this is financially feasible. To encourage oil contaminated area cleanup, the BCE/SCE will provide data and information useful for feasibility examination to any organisations that intend to clean oil contaminated land. The

BCE/SCE should enforce soil investigation in EIAs by a developer. The soil data thus obtained will be integrated in the GIS database.

6. **Protection of Mineral Resources:** To complete a control system of illegal mining and improper mining operation the BCE shall further develop enforcement mechanisms with the cooperation of police, BEP and SCMS.
7. Approaches of waste management are generally divided into two: proper treatment and disposal of generated waste, and waste generation minimisation. The former needs waste collection, treatment and disposal services and facilities, which were discussed above. For the latter, large waste producers (factories) will be required to apply CPT (clean production technology), such as the conversion to clean energy and saving of energy and raw materials. The BCE/SCE should develop financial and technical support systems for factories to apply CPT.

### Phase III.

1. **MSWM:** Current practices of MSWM in developed countries are to minimise waste generation, to recycle or reuse generated waste and to stabilise non-recyclable or non-reusable waste in an environmentally friendly manner either by incineration, landfill disposal or any other measures. Therefore, after the establishment of an adequate refuse collection service and sanitary disposal, the BCE/SCE will encourage the introduction of waste minimisation and waste recycling systems for MSW.
2. **HWM:** The most important issue to encourage the construction of HW treatment facilities is the strict enforcement of HW treatment and disposal standards. If the control of illegal HW treatment and disposal is loose, HW treatment facilities constructed at large expense will be of no use. The BCE should further strengthen its enforcement capability.
3. **Medical Waste Management:** In order to develop a proper disposal system for medical waste it is desirable to incinerate it at a central incineration plant, but the small amount of medical waste generated will make it difficult to introduce an independent facility specifically for medical waste. To promote the central treatment of medical waste, the BCE/SCE will provide information on available incineration facilities, such as HW incinerators, cement kilns, and others.
4. **Illegal Dumps:** To further encourage illegal dump cleanup, the BCE/SCE will ask the BEP/district EPs to organise campaigns to cleanup small or medium-scale dumps with the cooperation of local people. For the cleanup of large dumps the BCE/SCE will assist the BEP/district EPs to raise a fund for cleanup.
5. **Land Contamination:** The restoration of soil-contaminated areas requires considerable investment. Therefore, the BCE/SCE will organise a national work group in co-operation with other organisations to promote and conduct soil contaminated area cleanup in industrial areas.
6. **Protection of Mineral Resources:** When a control system of illegal mining and improper mining operation is completed, the BCE shall encourage rehabilitation of damaged areas, which shall be conducted by mining companies (polluters) in cooperation with BEP and SCMS. However the rehabilitation plan shall carefully examine its economic viability, degree of the environmental damage, social needs, etc. before the implementation.

7. **Recycling:** To further encourage factories to minimise waste, the BCE/SCE will encourage them to manufacture recyclable products by introducing EPR (extended producer's responsibility), etc. in addition to the application of CPT.

### 7.3.3 Monitoring and Inspections

#### a. Waste Management Facilities

The Law on Industrial and Household Waste of 30.8.98 (Law on Wastes), which was supplemented by Presidential Decrees of 26.10.98, 29.6.00 and 1.7.00 on its application, define that licensing waste management facilities for industrial waste is the responsibility of the SCE while those for domestic waste is of the local executive powers. The Law (as reinforced by the Presidential Decrees) states that the adherence to license conditions, environmental standards and regulations is inspected by the Regional Ecology Committees; i.e. BCE in the Baku city. The BCE should monitor the operation of facilities by receiving relevant documents from them, and, when necessary, also inspect them at the site by referring to license conditions and environmental standards/regulations.

However, the regulations, which specify the standard of design, construction and operation of the facilities, are still immature. The UEIP HWM Study will develop a regulatory framework of HWM. When the framework is completed, the BCE should refer to the regulations for the inspection of HW management facilities. The BCE in cooperation with the SCE will modify the HW regulations to adapt to the waste management of municipal waste and medical waste, both of which lack appropriate regulatory arrangement.

#### b. Illegal Dump Control

The BCE should inspect illegal dumps, concentrating on large and problematic ones, to evaluate the extent of adverse impacts of them. When necessary, the BCE also needs to instruct the BEP and district EPs to take necessary measures to reduce the impacts. The data obtained through inspection will be integrated into the GIS database and be used for monitoring of their improvement or restoration.

#### c. Contaminated Land Restoration

A developer must investigate soil pollution on the site to identify the degree of land contamination during the EIA process. The data obtained by EIA will be integrated into the GIS database and be used to monitor the consequence of development.

### 7.3.4 Law Enforcement and Incentives

#### a. Law Enforcement

##### a.1 Waste Management Facilities

The objective for the BCE/BEP should be to pass operation of all landfill sites to the private sector as soon as is practicable. For the establishment of a waste management industry in the private sector a strict enforcement of proper waste disposal by the government is indispensable.

This will require appropriate legislation to ensure a smooth transition from state to private management and adequate security of unimpeded operation for the future. However, in order to ensure the correct and appropriate operation, the facilities must be

open to inspection on demand by the BCE (acting for itself and on behalf of the BEP) to ensure operations conform to the terms of the licence regarding all aspects of environmental management.

In particular, legislation will be required enabling the BEP to take over the management of a site where there is environmental degradation due improper procedure or practice by the operator (for example burning where landfill is mandated, or acceptance of hazardous or clinical wastes as normal waste).

### **a.2 Illegal Dump Control**

Litter and illegal dumping are major problems within Baku and there are few open areas free of unsightly and potentially hazardous waste. In addition to laws prohibiting these practices, provision of suitable disposal methods needs to be developed. Only at that stage (eg after provision of sufficient litter bins in public areas and regular and reliable collection of these) will it be appropriate to enforce illegal littering.

For illegal dumping, a two-pronged approach is required. Firstly there should be a clean-up team, removing illegal dumps immediately these appear. (There is significant evidence around the world to show that once an illegal dump commences, others add waste.) The BCE should have enforcement officers tracking down those responsible and the legislation should enable penalties to be imposed rapidly. In other countries, penalties for so called “fly-tipping” are severe and include confiscation of any vehicle used in this process, financial penalties for the driver of the vehicle responsible and financial penalties with potential imprisonment for those responsible.

### **a.3 Contaminated Land Restoration**

In the Soviet era, little effort was made to ensure restoration or amelioration of environmentally degraded land. It should be necessary to conduct environmental audits prior to land improvement programmes and these audits should be mandatory where there is any change of ownership or long term leaseholder on land previously used for industrial or commercial purposes. Legislation would be required to compel such audits.

These should be conducted independently (at the expense of buyer or seller, or shared between them) and the results lodged with the BCE. The condition of the land should be considered by the BCE prior to new development and the BCE should have the legal power to compel environmental clean up where this the condition of the land causes a problem for human health (eg where chemicals are leaching into the watercourse). Legislation requiring the current owner to finance the clean up is required. Where the current owner is unable to finance the clean up, legislation should enable the BCE to compulsorily purchase the site, organise the clean up and sell the land, passing any surplus of receipts over costs to site owner.

### **b. Promotion and Incentives**

The SCE/BCE shall introduce financial incentives to promote waste minimisation and recycling as well as introduction of CPT and manufacturing recyclable products. The incentives will be:

- Reduction of tax on the investment for construction of waste recycling facilities and introduction of CPT.
- Raise fee for water and electricity.

- Raise tax on fuel and raw materials.
- Free technical assistance to the investment for construction of waste recycling facilities and introduction of CPT.

### 7.3.5 Data and Information Management

Data and information on land protection and waste control shall be integrated in the GIS database at the BCE. The Land Protection and Waste Control department staff should continuously modify and supplement those data and information by additional data and information. The department staffs need to have computer skills to put these data into computers using the GIS software. The BCE/SCE will make full use of the GIS data for not only their daily work, but also public awareness promotion and dissemination works.

### 7.3.6 Investment Plans

Items requiring investment are:

- Computer training for staff; may need to hire instructors. Foreign experts may need to be dispatched.
- Office equipment such as a personal computer, etc.
- Equipment for the inspection such as vehicle, sampling tools, etc.

### 7.3.7 Personnel Plan

Field in charge	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Inspector for MSW	1	1	1	1
Inspector for HW	1	1	1	1
Inspector for Land and Mineral Resources Protection	2	2	2	2
Inspector for Medical Waste	0	1	1	1
Inspector for Illegal Dumps	1	1	1	1
Data/information management	0	1	1	2
Total	6	8	8	9

## 7.4 Fauna and Flora Protection and Conservation Areas Management

### 7.4.1 Fauna Protection

#### a. Directions

The BCE will be the centre for fauna information in Baku. Since keeping records of fauna species entails a large workload, this process will involve Institute of Zoology within the Academy of Sciences as it does at present. The BCE should then integrate



the record, enter data into the GIS, and provide data to the public and other organisations to promote nature conservation awareness.

Fauna protection has been carried out by the BCE using three key approaches: i) control of illegal fishing; ii) control of illegal hunting; and iii) controlled issue of hunting licences. Responsibility for hunting and associated permits and licenses will remain the responsibility of the BCE.

However, the issues related to fish are more complex. Within the Caspian Sea there are Azerbaijani regional borders and international boundaries, all within close range of the coastline. Devolving control directly to *regional* committees of the SCE may therefore cause territorial disputes if vessels are followed over boundaries or into international waters. Control of fish catches should therefore be the responsibility of the SCE. However, in practice, the observation of individual vessels should be undertaken by the marine police, with whom the SCE should work closely. In the event that the SCE wishes to inspect a specific vessel whilst at sea, the marine police should arrest the vessel and assist the SCE inspector to conduct such searches and examinations as are appropriate. Examination of fish catches at ports and harbours in the Baku region can be undertaken by the BCE without direct involvement of the marine police.

In other words, the work associated with illegal fishing will be allocated as follows:

- catching suspected fishing boats: Marine police;
- identifying whether fishing is illegal or not (eg excess of the permissible catch, catching rare species, etc.): SCE/BCE;
- punishing the illegal fishermen according to the penal regulations, or taking another appropriate actions: SCE/BCE together with the prosecutors' office.

Accordingly, the vessels which currently belong to the BCE and cost the BCE substantial expenses for maintenance, should be abolished or transferred to other organisation.

Where the SCE suspects that a vessel is fishing illegally, it may be necessary to produce aerial photographic evidence or satellite images to validate the claim. Clearly, the required equipment will be beyond the financial resources of the BCE within the M/P period.

In the plan for the restructuring of the SCE, whereby the environmental management aspects of fishery resources management would be devolved from different organisations in the country to be integrated in the MOEP, the SCE (MOEP) should have comprehensive capacity for research based fishery resources management enabling it to determine appropriate levels of catch. Since fishery resources management is a concern of not only Azerbaijan but also Caspian littoral countries, the SCE (MOEP) will need close communication with them following the initiative of the Caspian Environmental Programme.

## b. Strategies

BCE/SCE	Other Organisations	
Works	Works	Organisation
PHASE I: 2001 - 2003		
<ol style="list-style-type: none"> <li>To review and improve legislation to protect fauna.</li> <li>To raise computer skills of department staff for GIS data input and data presentation.</li> <li>To strengthen the institution with equipment for fauna protection.</li> <li>To widely publicise the legal hunting procedure.</li> </ol>	<ol style="list-style-type: none"> <li>To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern.</li> <li>To co-operate with the BCE/SCE for fauna protection.</li> </ol>	<p>GoAz</p> <p>BEP, district EP, others.</p>
PHASE II: 2004 – 2006		
<ol style="list-style-type: none"> <li>To integrate species record and enter data to the GIS.</li> <li>To disseminate the species data in the GIS to the public.</li> <li>To utilise the data integrated in the GIS for an appropriate hunting license system.</li> </ol>	<ol style="list-style-type: none"> <li>To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern.</li> <li>To co-operate with the BCE/SCE for fauna protection.</li> </ol>	<p>GoAz</p> <p>BEP, district EP, others.</p>
PHASE III: 2007 - 2010		
<ol style="list-style-type: none"> <li>To complete a routine procedure of data input to the GIS.</li> <li>To improve the data presentation skill to effectively disseminate the species data on the GIS to the public.</li> <li>To assess the fishery resources and to encourage sustainable fishery production.</li> </ol>	<ol style="list-style-type: none"> <li>To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern.</li> <li>To co-operate with the BCE/SCE for fauna protection.</li> </ol>	<p>GoAz</p> <p>BEP, district EP, others.</p>

The works to be done by the BCE/SCE are explained in detail below.

### Phase I.

- The regulation on hunting activity and hunting farms management, issued in 1985 in the Soviet time, is still in effect at present. Since a new law on environmental protection subsequently came into force, this regulation may need revision accordingly.
- The species record has been kept only on paper and in paper files. The department staff need to have computer skills to put these data into computers using the GIS software.
- The BCE will need some basic equipment for execution of its tasks. It will include:
  - a motor boat for research on fauna in the sea area;
  - a 4WD vehicle and a trailer to carry and transport the boat between ports;

- communication tools (mobile and radio telephones) to exchange information among staff;
- digital cameras to keep more concrete species data and to make the GIS species data more attractive and visual.

The vehicle will also be shared among the BCE officers for use in connection with their work.

4. The current BCE's task of issuing licenses and controlling illegal hunting will continue with more efficiency. Using publicity, the procedure for licensing should be better understood and followed by the public. Joint work with the BCE environmental education staff is necessary.

## **Phase II.**

1. By utilising the GIS, data over a number of years are integrated and can be processed to assess species population trends. The GIS is also a useful tool to monitor fauna distribution as it links species data with location data.
2. Species data on the GIS should be accessible by the general public so that people will recognise the real status of fauna in Baku and become more familiar with nature.
3. The control of illegal hunting and controlled issue of hunting licences will be continued. The public awareness raising through data dissemination (item 2 above) will encourage people to protect fauna by following the legal process for hunting. The data integration on the GIS will facilitate the SCE to determine the appropriate number of each fauna species that can be legally hunted.

## **Phase III.**

1. By this stage the process to integrate data and to enter them into the GIS should be a routine task for BCE personnel.
2. The BCE should improve its presentation skills to produce attractive and informative pictures, by making the best of the GIS programme.
3. Presuming that the MOEP is established by this stage, the MOEP (or the SCE) should have full responsibility for managing the fishery resources of the country. This will require the MOEP (SCE) to cooperate with neighbouring countries, to observe the trend of fish population, to examine the causes of changes in fish population, and further to promote sustainable fishery production without exhausting the existing resources. The BCE, in cooperation with other regional environmental committees, will support the SCE by regional monitoring of fishery resources.

### **c. Monitoring**

In cooperation with other organisations, the BCE should keep species records and maintain the GIS database. The GIS database will be used for assessment of trend of species population and distribution, which is to be reflected by the BCE and the SCE in the fauna protection policy.

#### **d. Law Enforcement**

Poaching remains a serious concern at a number of reserves in Azerbaijan, particularly those which are the natural habitat for various types of deer and other game species. The BCE lacks the staff numbers to patrol the region adequately and lacks vehicles and equipment to follow and apprehend suspected poachers.

Experience in other areas has shown that active wildlife criminals are frequently involved in other forms of criminal behaviour, including burglary and vehicle crime. It is therefore likely to be in the interests of the local police to cooperate with prevention of and investigation into poaching activities. This relationship has not been formalised. Despite this, there has been some small success in this area but more needs to be done.

In particular, the process of obtaining a hunting licence needs to be clarified, updated and publicised, but conversely the penalties for poaching need to be increased to ensure that the activity becomes increasingly risky. It is important to recognise that poachers may well see themselves as outside the legal process and not respond to a licence process. (BCE experience is that poachers are not individuals trying to outwit the gamekeeper for food, but are part of a serious poaching business.) It is therefore necessary for there to be stringent penalties and deterrents. In particular, the SCE/BCE should have the power to seize vehicles and equipment used in poaching activities and sell these to defray its costs. In many jurisdictions, poachers face imprisonment - even for a first offence. In the case of illegal fishing activity, there should be a recognition that commercial fishing illegally (whether in breach of a licence or fishing without one at all) should render the owner and captain liable to very severe penalties. (For comparison, in the European Union, the boat may be seized and penalties in excess of US\$ 50,000 are commonplace.) Small scale poaching is clearly a lesser crime. Further, the BCE should publicise successes widely, in order to try to discourage others.

### **7.4.2 Flora Protection**

#### **a. Directions**

The BCE currently recognises that its responsibility is to detect those who illegally cut trees in the city. What it then does is to claim a compensatory payment from the offender for the damage to flora. However, this is not environmentally effective as the payment is not actually used to restore the lost greenery. Recognising that the main reason for people cutting trees is to obtain a land plot to start or expand a business, it is a matter of not just greenery protection but of land allocation procedures.

The main focus should be to prevent such violations, by developing and enforcing a land use control mechanism, rather than to blame people after the event took place. Such land use controls must be formally recognised by all governmental sectors, particularly the BEP, as well as the general public. The BCE should support the execution of land use control by applying the EIA process more rigorously. The Flora unit of the BCE will then require a new emphasis for its work - from looking at individual trees to managing the city's overall flora environment.

Greenery development in Baku has been instigated mainly by the BEP, and by Production Association of Forestry (Azerbmеше) and Ministry of Road Construction to a limited extent. The BEP runs six nurseries and closely cooperates with the Botanical Garden where research on flora species suitable for the city and greenery maintenance has been carried out in cooperation with the Institute of Botany and the

Institute of Microbiology within the Academy of Sciences. The greenery development plans are to be developed and put into practice by those implementing organisations. The roles of the BCE are to integrate its plans into the GIS, monitor its achievement, understand the overall greenery conditions of the city, and give suggestions to the implementing organisations by providing information from the GIS for their planning processes.

In order to introduce a more widespread culture of flora protection, there is a need for awareness by the general public that increasing city greenery to the current level follows a long history of cultivation: furthermore that greenery as an important element of city landscape is vital not just visually but as an environmental asset. The BCE should put considerable effort into public awareness raising in this area. By doing so, people should be urged to take care of plants and to control illegal cutting among themselves.

When trees have to be cut down for urban development, the BCE should carefully assess the degree of damage in its EIA process from the viewpoint of city greenery management. If there is damage, the BCE should enforce its power to cancel or amend the development plan, or to oblige the developer to plant trees either in or around of its premises in accordance with a quantified plan.

#### b. Strategies

BCE/SCE	Other Organisations	
Works	Works	Organisation
<b>PHASE I: 2001 - 2003</b>		
<ol style="list-style-type: none"> <li>To clarify the tasks of BCE for city greenery.</li> <li>To review and improve the legislation for the BCE to execute its tasks.</li> <li>To raise computer skills of department staff for GIS data input and data presentation.</li> <li>To review the greenery data on the GIS.</li> </ol>	<ol style="list-style-type: none"> <li>To formulate a plan on tree plantation (the area, tree species, tree numbers, etc.).</li> <li>To construct nurseries</li> <li>To carry out research on flora.</li> </ol>	<p>BEP, PAF, MORC</p> <p>BEP and/or others.</p> <p>Academy of Science, universities, Botanical gardens, others.</p>
<b>PHASE II: 2004 – 2006</b>		
<ol style="list-style-type: none"> <li>To communicate with greenery implementing agencies.</li> <li>To enter greenery information into the GIS.</li> <li>To promote public awareness and participation in greenery development.</li> </ol>	<ol style="list-style-type: none"> <li>To plant trees.</li> <li>To carry out research on flora.</li> </ol>	<p>BEP, PAF, MORC</p> <p>Academy of Sciences, universities, Botanical gardens, others.</p>
<b>PHASE III: 2007 - 2010</b>		
<ol style="list-style-type: none"> <li>To keep the GIS data updated.</li> <li>Monitor overall city greenery and give suggestions on greenery development to the implementing agencies.</li> <li>To cooperate with the EIA personnel of the BCE/SCE to prevent trees from being unnecessarily felled.</li> <li>To promote public participation in greenery development.</li> </ol>	<ol style="list-style-type: none"> <li>To plant trees.</li> <li>To carry out research on flora.</li> </ol>	<p>BEP, PAF, MORC</p> <p>Academy of Sciences, universities, botanical gardens, others.</p>

Note: PAF: Production Association of Forestry (Azerbmeshe)  
MORC: Ministry of Road Construction

The works to be done by the BCE/SCE are explained in detail below.

### **Phase I.**

1. The role of the BCE in the field of city greenery was described in Section 4.4.3. The shift from field based inspection to policy based decision making, should be fully understood by the BCE, the SCE and other relevant authorities.
2. The Decree of Cabinet of Ministers No. 493 in 1983, regarding flora protection, should be fully reviewed and revised and the responsibilities and obligations of the BCE to execute its role should be stipulated in legislation. With the new legislation, the BCE should receive necessary information from other organisations without charge to enable it to enforce its obligations.
3. In order to utilise the GIS for efficient work execution fully, the staff should acquire computer skills for data input and data processing on the GIS software.
4. The greenery data on the GIS should be reviewed and, if necessary and if the new information is available, should be updated.

### **Phase II.**

1. Following the revised legislation, the BCE should have active communication with greenery development implementing agencies (BEP, Production Association of Forestry (Azerbmeshe) and Ministry of Road Construction etc) to cooperate in the development of their plans and achievements. The BCE also should be provided from those organisations with data of existing greenery.
2. The information obtained will be entered in the GIS and integrated. The GIS will allow the BCE to obtain an overall picture of city greenery, understand the distribution of green areas and assess the increase or decrease in green areas.
3. Public awareness is a time-consuming but essential approach for the protection of trees from illegal cutting. The publicity of the city's history of greenery development, people's visits to the Botanical Garden, installation of signboards in parks to call for people's interest in city greens and other public awareness activities should be promoted.

### **Phase III.**

1. The acquisition of information from the implementing agencies and the GIS data update should be a routine process for the BCE.
2. Using the GIS, the status of greenery must be monitored so that the BCE understands the level of greenery development over all the city and offers suggestions to the implementing agencies: for example which areas of the city should be given priority for greenery development and which types of greenery development should be promoted (e.g. parks for neighbouring citizens or forest plantation for land slide prevention).
3. In the EIA process, the possible impact on the flora environment must be examined. In cases where development activities are expected to affect trees

to a certain extent, they should be conditional on the modification of plans or compensating actions.

4. Public awareness raising will be further developed by public participation in greenery development through such activities as tree planting at schools by school children and the establishment of Arbour Day.

**b. Monitoring**

The BCE should be record plans and achievements from greenery development implementation agencies and integrate those in the GIS. This should enable the BCE and SCE to monitor the overall changes in greenery resources in the city and consider the next actions required.

**d. Law Enforcement**

By its nature, city tree felling tends to be on a small scale, with many of the perpetrators taking a view that they are felling only a small number of trees. However, the cumulative effect is considerable. In practical terms, catching those responsible “in the act” is not a realistic expectation. However, if the location of trees is established and marked on the GIS, it will be possible to determine where trees have been illegally felled. There should be a presumption of responsibility, whereby the occupier of premises is assumed to be responsible for the felling of trees, unless they can show that the trees were felled by someone else or with appropriate authority.

The law will need strengthening in order to enable the BCE to restrict development or demand environmentally compensatory measures will be required.

The best approach will be an educational one - whereby it is understood that ad-hoc felling of trees is neither acceptable nor desirable. Additionally, designating some important trees (or groups of trees) as “trees of special conservation importance” and placing appropriate signboards describing their characters might be a possible approach to encourage preservation.

### **7.4.3 Conservation Areas Management**

**a. Directions**

**a.1 Nature Reserves**

The only nature reserve in Baku, the Gobustan Nature Reserve, has been under the control of Ministry of Culture. This organisation structure should remain, recognising that the value of the reserve is in its cultural importance. The contribution of the BCE will be to keep location data of the reserve in the GIS and to control land use near the area.

**a.2 Sanctuaries**

In Baku (where its arid climate hampers diversified flora growth), two sanctuaries are the unique zones for people to have an opportunity to become aware of “nature values”. The role of the BCE should therefore not be limited to the protection of sanctuaries from human influences, but extend to the encouragement of people’s nature consciousness. Taking account of the current management capability of the BCE, Absheron sanctuary development will be the first step. The development of the Gil island sanctuary will follow in future, but it will require the examination of natural

resources in the neighbouring islands as the region forms a habitat for waterfowl as a group of islands.

### **a.3 National Park**

Boulevard Park was newly designated as a national park and the BEP should take full responsibility for managing it. The BCE's GIS will help ensure rational land use around the park. The BCE, together with the SCE and the Caspian Inspectorate, should also promote its recreational importance through the environmental improvement of the Caspian Sea.

### **a.4 Natural Monuments**

The management of all natural monuments is the responsibility of local authorities, and the work of BCE is restricted to supervision. With this understanding, the directions below should be followed by relevant bodies.

#### **a.4.1 Binagadi Deposit**

A long-term excavation plan should be formulated to execute academic research and improve the Natural History museum, where excavated fossils are displayed. A signboard should be installed at the site which describes the academic significance of the deposit. Visits of school children to the site and the museum will be then promoted.

#### **a.4.2 Yasamal Valley**

There should be a compulsory land use control system to restrict large-scale construction works and land disturbance. Because of its beautiful scenery, the area may need to be designated as a landscape reserve area in which human activities that may degrade the scenery will be prohibited.

#### **a.4.3 Lokbatan Mud Volcano**

The poor accessibility to the site has kept people from visiting the site and it is therefore well preserved. Protection will not be the main issue but the BCE should promote land use control in order to avoid possible damage by volcanic activities.

#### **a.4.4 Korgoz Mountain**

For the protection of its scenic beauty, land use control at the area must be enhanced to limit the development of large construction and land disturbance, for example by quarry development. The area may need to be designated as a landscape reserve area in which human activities that may degrade the scenery will be prohibited.

#### **a.4.5 Greater Kanizdag**

Land use control needs to be enforced to avoid large-scale construction and land disturbance, and also to prevent negative influences on people by volcanic activities.

#### **a.4.6 Beyuk Dash**

A fence should be installed to limit the entry of people, as the area is not safe due to the presence of many craters. Academic research will be necessary, based on which the area's importance may become recognised and an appropriate management plan formulated.



#### a.4.7 Ayrantekan Mud Volcano

Land use control needs to be enforced to avoid large-scale construction and land disturbance, and also to prevent negative influences by volcanic activities.

#### a.4.8 Dashkil Mud Volcano

Land use control need to be enforced to avoid large-scale construction and land disturbance, and also to prevent negative influences by volcanic activities.

#### a.4.9 Baku Layer

The land use at and near the site must be strictly controlled because of its scientific importance and for disaster prevention. In particular, construction on the slope should be totally prohibited. Engineering works will be also necessary in part of the site to prevent land slides.

#### a.4.10 Bayil Rocks

Because these are below the water surface and not visible, there is a risk of them being crushed by ships. A warning sign should be installed.

### b. Strategies

BCE/SCE	Other Organisations	
Works	Works	Organisation
PHASE I: 2001 - 2003		
<ol style="list-style-type: none"> <li>1. To raise computer skills of department staff for GIS data input and data presentation.</li> <li>2. To urge the relevant local authorities to formulate a conservation plan and/or land use plan for Gobustan Nature Reserve, Boulevard Park, and each natural monument and to report those plans to the BCE.</li> <li>3. To put the Absheron sanctuary development plan into practice.</li> </ol>	<ol style="list-style-type: none"> <li>1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern.</li> <li>2. To co-operate with the BCE/SCE for natural conservation area management.</li> </ol>	<p>GoAz</p> <p>BEP, district EP, others.</p>
PHASE II: 2004 – 2006		
<ol style="list-style-type: none"> <li>1. To enter the land use plans for Gobustan Nature Reserve, Boulevard Park and natural monuments into the GIS.</li> <li>2. To urge relevant organisations to implement the conservation plans for some of the natural monuments.</li> <li>3. To complete the Absheron sanctuary park development and start its operation.</li> </ol>	<ol style="list-style-type: none"> <li>1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern.</li> <li>2. To co-operate with the BCE/SCE for fauna protection and nature conservation area management.</li> </ol>	<p>GoAz</p> <p>BEP, district EP, others.</p>

BCE/SCE	Other Organisations	
Works	Works	Organisation
PHASE III: 2007 - 2010		
<ol style="list-style-type: none"> <li>1. To provide information on natural conservation areas to the public for awareness raising.</li> <li>2. To utilise land use plans for nature conservation areas in the EIA process.</li> <li>3. To start to examine the Gil Island sanctuary development plan.</li> </ol>	<ol style="list-style-type: none"> <li>1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern.</li> <li>2. To co-operate with the BCE/SCE for fauna protection and natural conservation area management.</li> </ol>	<p>GoAz</p> <p>BEP, district EP, others.</p>

The works to be done by the BCE/SCE are explained in detail below.

### Phase I.

1. The staff should acquire computer skills for data input and data processing on the GIS software.
2. Each responsible organisation should prepare a conservation plan and/or a land use plan for each nature conservation area. In some areas, academic research may be required.
3. In Chapter 10 the team proposes a plan for the Absheron sanctuary park development. The details of the plan should be further examined and completed, and put its development into practice.

### Phase II.

1. The land use plans prepared by relevant organisations should be received by the BCE without charge and entered in the GIS.
2. Some of the natural monuments will need the installation of fences or signboards, and further research. Such implementation will be promoted.
3. The Absheron sanctuary development plan will be completed and the visit of city dwellers encouraged.

### Phase III.

1. Locations, characteristics, scientific interests and development restrictions of nature conservation areas should be available to and understood by those who are engaged in urban development, whether in the public or private sector. In particular, they should be well informed of land use control strategies around some of the nature conservation areas.
2. Once the land use plans of the nature conservation areas are integrated in the GIS, the BCE should fully utilise them in its EIA process to prevent negative impacts in the relevant areas by development works.
3. The research on Gil Island sanctuary development will be started. It should be noted that not only Gil Island but also a number of other islands nearby and the seashore of the mainland may need to be considered as a sanctuary as a

whole. The BCE should closely discuss the best way for development with academics.

**c. Monitoring**

In the sanctuaries, species records should be kept (see section 7.4 above).

The interventions in the nature reserves, sanctuaries, national parks and natural monuments such as development activities inconsistent to the land use plans near the conservation areas, must be first restricted by the EIA process. If such actions take place, the impact should be monitored and the developers obliged to carry out compensatory environmental actions as deemed appropriate by the BCE.

**d. Law Enforcement**

Land use control must be fully incorporated into the EIA process by the BCE and SCE. The relevant authorities should announce such land use restrictions around the conservation areas to the wider population to ensure appropriate development plans.

The BCE must have the lawful authority to demand compensatory environmental actions in addition to any financial compensation in appropriate cases, without recourse to lengthy court procedures. In particular, there is a need for a “stop order” to prevent development pending an appeals process.

**7.4.4 Data and Information Management for Fauna and Flora Protection and Conservation Areas Management**

Data and information on the nature environment of the city and surrounding areas should be integrated in the GIS for the BCE to have a total view of the position and improve the management system as written in previous sections.

**7.4.5 Investment Plans for Fauna and Flora Protection and Conservation Areas Management**

Items requiring investment: (to be finalised through further discussion)

- computer training for staff: may need to hire instructors. Foreign experts may need to be recruited;
- a motor boat and other equipment for fauna protection;
- sanctuary development: consulting work for specified planning and construction;
- public education: printing pamphlets regarding, for example, proper procedures for obtaining hunting licences; introduction of public facilities such as botanical gardens, Baku zoo, Natural History Museum, Boulevard National Park; distribution of nursery trees at tree planting events.

## 7.4.6 Personnel Plan

### a. Fauna Protection

Field in charge	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Inspector	4 <sup>*1)</sup>	0	0	0
Fishery resources management	0	1	1	1 <sup>*4)</sup>
Data/info management	0	1 <sup>*2)</sup>	1	1
Inspector specialised in on-land fauna resources management including hunting inspection	0	3 <sup>*2)</sup>	3	3
Vessel crew	10 <sup>3)</sup>	0	0	0
Total	15	6	6	6

4 inspectors numbered \*1) and 4 personnel numbered \*2) are the same, but with more specific roles.

<sup>\*3)</sup> Vessels to be transferred from BCE at earliest opportunity

<sup>\*4)</sup> can be more after merge with Azerbaij

### b. Flora Protection

Field in charge	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Inspector	4	0	0	0
Inspector specialised in policy/legislation	1	2	2	1
Inspector specialised in Data/info management	0	2	2	2
Public awareness	0	1	1	2
Total	6	6	6	6

### c. Conservation Areas Management

Field in charge	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Sanctuaries	0 <sup>*1)</sup>	1	1 <sup>*2)</sup>	3
Sanctuary guards	3	3	3	3
Natural monuments	2	0	0	0
Natural monuments, national reserve, national park	0	1	1	1
Data/info management	0	1	1	1
Public awareness <sup>*3)</sup>	0	(1)	(1)	(1)
Total	6	7	7	9

\*1) There are three guards working in the Absheron sanctuary by shift. Personnel of fauna protection work for fauna protection in the sanctuaries. However, there are no personnel who specially engage in sanctuary management.

\*2) Additionally external expertise (nature guides, volunteers) may need to be involved. See the implementation plan for Absheron sanctuary park development.

\*3) Personnel of data/information management will be also in charge of public awareness.

## 7.5 Laboratory (Chemical Analysis)

### 7.5.1 Directions

The laboratory is a technical focal point for environmental control and law enforcement, which is the responsibility of the BCE. The practical work involved in air protection, water resources protection, EIA and food environmental control departments/units of the BCE largely depend on laboratory work. Therefore a long-term laboratory development plan for effective operation and sound finance is necessary.

By the target year 2010, the BCE laboratory will:

- analyse emission gas and wastewater from factories when the BCE inspectors identify a violation of permissible normative standards
- analyse emission gas and wastewater from factories that can not analyse those by themselves;
- analyse soil samples from land plots where a development project is planned, on the request of a developer;
- analyse the potential contamination of food;
- analyse air quality at a newly established monitoring station that monitor the influence of mobile sources.

### 7.5.2 Strategies

BCE/SCE	Other Organisations	
Works	Works	Organisation
PHASE I: 2001 - 2003		
<ol style="list-style-type: none"> <li>1. To improve techniques to analyse wastewater and soil by utilising the existing laboratory facility.</li> <li>2. To install a minimum level of equipment for factory emission gas and food analysis.</li> <li>3. To obtain additional equipment for wastewater and soil analysis.</li> <li>4. To participate the establishment of a new monitoring station.</li> </ol>	<ol style="list-style-type: none"> <li>1. To co-operate with the BCE/SCE in training laboratory technicians by providing technical instructions.</li> <li>2. To provide monitoring data to the BCE/SCE.</li> <li>3. To exchange technical information.</li> </ol>	<p>Academy of Sciences, Land Committee, Hydromet.</p> <p>Hydromet, MoPH, Land Committee.</p> <p>Academy of Sciences, Land Committee, Hydromet.</p>
PHASE II: 2004 – 2006		
<ol style="list-style-type: none"> <li>1. To start analysis of factory emission gas, and of food.</li> <li>2. To start air monitoring at the new monitoring station.</li> <li>3. To strengthen the laboratory facility for factory emission gas and food analysis.</li> </ol>	<ol style="list-style-type: none"> <li>1. To exchange technical information</li> </ol>	<p>Academy of Sciences, Land Committee, Hydromet.</p>
PHASE III: 2007 – 2010		
<ol style="list-style-type: none"> <li>1. To develop manuals for quality assurance and quality control of analysis.</li> <li>2. To establish training programmes for laboratory technicians.</li> <li>3. To take part in environmental projects.</li> </ol>	<ol style="list-style-type: none"> <li>1. To exchange technical information</li> </ol>	<p>Academy of Sciences, Land Committee</p>

The works to be done by the BCE/SCE are explained in detail below.

### Phase I.

1. The laboratory facility that was completed in the “Experiment on enhancement of the BCE laboratory” by the JICA team should be fully utilised. The BCE should analyse wastewater and soil. Glassware must be supplemented.

**Wastewater from factories:** When the BCE inspectors from the Water Resources Protection Unit identify a possible violation of wastewater discharge standards, or when factories request that the BCE should analyse their wastewater to comply with their data keeping obligations, the BCE inspectors take wastewater samples and pass them to the laboratory. In the latter case, the laboratory will charge the clients appropriate costs on a contract basis for consumables and facility maintenance (e.g. chemical agents, replacement of broken or obsolete facilities, etc.).

**Soil:** (See Section 3.7) The BCE laboratory analyses soil quality as part of the EIA process on the request of a developer. Samples will be taken by the BCE inspectors from the Land Protection and Waste Control department. It is preferable that the BCE develops its experience of soil analysis and broadens its knowledge of soil contamination in the city.

The BCE laboratory should improve its accuracy and efficiency, promote itself for increased work opportunities, and systematise the analysis procedures.

2. The BCE laboratory should possess a minimum level of equipment for factory emission gas and food analysis. Further facility development will follow in Phase II.

**Factory emission gas:** When the BCE inspectors from the Air Protection Unit identify a possible violation of gas emission standards, or when factories request that the BCE should analyse their gas to comply with their data keeping obligations, the BCE inspectors will sample emission gasses and pass the samples to the laboratory. For this purpose, the BCE must be equipped with portable equipment for factory emission gas analysis

**Food:** (See Section 3.6) The items to be analysed by the BCE laboratory for food control are heavy metals, pesticides, phenol and radioactivity. For this purpose, the BCE must be equipped with equipment for food quality analysis.

3. In order to improve the work on wastewater and soil analysis, the BCE should obtain the following equipment during this phase:
  - additional equipment for factory wastewater analysis;
  - additional equipment for soil analysis.
4. The BCE laboratory should actively participate in the establishment of a new air monitoring station which specifically monitors the impact of car exhaust to the ambient air. The BCE laboratory will be in charge of the operation and maintenance of the station, as well as data collection.

## Phase II.

1. With the newly obtained equipment, the BCE laboratory starts the analysis of factory emission gas, and of food.

**Factory emission gas:** Emission gas from the factories (possibly polluting) is analysed at the BCE laboratory and reported to the Air Protection Department, which will take the next action based on the results and enter the data into the GIS. For emission gas analysis on a request basis, the BCE should charge clients the appropriate cost on a contract basis.

The laboratory staff must improve analytical technique and efficiency in order to manage the increased workload.

**Food:** The laboratory must develop analytical techniques including the proper preparation of food samples. Since food quality is directly related to human health, the analysis must be consistently reliable.

2. Automatic analysers will be installed at the mobile source pollution monitoring station. The analysers will not be kept switched on but be switched on and off by the laboratory staff. They should therefore learn the operation, maintenance and usage of the automatic analysers.
3. The laboratory facility for factory emission gas and food quality analysis is strengthened by obtaining the following.

**Factory emission gas:**

- additional equipment for factory emission gas analysis.

**Food:**

- additional equipment for food quality analysis

## Phase III.

1. Learning from its experience of air, water, soil and food analysis up to this phase, the BCE laboratory should develop technical manuals in order to execute analysis of high quality systematically.
2. Training programmes should be developed to raise the analytical skills of laboratory technicians.
3. The BCE laboratory should promote itself to take part in laboratory elements within projects funded by the international donors and other organisations such as the World Bank, UNDP, EU-Tacis, and EBRD.

### 7.5.3 Monitoring

It is other BCE departments and units that monitor environmental quality by looking at air, water, soil and food. The BCE laboratory staff should be mindful of the importance of their work, on which environmental quality monitoring is based, and keep improving its techniques.

### 7.5.4 Law Enforcement

The laboratory of the BCE will be responsible for the conduct of all appropriate tests to ensure that samples collected by inspectors or enforcement officers are properly assessed. Any enforcement action may rely on evidence given as a result of the

laboratory analysis and it is therefore essential that there are proper procedures in place to ensure work done is of the highest professional standards. This will include procedures for a “chain of custody” (ie the process to ensure that the sample tested is the sample collected, and that no substitution is possible).

It may be necessary for the BCE to pass samples to other laboratories for analysis either due to workload pressures or due to the absence or malfunction of specialist equipment. It is imperative that any such laboratories are appropriately certificated. The BCE should identify and approve these laboratories in advance of a specific need arising, in order to plan for their use. This planning should include all contractual arrangements, whether the laboratory is in the state or private sector.

In view of the shortage of measuring equipment in industry, the BCE may carry out analyses for factories or other productive units where they lack the facilities to carry out this work for themselves. Clearly, this may create conflicts of interest and the BCE should ensure that there is no conflict. This will require carefully drafted contracts to ensure that the BCE is able to act on the basis of samples it has taken under such circumstances.

The BCE, together with other state bodies should certify new laboratories as appropriate for the conduct of specific wastewater and emissions testing.

#### 7.5.5 Data and Information Management

The results of analyses must be promptly sent to the relevant departments or units of the BCE, which will in turn utilise the data for their operations and enter the appropriate data into the GIS.

#### 7.5.6 Investment Plan

Phase I.

1. Portable equipment for factory emission gas analysis
2. Equipment for food quality analysis
3. Additional equipment for factory wastewater analysis
4. Additional equipment for soil analysis
5. Vehicles
6. Personal Computers

Phase II.

1. Additional equipment for factory emission gas analysis
2. Additional equipment for food quality analysis
3. Expansion of the laboratory building

#### 7.5.7 Personnel Plan

	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Air	0	3	3	6
Water	8	4	4	4
Food	0	1	2	3
Total	9	9	10	14



## 7.6 Food Environment Control

### 7.6.1 Directions

In order to support economic growth, humans have been using various chemical substances which are now spread in the environment. On the other hand, in recent decades humans also started to recognise that their health is in danger of being affected through food intake by those substances that are now dispersed in the environment.

The BCE/SCE will have the responsibility for (i) analysis of heavy metals, pesticides, phenol and radioactivity associated with food and (ii) toxicological control of chemical substances, on condition that a new Presidential decree is issued. In the case of pesticides, analysis is already the legal responsibility of the BCE/SCE<sup>2</sup>. The extension of responsibilities for the BCE/SCE is an indication of today's concerns about human risks of chemicals mentioned above.

The important point is that food contamination with such substances is the consequence following from a contaminated environment. The BCE/SCE should reflect the results of the food analysis and toxicological knowledge in its own environmental management approach. For example, once cadmium contamination in a fish is observed, the BCE should investigate its source, the pathway from the outlet of cadmium to the fish, cadmium contamination in other seafood, and the level of health risk to humans. The BCE/SCE also should inform the general public of how serious the event is/was and what people should do or not do. The findings from toxicology analysis of chemical substances must be incorporated in the wastewater discharge standards, air emission standards, and/or ambient quality standards reviewing their behaviour in the environment.

In other words, food control must not be undertaken simply by discarding the food concerned. Instead, the BCE should regard food control as an impetus to cope with a newly revealed environmental issue.

Considered in this way, the control by the BCE/SCE of contamination of imported food (which is also to be stipulated in a new Presidential decree) will require international intervention. On finding imported food contaminated with heavy metals, pesticides, phenol or radioactivity, disposal of the food is easy to arrange, but the cause of contamination should be investigated and countermeasures must be taken. It should be the SCE which urges the country of origin to take appropriate actions.

On the other hand, toxicology analysis of chemical substances has a different implication. The results of toxicology analysis must be incorporated in the wastewater discharge standard, air emission standard, ambient quality standard, and any other standards or guidelines. Toxicology analysis of dioxins is a typical example, in that newly found toxicological features of dioxins have induced the government of many countries to set new ambient quality standards, air emission standards and guidelines of maximum dioxin intake levels from food consumption. Therefore toxicology is of national importance and a matter for the SCE to oversee.

However, toxicology analysis requires enormous inputs. The concern of modern science has shifted to the impact of chemicals at trace level (nano or pico units) in the long term. The type of the impact concerned has also changed from a high-level one

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<sup>2</sup> However, the SCE/BCE do not have equipment to analyze pesticides at this moment.

(disease and/or death) to a hormonal or genetic level. A number of time-consuming laboratory studies are necessary to reach a reasonable conclusion. Therefore the role of the government, in the form of the SCE, should be to promote research activities at different institutions and to gather information on toxicology analysis from various organisations in the country and abroad, rather than to carry out fundamental analysis by itself. This information should be used in the determination of appropriate food safety standards.

**b. Strategies**

BCE/SCE	Other Organisations	
Works	Works	Organisation
PHASE I: 2001 - 2003		
<ol style="list-style-type: none"> <li>1. To promote a proper legislative arrangement.</li> <li>2. To clarify the tasks of the BCE and the SCE.</li> <li>3. To review and improve the institution for the defined tasks.</li> <li>4. To develop a sampling procedure.</li> <li>5. To develop laboratory facilities of the BCE.</li> <li>6. To collect scientific research results to understand the environmental impact on food and health impact of contaminated food.</li> <li>7. To assess the current impact of poor environment quality on food quality.</li> <li>8. To study toxicological researches abroad and in Azerbaijan.</li> </ol>	<ol style="list-style-type: none"> <li>1. To promote a proper legislative arrangement.</li> <li>2. To develop a clear procedure for food import.</li> <li>3. To carry out food control within each jurisdiction.</li> <li>4. To carry out scientific research.</li> </ol>	<p>MoPH, MoA, others.</p> <p>Port/airport authorities, others.</p> <p>MoPH, MoA, others.</p> <p>Academy of Sciences, universities, others.</p>
PHASE II: 2004 – 2006		
<ol style="list-style-type: none"> <li>1. To carry out food sampling, analysis, and assessment.</li> <li>2. To develop a system within the BCE to respond to the detection of contaminated food.</li> <li>3. To strengthen the laboratory facility for food control.</li> <li>4. To consider the necessity of adding or revising existing regulations.</li> </ol>	<ol style="list-style-type: none"> <li>1. To enforce legislation within each jurisdiction.</li> <li>2. To carry out scientific research.</li> </ol>	<p>MoPH, MoA, others.</p> <p>Academy of Sciences, universities, others.</p>
PHASE III: 2007 - 2010		
<ol style="list-style-type: none"> <li>1. To improve laboratory work standards and processes.</li> <li>2. To review and revise the food control system if necessary.</li> <li>3. To revise/add regulations as necessary.</li> <li>4. To provide information on the possible risks of food contamination to the public.</li> <li>5. To keep the SCE itself updated with toxicological research.</li> </ol>	<ol style="list-style-type: none"> <li>1. To enforce legislation within each jurisdiction.</li> <li>2. To carry out scientific research.</li> </ol>	<p>MoPH, MoA, others.</p> <p>Academy of Sciences, universities, others.</p>

MoPH: Ministry of Public Health  
MoA: Ministry of Agriculture

The works to be done by the BCE/SCE are explained in detail below.

### **Phase I.**

1. Many legal documents related to food control have not come into effect due to the delay of final approval by the country's top decision makers. The SCE/BCE should strongly urge their early enactment. The new legislation should be developed with through coordination among plural organisations involved in food control of the country.
2. Food control is a new field for the SCE and the BCE and the tasks are not yet clearly demarcated between the two. The SCE should lead the environmental policy regarding food safety and the BCE should monitor the local environment by examining food quality.
3. Based on item 1 above, the staff of the SCE and the BCE should raise their knowledge and expertise in regard to food control. In particular the BCE needs analytical skills and to define analytical processes.
4. The BCE should develop a sampling procedure by which environmental influences on food quality can be effectively detected.
5. The BCE needs equipment for food analysis. See Section 3.5. In this initial phase, the minimum requirement will be met.
6. There are many cases in the world where contaminants in the environment degrade food quality and affect the human health. The causes and mechanisms vary, and the SCE/BCE staff should keep abreast of those incidents.
7. The food department staff should understand the current environment quality in Baku through discussion with others, including BCE staff, and assess whether it is likely that contaminants may cause food to be poisoned.
8. The SCE should gather information on toxicological researches undertaken abroad and in Azerbaijan and deepen its knowledge about toxicological features of various substances and the research trend.

### **Phase II.**

1. According to the sampling procedure developed in Phase I, the BCE samples food, analyses its quality, and check the result against the standards.
2. In case of detection of serious food contamination, the BCE must develop a procedure by which necessary actions can be taken without delay, including scientific research by sector departments of the BCE in cooperation with other institutes to find out causes and consequences, announcement to the public, and disposal of the food concerned.
3. The BCE should further strengthen the laboratory facility for food control, in addition to item 5 of Phase I. See Section 3.5.
4. Based on the study of toxicology (item 8 of Phase I), the SCE should examine whether the existing regulations have any deficiencies or undue complexities and to consider revising them or adding new ones. If specific subjects need clarification, the SCE should promote research activities at institutions of universities, Academy of Sciences and others.

### **Phase III.**

1. Because of the sensitivity of the food issue, the quality of the laboratory works must be of the highest standards.
2. The SCE and BCE should review their food control procedures (e.g. food sampling, procedure on the detection of contaminated food (item 2 of Phase II), analytical methods, etc.) and revise them, if necessary.
3. The SCE should revise or add regulations if necessary responding to the toxicological findings.
4. The SCE and the BCE need to inform the general public of the food contamination mechanisms and possible risks of contaminated food. Such information should encourage the compliance of legal requirements for proper use and discharge of chemicals.
5. The SCE should continue to review toxicology research. It may need to organise a technical committee with experts from different institutions to exchange information and opinions. The SCE should then suggest toxicological research topics which are needed for policy making.

#### **7.6.2 Monitoring**

Food control aims to protect human health. As stated above, one approach is to look at environmental conditions. Therefore, food quality monitoring should be based on appropriate sampling procedures designed with the consideration of the following:

- which chemicals are particularly concerned?

In order to use the laboratory resources available to the BCE efficiently, chemicals which are particularly presumed to be contaminating food should be identified, according to the experience of the BCE in environmental management and past environmental incidents;

- which types of food are vulnerable to those chemicals?

Considering the characteristics of those chemicals, the BCE should target particular types of food to be analysed. For example, if a concerned chemical appears in wastewater and is easily absorbed by fat, fish meat will be vulnerable;

- where to sample food?

Depending of the type of targeted food, food must be sampled at an appropriate point. For example, if milk is the considered, it should be sampled before being further processed to enhanced dairy products.

#### **7.6.3 Law Enforcement**

It is clearly understood that poor control of chemicals in the environment may lead to food contamination. The Food Inspectorate should liaise closely with the water resources protection department, air protection department, Ministry of Agriculture in regard to the usage of pesticides, and other governmental bodies in regard to food processing standards (such as use of preservatives). This will facilitate the early identification of problems of contamination. It is also imperative that the law enables

the SCE/BCE to take immediate action in respect of contaminated or potentially contaminated food.

The BCE should have a number of emergency plans prepared to avoid inappropriate action being taken in haste (as has occurred elsewhere). The power to act should be defined in legislation, in order to prevent unnecessary and possibly fatal delay.

The BCE must have the lawful authority to seize food samples for investigation where contamination is suspected. There must be a clear definition of “food”, to include, for example:

- edible substances;
- drink;
- articles of no nutritional value intended for human consumption (eg chewing gum);
- ingredients.

There must be a right of entry to premises where food is prepared, stored, supplied, sold or produced. This right must enable the BCE officer to take with him other staff or equipment necessary to carry out his work.

#### 7.6.4 Data and Information Management

Data and information that have been entered to the GIS and that are to be obtained by other sector departments of the BCE are the base of food monitoring as stated above. The results of food analysis must be processed and stored in the computers in such a way as to allow searches for each chemical.

#### 7.6.5 Investment Plan

- office equipment such as personal computer, etc.;
- equipment for the inspection such as a vehicle, etc.;
- computer training for the staff; may need to hire instructors. Foreign experts may need to be dispatched.

#### 7.6.6 Personnel Plan

	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Food inspection	6	3	3	3
Research	0	2	2	2
Data management	0	1	1	1
Total	7	7	7	7

### 7.7 EIA

#### 7.7.1 Direction

The ultimate goal of the integrated environmental management master plan is to contribute to the sustainable growth of Baku City giving due to attention to the

environment. The EIA process is one of the tools to achieve this goal effectively. Therefore, by 2010, the EIA process must be fully in effect and its fundamental purposes, i.e. to predict environmental impacts of given development activities, to take countermeasures to avoid negative impacts beforehand, and to develop the city in a sustainable way, should be pursued. The GIS database which is to be developed by the team will be fully utilised in order that EIA may take account of natural and social conditions and environmental zoning in particular.

According to the Environment Protection Law of 1992 (and its amendment of 1999), the preparation of EIA reports is not compulsory. However, an EIA review for large and major projects has been conducted by the SCE, even where the project is in the BCE's territory. The BCE has so far evaluated only small projects for which the developers submit only the project design documents. Therefore the experience of the BCE in the EIA review for large projects is still limited. The BCE's capabilities in environmental project evaluation should be developed sufficiently to conduct large-scale projects that require EIA.

### 7.7.2 Strategies

BCE/SCE	Other organisations	
Works	Works	Organisation
PHASE I: 2001 - 2003		
<ol style="list-style-type: none"> <li>1. To review the demarcation between the SCE and the BCE for environmental review.</li> <li>2. To clarify the screening process.</li> <li>3. To develop a manual for EIA report preparation.</li> <li>4. To review the fee structure for EIA.</li> <li>5. To improve the environmental review documents.</li> <li>6. To raise computer skills of department staff to use information on the environment of Baku in the GIS in order to facilitate EIA review.</li> <li>7. To promote public involvement in the EIA process.</li> </ol>		
PHASE II: 2004 – 2006		
<ol style="list-style-type: none"> <li>1. To develop a manual for environmental project review.</li> <li>2. To have the previous EIA reports available for use as reference.</li> </ol>		
PHASE III: 2007 - 2010		
<ol style="list-style-type: none"> <li>1. To introduce a system to trace implemented projects in order to compare the assessed environmental impacts and those that have taken place, and to reflect these on the EIA of similar projects.</li> <li>2. To improve the efficiency of EIA review.</li> </ol>		

The works to be done by the BCE/SCE are explained in detail below.

### Phase I.

1. Oil related projects and large-scale projects have been reviewed by the SCE but the geographic or functional jurisdiction of the SCE and the BCE for environmental review is arbitrarily decided. There should be a clear set of rules to define which committee reviews which type of projects, taking into account project impact and/or project area.
2. When the BCE receives the initial request for an environmental review from a developer, it first receives only a project planning document. The BCE then has to determine whether the project planning document is sufficient for its review and whether an EIA report is also needed. The criteria for this screening process should be clarified and open to the prospective developers so that they can know in advance whether they need to prepare EIA reports.
3. The SCE/BCE should develop a manual for EIA report preparation to be used by developers. The manual will contain the following:
  - i ) list of factors (eg air quality, water quality, soil, vegetation, etc.) which have to be assessed depending on the project type (factory construction, oil extraction, etc.);
  - ii ) types and volume of information that have to be collected for a sufficient understanding of current environmental situation;
  - iii ) extent of information which field surveys have to achieve for a sufficient understanding of the current environmental situation;
  - iv ) methodology for environmental impact prediction and assessment for each item.

In regard to item i), all the EIA studies should include soil investigation at the planned site to avoid risks which may be posed by toxic contaminants in the soil. This is because there is insufficient information on soil pollution caused by past industrial activities, conducted without adequate (or any) attention given to the long term environmental consequences.

4. As in a number of other countries, the fee paid by the developer is not fixed but depend on the scale and complexity of EIA work to be conducted. On the reception of a request for project approval from a developer, the BCE has to review the project in outline and to prepare an “environmental impact review plan”, which defines the necessary work items, work methods and review costs. All the interested parties discuss this plan, amend it as necessary and sign a contract for the EIA review to be conducted, based on information supplied by the developer and then reviewed and tested by the BCE.
5. The environmental review documents currently prepared by the BCE contain only their conclusions. To be more authoritative, reliable and transparent, the documents should also contain the basis for the conclusions.

When projects require sensitive consideration because of their scale, type or location, personnel in other departments of the BCE have been occasionally involved in the EIA review process if their expertise is needed. When an EIA

report is to be reviewed, the BCE should organise an Environmental Review Expert Group involving appropriate experts with relevant specialities.

As the economy grows, international economic investment will increase and Azerbaijan society will become more democratised. Environmental review documents, lacking the description of the decision making process behind the conclusions, will not be acceptable to private enterprise nor to the population as a whole.

6. The EIA department staff must have enough computer skills to utilise environmental information integrated in the GIS.
7. Residents living around a proposed project site are the most vulnerable to the impacts. Following directions from the EIA review process, the impacts are expected to be not serious although they are rarely expected to be nil. Final decisions on whether the impacts are acceptable should reflect the opinions of the local residents. Therefore, the EIA process should be open to the public and consultation encouraged. If the residents are familiar with the project, they will also become keen to know the environmental consequences.

Because the interest in environmental issues among the general public was considered low, the BCE did not involve the community in its EIA process. Public participation in EIA will be, however, a good approach to raise public awareness of the environmental issues generally and of those relating to specific projects. The BCE should make available the information on projects under review and give opportunities to the public to make their comments. The public participation system will be developed during Phases I and II, and fully instituted in Phase III.

#### **Phase II.**

1. Based on the experience and technical expertise obtained during Phase I, the BCE should prepare a manual for environmental project review. This must be fully understood by all the staff and the BCE must ensure that all projects are reviewed in a fair manner.
2. The reports prepared for EIA and conclusions should be in principle opened to the public for the reference of prospective investors and developers.

#### **Phase III.**

1. The actual environmental impacts after the project should be monitored and compared with predicted impacts. By examining the causes of any unpredicted impact, project evaluation techniques of the BCE should be improved.
2. As a consequence of economic development, the number of development projects which require the approval of the BCE will increase. To avoid any delay in the EIA review process, the BCE should increase the staff and work efficiency.

### **7.7.3 Monitoring**

After the EIA process and project implementation, environmental impacts will be monitored by other BCE departments and units. The EIA department should



communicate with other BCE staff to determine the actual environmental impacts and compare those with predicted ones. The reasons for any adverse discrepancy must be examined.

#### **7.7.4 Law Enforcement**

The basis of those projects which require an EIA must be clearly defined so that developers are in no doubt whether a full EIA is required or not. The legislation should also define comprehensively which environmental factors need to be included in EIAs. Articles 51, 52, 53 and 54 of the 1999 Environmental Law describe the relevant issues.

However, there is some further clarification required in respect of the information to be provided by the developer and the work done by the SCE.

There is no clear separation of responsibilities between the SCE and local environmental committees and a policy decision is required. In principle, all EIAs should be considered in the first instance by the BCE where the development is in its geographic area. The SCE should have the right to oversee EIAs of particular national importance, those with potential environmental effects which may cross regional or national boundaries or where assistance is sought by the BCE.

The right of appeal by a developer against the findings of the BCE should rest with the SCE.

A fee scale should be defined based on the work required in conducting the necessary checks of developers submissions. These will be based on a “case by case” analysis of the work required and a rate should be defined sufficient to cover the staff and capital costs incurred, including a charge for the preparation of the report. As small developments by individuals will generally not require EIAs to be prepared, the charging should be on a fully commercial basis, similar to that charged by private sector consulting firms in this field. Any tests sub-contracted by the BCE to external organisations should be recharged at cost. (It will be imperative to ensure that any checks are conducted by a different organisation from that which conducted the data submitted for review.)

The legislation should define the timescales for each step of the EIA review process, to ensure that the institutional delay to the progress of the developer is kept to a minimum. The legislation should specify the maximum (not target) period for the BCE to conduct its reviews and the basis on which this may be extended (for example if there are particular complexities not foreseen at the early review process).

The process for evaluating compliance with conditions set in the EIA should be defined, together with the legal basis for enforcement action to ensure compliance.

Working to tight timescales in an open information culture will require strengthening of the EIA department in both its professional expertise and as the economy grows, in staff numbers. Staff will require a good and working knowledge of the GIS system, the legislation and best environmental practice.

This issue should be addressed urgently by the senior management of the BCE.

### 7.7.5 Data and Information Management

The summary of the results of EIA reviews and information gained should be entered to the GIS together with other factors such as pollutant emission quantities into air and in wastewater. These data will be then compared with the results of monitoring after the project is implemented.

### 7.7.6 Investment Plan

Items requiring investment:

- office equipment such as a personal computer, etc.
- equipment for inspection such as a vehicle, sampling tools, etc.
- publishing of manuals;
- personal computer;
- computer training for staff;
- library of reference data.

### 7.7.7 Operation and Maintenance (Personnel) Plan

The workload of EIA will increase as economic activities are expected to be doubled in the coming decade. Accordingly the EIA department staff will increase up to about ten.

	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Geologist	2	2	2	2
Environment	2	2	4	6
Data/information management	1	1	1	1
Total	6	6	8	10

## 7.8 Information

### 7.8.1 Directions

#### a. Information Centre

This department was established about one year ago. Its main job at present is the compilation of information on activities in the BCE. Environmental information dissemination to society is still on a limited scale, although it puts articles on environmental issues in newspapers from time to time. In the coming years, it should widen its activity which includes information compilation and information diffusion.

The fundamental role of the Information and Environmental Education Department should be to act as an information centre for the BCE and the Baku environment. Therefore it is proposed to rename the department "Information Department". The department has so far been compiling information on the BCE's activities, but it should aim to be a focal point to which information - not only about the BCE itself but also the environmental status of Baku - is gathered from the BCE and other organisations, and from which such information is diffused.

For this purpose, the GIS established by the team in this study is a powerful vehicle and the department should make the best use of it. The data input of environmental information available to sector departments of the BCE will be done by departments themselves, as already described previous sections. This department then integrates information, processes it for presentation, and makes it accessible for industries, schools, the general public and any others who need it. The internet will be the prime means for information diffusion.

The department also bears the responsibility for the overall maintenance of the GIS facilities, including hardware and software. The department staff must have an intensive training input to gain the wide knowledge of computers, networks and the internet.

The major purposes of information compilation and diffusion will be to strengthen public relations and to promote environmental education.

#### **b. Public Relations**

The public in general is not well informed about environmental matters. The education system does not include a developed environmental curriculum, although some work is now being advocated. The aim is to develop an understanding of the importance of the environment in the processes of economic and social development - "to put the environment on the political and social agenda".

Publicity for environmental initiatives has been restricted by a lack of resources and a shortage of skilled public relations experts. Much publicity has relied on the printed mass media reporting press releases from the SCE/BCE.

The media has an important rôle in promoting environmental awareness and policy, which should not be overlooked. The media can be used effectively to disseminate information about actions being undertaken which could be duplicated or replicated elsewhere, whether within or outside Baku (for example the clean up of illegal solid waste dumps).

The department should ensure it works actively with the media (printed, radio and TV media) to ensure maximal coverage for work undertaken and planned by the BCE. In particular it would be helpful if the BCE is able to supply "stories" to the media on a regular basis, which describe what is planned and ongoing.

The BCE should form close working relationships with the major oil companies operating in Baku each of which has a public relations department. Whilst the main focus of their work will be to promote their own activities, informal discussion indicates that these companies may well be willing to enhance the work of the BCE. Seminars and discussions with other sectors of industry on different topics will be also promoted.

NGOs, if properly consulted and directed can work with the BCE to ensure that proactive environmental interventions are successful and well publicised. Their rôle will be to act as a communication vehicle, able to explain their actions in terms the community can understand.

### **c. Environmental Education**

The Ministry of Education is currently undertaking a comprehensive programme of curriculum review. Many of the materials used, in several subjects are considered out-of-date and need radical overhaul. The BCE should liaise with the education sector to ensure that environmental affairs are included at all appropriate levels.

Environmental education will be divided into two types: school and higher education, and public education. Public education will then be performed in two tranches: a “pro-active” and a “reactive” form.

In the reactive form, the BCE purely provides information related to the environment. How to act on that information in the interests of the environment is left to the information receivers.

The GIS, which will be further enhanced by the contribution of each department of the BCE and others, will be a major tool for this form of environmental education. Access to the information on the GIS should be possible through the internet so that the widest population understands the environmental situation. For educational purposes, not only the environmental information but also the BCE’s activities, rôles of the general public in environmental conservation, regulations, information on environmental facilities in Baku (e.g. botanical garden, Baku zoo, sanctuaries, natural monuments) and others should also be available on the internet. These kinds of information can be also printed in newspapers, pamphlets and signboards, and broadcast on TV.

In the pro-active form, the BCE should organise events and urge the public to be involved in real actions. Events might include voluntary tree planting, city cleanup, public open days demonstrating the GIS, tours of the Absheron sanctuary and visits to polluted sites. The actual execution of such events does not need to be done by the BCE itself and can be entrusted to NGOs.

These educational measures are to be extended to school education. There is currently a proposal under review for an environmental education component to be implemented under the World Bank funded Azerbaijan education reform project. This programme is being managed by the SCE in conjunction with the Ministry of Education.

BCE’s information provided on the internet, printed forms and on TV should be utilised in classes, and environmental activities should be incorporated into school life (e.g. excursions to the sanctuary). For this purpose, the BCE should have a close link with school teachers, local education committees and the Ministry of Education in order to promote environmental education at schools strongly.

The BCE should also discuss the required skills of graduates and post graduates with Ministry of Education and relevant authorities of universities so that their higher education becomes more environmentally focussed, practical and enables future knowledge based support for environmental management.

## 7.8.2 Strategies

BCE/SCE	Other organisations	
Work	Work	Organisation
<b>PHASE I: 2001 - 2003</b>		
<ol style="list-style-type: none"> <li>1. To reorganise the department to cover public relations.</li> <li>2. To gain journalist skills.</li> <li>3. To obtain computer skills.</li> <li>4. To open the BCE's homepage.</li> <li>5. To establish an environmental data sharing system among environmental management related organisations.</li> <li>6. To develop a framework to promote environmental education.</li> <li>7. To promote the establishment of a taskforce with the education sector.</li> <li>8. To meet the environmental NGOs on an annual basis to promote publicity and education</li> </ol>	<ol style="list-style-type: none"> <li>1. To provide the BCE/SCE data necessary for environmental management.</li> <li>2. To publicise information relevant to illegal waste dumping in order to promote the illegal dump monitoring system.</li> <li>3. To establish a taskforce to strengthen environmental education.</li> <li>4. To develop the NGO capacity</li> </ol>	<p>organisations involved in environmental management</p> <p>BEP and each district EP</p> <p>Ministry of Education</p> <p>NGO forum, ISAR*</p>
<b>PHASE II: 2004 - 2006</b>		
<ol style="list-style-type: none"> <li>1. To broaden the information in the BCE's homepage.</li> <li>2. To organise public events.</li> <li>3. To support the education sector by providing environmental information.</li> <li>4. To work more closely with environmental NGOs</li> </ol>	<ol style="list-style-type: none"> <li>1. To instruct the public how to contribute and participate in environmental management e.g. by minimising waste generation, protecting natural resources, and keeping the city clean.</li> <li>2. To include environmental subjects in primary/secondary school education</li> <li>3. To promote environmental higher education.</li> </ol>	<p>BEP and each district EP</p> <p>Ministry of Education</p> <p>Ministry of Education</p>
<b>PHASE III: 2007 - 2010</b>		
<ol style="list-style-type: none"> <li>1. To broaden the information in the BCE's homepage.</li> <li>2. To organise public events.</li> <li>3. To evaluate the progress of environmental education</li> </ol>	<ol style="list-style-type: none"> <li>1. To continue to instruct the public how to contribute and participate in environmental management.</li> </ol>	<p>BEP and each district EP, others.</p>

\*ISAR: A humanitarian aid agency of the USA.

The works to be done by the BCE/SCE are explained in detail below.

### Phase I.

1. The department should be reorganised to be a department that covers the GIS management and public relations field.
2. The staff should gain journalist skills to present environmental matters in an appropriate manner for mass distribution.
3. The department staff should gain computer skills with an emphasis on web page editing and overall maintenance of GIS facilities.

4. The BCE must secure an internet server facility to host its homepage<sup>3</sup>. The first web page contents will be a set of *html* files prepared by the team. The opening of the BCE homepage should be widely publicised and it should be linked with other environment related web pages and sites.
5. As part of the public relations process, the BCE should actively exchange data and information with other relevant organisations.
6. The department staff should consider which environmental information should be delivered to whom by what means. Discussion with other department staff is inevitable.
7. The BCE/SCE should have a close link with the education sector. It needs to promote the establishment of a taskforce with the education sector within the Ministry of Education and/or a regional education committee.
8. The BCE/SCE should start a dialogue with the NGOs so that the NGOs can act as a key player in publicity and environmental education.

## **Phase II.**

1. Based on the result of item 5 of Phase I, the information presented in the BCE web page should be broadened and used for educational and promotional purposes.
2. Based on the result of item 5 of Phase I, the BCE will organise public events, meetings with relevant groups (eg industry, developers, government), install signboards and distribute leaflets. On the completion of Absheron sanctuary development, the sanctuary tour facilities will be arranged.
3. The BCE should provide environmental information and suggest the need for human resources to the education sector and promote environmental education at schools. The BCE will need to prepare models of education tools.
4. Cooperative relationship between the BCE/SCE and the NGOs should be further strengthened.

## **Phase III.**

1. Receiving comments from the website visitors and the BCE internet presence should be further strengthened.
2. The BCE will continue to organise public events, install signboards and distribute leaflets.
3. The BCE should evaluate the progress of environmental education, and propose improvement measures to the education sector.

### **7.8.3 Monitoring**

The key measure for success of the department's activities is not in the number of articles or reviews (although that is important) but rather in the effect that the public relations and environmental education activity is having on the area. The former is

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<sup>3</sup> The Azerbaijan government hosts several State Committee and Ministry sites in addition to the Office of the President.

“input” whilst the latter is “output”, where the ultimate interest should be. An annual counting of illegal dumps in the area, for example, should be conducted to monitor their improvement “on the ground”. These sites should include a range of public, commercial, industrial and residential areas and their improvement recorded photographically. The outputs can be illustrated on the BCE’s website.

A review along the lines of the SCE’s “state of the environment report” should be produced and circulated amongst the media and other bodies.

#### **7.8.4 Law Enforcement**

There are a number of laws concerning the press and publicity<sup>4</sup>. It is imperative that the BCE operates within this framework and does not leave itself open to censure. There are no major legal issues to consider.

#### **7.8.5 Data and Information Management**

Press releases currently require approval from the BCE Chairman and this method is, in general, inappropriate for the future. The department should generate a stream of stories which should be in accord with BCE policy and strategy, but should not require case by case approval from senior management.

The GIS will have a fundamental rôle in informing the staff of the BCE, the SCE, other government departments and the public about the factual basis of the environment in Azerbaijan.

The database will become the core reference point and it is imperative that the BCE develops a system for validation of proposed inputs and control over access to sensitive data. The BCE will need to manage the GIS to ensure that it is updated regularly and consistently and that the sources of raw data are clearly indexed.

In general, charges should not be levied for the provision of information from the GIS to the public, but it may be appropriate to charge for specific research or provision of data to commercial entities (beyond basic reference data). No charge should be levied for the provision of data to other government bodies, whether within Baku or elsewhere.

An increasingly important query source will be the internet and it is important that the BCE web site does more than provide basic data, but allows access to some data and has a query facility. Staff will need to be trained in web site development and to respond appropriately to queries (which may be in Russian, Azeri or other languages).

#### **7.8.6 Investment Plan**

Items that need financial arrangement:

- Office equipment including PCs
- GIS equipment (hard and soft)
- Internet connection (maintenance of internet account, server facility, etc.)

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<sup>4</sup> for example: Normative Act March 1995 concerning placement of advertisements and posters in Baku City, 1997 Law on advertising, 1998 regulations for mass showing of films and videos, Normative Act January 2000 amends 1995 regulations

- Computer training
- Education tools (signboards, pamphlets, etc.)
- Event (Cleanup, tree planting, sanctuary tour, advertisement for event, etc.)

### 7.8.7 Personnel Plan

	Present	Phase I	Phase II	Phase III
Management	1	1	1	1
Information compilation and processing	2	1	1	1
System engineer (Internet and GIS maintenance)	0	2	2	3
Public relations	1	1	1	1
Environmental education	0	1	1	1
Total	4	6	6	7

## 7.9 Administration Department

### 7.9.1 Direction

The administration of the BCE should be streamlined in order to achieve two key objectives:

- provision of an *effective* support service to the BCE;
- provision of that service in an *efficient* manner, using up-to-date support facilities to minimise the cost burden.

Administrative services within the BCE are currently provided by separate units concerning legal, human resources (personnel), finance and accounting, and maintenance functions. As is common practice within Azerbaijani government departments, there is no single function within the BCE clearly responsible for general administration.

At present the administrative overhead (including maintenance) comprises 15 percent of the staff headcount. The M/P aims to bring this overhead down to less than 5 percent of the total staff numbers.

The BCE management should conduct an annual review throughout the M/P period to determine whether there are any functions in the administration department which should be privatised, for example maintenance, cleaning or driving. The BCE should consider the standard of work required, the current total cost (including salaries, materials and other expenses) and the cost of the work done externally.

Where it is more appropriate for the work to be carried out externally, a contract should be drawn up with the proposed supplier

The finance unit will assume responsibility for computing and related equipment management. It will need to use external suppliers for specific technical problems which may arise with computers and the GIS system.



Revised methods of working should be in place by the end of the first phase, (ie by 2003) if there is no transition to MOEP status. In the event that there is an earlier transition, new administrative operations and processes should be introduced as an integral part of that transition.

All administration functions will report to a deputy chairman within the BCE/MOEP structure.

## 7.9.2 Strategies

BCE/SCE	Other Organisations	
Work	Work	Organisation
PHASE I: 2001 - 2003		
<ol style="list-style-type: none"> <li>To improve financial information and support to senior managers. The SCE/MOEP to provide clear instructions regarding its financial administration requirements</li> <li>To provide a comprehensive human resources development service for all BCE management and staff</li> <li>To develop a set of operating guidelines to enable staff to understand the legal issues connected with their work</li> <li>To raise computer skills of accounting and HR unit staff</li> <li>To manage the computing and related equipment (including GIS) within the BCE</li> <li>To streamline the work of the maintenance unit to operate a system of preventative maintenance</li> </ol>	<ol style="list-style-type: none"> <li>The CoM to ensure SCE/BCE staff rewarded appropriately for work done</li> <li>The Prosecutor's department and sectoral ministries to review procedures</li> </ol>	<p>CoM</p> <p>Prosecutor, Sectoral Ministries</p>
PHASE II: 2004 - 2006		
<ol style="list-style-type: none"> <li>To transfer maintenance and office cleaning work from the BCE to a stand-alone function operating under a service contract</li> <li>To Increase use of computers to enable staff reductions</li> </ol>		
PHASE III: 2007 - 2010		
<ol style="list-style-type: none"> <li>Continue personal development of all staff with skills and knowledge training inputs as required.</li> </ol>		

In order to be effective the BCE must carry out the following:

### Phase I.

#### *Financial and accounting support*

- Budgets are prepared annually on a calendar year basis, the peak work in this area being in November and December. Over the course of the year, the BCE typically receives only a proportion of the allocated budget from the Ministry of Finance through the SCE and this places a burden on the finance unit to plan,

- monitor and control income and expenditure. Expenditure plans - for use within the BCE - should be prepared by the unit.
2. The BCE management should review the accounting support it requires. The BCE should establish a system of standard monthly reports for the senior management and for the SCE, which should be presented in diagrammatic and easy to understand format. These presentations should be accompanied by recommendations for the financial activities for the following one, three and twelve month periods.
  3. The increased use of computers generally should enable the unit to:
    - keep accurate records of planned and actual incomes and expenditures;
    - prepare and present financial information in “customer friendly” formats more easily than in the past;
    - enable an accurate audit trail to be maintained, thereby improving transparency and accountability.

### ***Computing, GIS and networks***

4. This unit will be responsible for the “facilities management” (supply and maintenance) of the hardware and software of the GIS<sup>5</sup> and other computing, telephony and network systems within the BCE/MOEP. (Note - the unit is **not** responsible for data entry or upkeep on any system *except* those providing direct financial services information and outputs in connection with the unit’s own work.) The unit will be responsible for ensuring that all equipment is physically marked and properly recorded as the property of the BCE/MOEP and its condition audited annually. The unit will be responsible for ensuring that **only approved software** is installed on BCE/MOEP equipment.

### ***Human resources***

5. In order to achieve the goals of this M/P there is a significant demand for training in technical, managerial and computing skills. The HR unit should oversee and arrange this training, to ensure that each person receives the training and development he/she requires in order to perform the key job tasks competently and professionally, in accordance with BCE policy.
6. The HR unit should work with the SCE to oversee the staff changes (new joiners, leavers, promotions and internal transfers) and ensure that each unit is staffed to the correct level, with individuals properly qualified for the tasks required.
7. The HR unit should establish a skills database to ensure that it is able to act as a centre of excellence within Azerbaijan, in specific areas where the Baku area has particular environmental challenges (for example in oilfield remediation or import of foodstuffs).

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<sup>5</sup> The GIS comprises computers, server, plotter, printer, scanner and other computing items which will require periodic attention and upgrade to operating system during the M/P period. They will need to be included in the BCE budget plan.

### ***Legal services***

8. The legal service to the BCE should enable each individual, in particular those involved in enforcement, to understand clearly their responsibilities and how these should be carried out to best effect.
9. The legal unit should develop a set of pro-forma documents for inspections, licence applications, prosecutions and all other standard processes.
10. The legal unit should continue to provide a service to the senior BCE management in respect of any issues which arise and require legal clarification.

### ***Maintenance***

11. The maintenance unit should develop a plan for preventative maintenance in conjunction with the finance unit and ensure that it is completed in a timely and appropriate manner.
12. One driver should remain with the BCE, the other returning to the SCE. The driver will require training in 4-wheel driving, towing and recovery skills to support the use of the BCE boat.
13. The two security guards should be encouraged to develop further skills to carry out some basic routine maintenance functions, including minor repair, electrical and plumbing works.

## **Phase II.**

### ***Financial and accounting support***

1. Work defined in phase I to continue.
2. The increasing experience with the use of computers will enable the unit to reduce one post.

### ***Computing, GIS and networks***

Work defined in phase I to continue.

### ***Human resources***

By the phase II, it should not be necessary for there to be more than one competent and qualified member of staff in this area, working closely with the deputy chairmen to ensure the correct staff allocations and development programmes are in place.

### ***Legal services***

Work defined in phase I to continue.

### ***Maintenance***

By phase II, salaries within the BCE may well have increased (under the Ministry of Finance plans), making the costs of an external function more competitive. The maintenance function may well be able to transfer to the private sector, operating under contract from the BCE. This will reduce the staff numbers and should bring cost savings and efficiencies to the BCE.

### **Phase III.**

#### ***Financial and accounting support***

Work defined in phase I to continue.

#### ***Computing, GIS and networks***

Work defined in phase I to continue.

#### ***Human resources***

Work defined in phase I to continue.

#### ***Legal services***

Work defined in phase I to continue.

#### ***Maintenance***

Work defined in phase II to continue.

### **7.9.3 Monitoring**

Monitoring efficiency and effectiveness in administrative and support functions is generally difficult. What is required is a recognition that the operational staff of the BCE are the key “customers” and that their needs must be satisfied in an appropriate manner.

The heads of finance, legal, human resources and maintenance should meet formally with senior BCE managers and heads of department at least twice yearly to agree what support services are required in the future.

### **7.9.4 Law Enforcement**

It is imperative that the BCE works within the overall legal framework of Azerbaijan. This is the responsibility of the Chairman and relies on information provided by department heads. It is anticipated that the budgetary process<sup>6</sup> will become more transparent within the timescale of the M/P and this will place an increased demand on the chairman for reliable and legally binding financial data.

### **7.9.5 Data and Information Management**

The finance and human resources activities require computers to enable them to conduct their work more efficiently and effectively.

Information requirements for the SCE/MOEP will need to be provided in a timely and specified manner.

### **7.9.6 Investment plan**

- Office equipment such as a personal computer, etc.
- Computer training for the staff; may need to hire instructors. Foreign experts may need to be dispatched.

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<sup>6</sup> under the direction of the World Bank public sector reform programme

## 7.9.7 Personnel plan

	Present	Phase I	Phase II	Phase III
Heads of BCE	3	3	3	3
Computing, GIS and networks	0	2	2	2
Human resources	2	2	1	1
Legal services	1	1	1	1
Financial management	1	1	1	1
Financial clerk	3	3	3	2
Financial planning	0	1	1	1
Maintenance	7	5	0	0
Total	17	18	12	11

## 7.10 Financial Management

### 7.10.1 SCE

#### a. Directions

The SCE should have a sustainable finance basis to enable itself to improve the environment adequately by the target year 2010. This implies that the SCE must acquire the necessary budget from the nation and minimise the necessary budget by institutional reform.

The foremost issue for the SCE is the implementation of the NEAP, in order to improve the state of the environment. For this purpose, the SCE requires a large investment and close coordination with other governmental bodies such as the Cabinet of Ministers, Ministry of Finance, Ministry of Economy, SOCAR and Azerenergy. In the initial stage, project implementation would be only possible with financial assistance from international aid agencies including the World Bank, Tacis and IDA<sup>7</sup>. By the target year, however, there should be a system by which country's environmental management is executed with appropriate allocation of the national budget, Environmental Protection Fund (EPF) and Oil Fund.

The EPF, which should be a key instrument for the "polluters pay" principle in Azerbaijan, is, however, small in scale and not generally used for environmental purposes. The charges on polluters remain at the 1992 level, thus no longer motivate industries to operate environmentally. It is vital to increase the EPF charges to meet the inflation of the country, which is about 250 times during 1992 to 2000<sup>8</sup>, and effectively utilise the EPF for environmental improvement. Cooperation with other state organisations and continuous discussion with the Ministry of Finance are inevitable.

Due to the limited budget from the state, the operation and maintenance (O&M) cost of the SCE has largely relied on "off budget" funds at present. The budget source should be shifted from the "off budget" fund to the general national budget, EPF and the Oil Fund by 2010.

<sup>7</sup> International Development Association, which provides soft-conditioned credit.

<sup>8</sup> US\$ 1.00=4,547 manat at the end of October 2000 according to National Bank of Azerbaijan and US\$ 1.00=18.4 manat in 1992 in *Statistical Yearbook of Azerbaijan 2000* by State Committee of Statistics.

The SCE also has to dismiss excess personnel or reallocate them to other responsibilities, strengthen the international cooperative relationships, improve work skills of the staff and raise the wage level, so that it transforms itself into a small and sophisticated organisation with professionalism and competence in decision making on environmental management in the country.

## b. Strategies

SCE Works	Other Organisations	
	Works	Organisation
<b>PHASE I: 2001 - 2003</b>		
1. To formulate a long-term financial plan.	1. To oblige newly invested industries to operate environmentally.	COM
2. To obtain international financial assistance.	2. To increase the EPF charges.	COM, Ministry of Finance
3. To improve organisational efficiency.	3. To introduce economic incentives for anti-pollution measures, eg tax exemption and/or soft loans for anti-pollution devices.	Ministry of Finance
4. To promote the increase of the EPF charges.	4. To disburse the EPF for environmental projects.	Ministry of Finance
5. To promote the allocation of the EPF for environmental improvement projects.		
6. To obtain support of the population.		
<b>PHASE II: 2004 – 2006</b>		
1. To promote the further increase of EPF charges.	1. To oblige existing industries to rehabilitate and operate environmentally.	COM
2. To promote the allocation of the Oil Fund for environmental projects.	2. To revise the EPF charges.	Ministry of Finance, COM
3. To obtain finance from the EPF for enhancement of the SCE's facility.	3. To disburse the Oil Fund for environmental projects.	Ministry of Finance, SOCAR
4. To obtain international financial assistance.		
5. To raise the transparency of "off budget" funds.		
6. To utilise the EPF for environmental improvement projects.		
<b>PHASE III: 2007 – 2010</b>		
1. To obtain necessary budget from the state (investment fund from the EPF and Oil Fund; operation and maintenance cost from the national budget).	1. To allocate the EPF and Oil Fund for environmental management.	COM, Ministry of Finance
2. To cease the dependence on the "off budget" funds.	2. To develop a new wage system.	Ministry of Finance
3. To promote the environmental use of the Oil Fund.		
4. To utilise the EPF for various environmental projects.		

COM: Cabinet of Ministers

The works to be done by the SCE are explained in detail below.

### Phase I.

### ***Strengthening the SCE***

1. The SCE should formulate a long-term financial plan for the implementation of the NEAP and the present environmental M/P, although it is not straightforward under the economic difficulties of Azerbaijan in its transition period.
2. Because of its own financial constraints, the SCE needs to obtain financial assistance from international aid bodies.
3. The SCE should improve its organisational efficiency by dismissing excess personnel and/or reallocating the right person to the right position. The work efficiency of individuals must be increased.
4. To make the EPF charge system effective in practice, EPF charges must be increased by as much as 50 times as a first step.
5. The SCE should strongly urge the COM and the Ministry of Finance to allocate the EPF for environmental projects. The introduction by the Ministry of Finance of a soft loan scheme to finance anti-pollution measures using the EPF should be particularly promoted.
6. The SCE should obtain support of the population, (ie tax payers), by stressing the importance of environmental management and the necessity of proper budget allocation through the mass media, the internet, and other communication tools.

### **Phase II.**

#### ***Strengthening the SCE***

1. The SCE has to urge the COM and the Ministry of Finance to further increase by several times the EPF charges, in order to ensure the financial basis for environmental improvement.
2. The SCE should urge the COM, Ministry of Finance and SOCAR to allocate the Oil Fund for environmental management.
3. Part of the EPF should be allotted for equipment, including the vehicles and computers necessary for the SCE to execute its mandate.
4. International financial assistance should be sought continuously for the implementation of the NEAP.
5. The “off budget” funds should be transparent by passing all the “off budget” funds to the state.

#### ***Environmental Improvement***

1. The SCE should promote the use of the soft loan scheme financed by the EPF.

### **Phase III.**

#### ***Strengthening the SCE***

1. The SCE should be financially sustained by domestic financial sources. Investment in environmental projects will be financed by the EPF and the Oil Fund, whilst the O&M of the SCE by the general state budget. The SCE must secure finance great enough to cover the financial requirements of regional

environment committees, including the BCE. The wage system should be restructured to increase the overall payment standard and to pay more for works requiring greater expertise.

2. The SCE should be a sound governmental body without dependence on “off budget” funds. Financially self sustainable functions in the SCE should be privatised.

### ***Environmental Improvement***

- 1 The SCE should promote the environmental use of the Oil Fund and facilitate contaminated land cleanup.
2. The SCE should keep announcing economic incentives for industries to operate in an environmentally friendly way (tax exemption, soft loans, etc.) and provide them with information on the best use of such incentives.

## **7.10.2 BCE**

### **a. Directions**

The BCE should have a sustainable finance basis to enable itself to adequately control the environment by the target year 2010. This implies that the BCE must acquire the necessary budget from the SCE and minimise the necessary budget by institutional reform.

The present environmental management M/P necessitates finance for i) initial investment and ii) continuous O&M cost.

The Republic has been facing financial difficulties since independence. Financial supply for environmental management through general loans is often restricted since it is not considered profitable. Therefore international financial sources will be inevitable for the meantime, including soft loans from international development banks. It is, however, preferable to arrange finance for the future expansion domestically and replacement of facilities after their initial investment. Therefore, the BCE should strongly advocate the revision of the EPF charges and environmental use of the EPF and Oil Fund to the COM and the Ministry of Finance together with the SCE.

The national general budget cannot currently cover all the O&M cost of the BCE. The enlargement of the “off budget” fund is inevitable for the coming few years, but the BCE should not rely on the “off budget” fund by the final phase of the M/P (Phase III).

### **b. Strategies**

SCE		Other Organisations	
Works		Works	Organisation
PHASE I: 2001 - 2003			
1.	To formulate a long-term financial plan.	1.	To increase the EPF charges.
2.	To obtain international financial assistance.		
3.	To improve organisational efficiency.		
4.	To improve the collection rate of the EPF charges.		
5.	To assist industries for environmental operation.		
PHASE II: 2004 – 2006			



SCE	Other Organisations	
Works	Works	Organisation
1. To obtain finance for enhancement of the BCE's facility. 2. To improve laboratory analysis services. 3. To raise the transparency of "off budget" funds. 4. To assist rehabilitation of existing industries for environmental operation.	1. To revise the EPF charges.	Ministry of Finance, COM
PHASE III: 2007 – 2010		
1. To obtain necessary budget. 2. To cease the dependence on the "off budget" fund. 3. To promote the environmental use of the Oil Fund. 4. To utilise the EPF for various environmental projects.	1. To obtain necessary budget. 2. To develop a new wage system.	SCE Ministry of Finance

The works to be done by the BCE are explained in detail below.

### Phase I.

#### *Strengthening the BCE*

1. The BCE should formulate a long-term financial plan for the implementation of the present environmental M/P. It must aim at the staged improvement of the financial status on the both sides of initial investment and the O&M cost. The dependence on the "off budget" funds must be phased down over the coming decade.

The table below shows recommended financial arrangements for the priority projects proposed by the team in regard to the financing of the priority projects (See Table 8-13). It is to be noted that the sixth priority project is excluded here since it should be financed by organisations other than the BCE.

Table 7-1: Financing Plan of Priority Projects

Phase I.

Priority project	Items to be invested	Financial source for investment	O&M cost	
			Personnel expenses	Others
Institutional building of the BCE	Equipment, eg personal computers	Foreign finance	General budget	General budget
Environmental data management	Enhancement of the GIS	Foreign finance	General budget and "off budget" fund	Environmental project evaluation fee, GIS users' fee*
Environment monitoring (including factory inspection)	Laboratory equipment and facilities, vehicles	Foreign finance	General budget and "off budget" funds	Laboratory analysis fee
Nature protection	Absheron sanctuary development	Foreign finance	General budget and "off budget" funds	Hunting licence fee
Illegal dump control	Vehicles	Foreign finance	General budget	General budget

\*) The use of GIS will be charged to cover O&M expenses, such as paper, inks, personnel cost, etc. However, the Internet access to the GIS data should be free.

Phase II.

Priority project	Items to be Invested	Financial source for investment	O&M Cost	
			Personnel expenses	Others**
Institutional building of the BCE	Equipment, eg personal computers	EPF	General budget	General budget
Environmental data management	Enhancement of the GIS	EPF	General budget	Environmental project evaluation fee, GIS users' fee*
Environment monitoring (including factory inspection)	Laboratory equipment and facilities, vehicles	EPF	General budget	Laboratory analysis fee and admission fee
Nature protection	Absheron sanctuary operation	EPF	General budget	Hunting licence fee
Illegal dump control	Vehicles	EPF	General budget	General budget

\*) The use of GIS will be charged to cover O&M expenses, such as paper, inks, personnel cost, etc. However, the Internet access to the GIS data should be free.

\*\*\*) The "off budget" fund must be transparent.

Phase III.

Priority project	Items to be Invested	Financial source for investment	O&M Cost	
			Personnel expenses	Others
Institutional building of the BCE	Equipment, eg personal computers	EPF + Oil Fund	General budget	General budget
Environmental data management	Enhancement of the GIS	EPF + Oil Fund	General budget	General budget
Ambient quality monitoring	Laboratory equipment and facilities, vehicles	EPF + Oil Fund	General budget	General budget
Nature protection	Gil Island sanctuary development planning	EPF + Oil Fund	General budget	General budget
Illegal dump control	Vehicles	EPF + Oil Fund	General budget	General budget

2. Because of its own financial constraints, the BCE needs to obtain financial assistance from international aid bodies.
3. The BCE should improve its organisational efficiency by dismissing excess personnel and/or reallocating the right person to the right position. The work efficiency of individuals must be increased. See Section 10.2.
4. The BCE should control the collection of the EPF charges from factories on the GIS in such a way as to easily accuse defaulters and to increase the charge collection rate.

### ***Environmental Improvement***

1. On the establishment of the soft loan scheme of the EPF, the BCE should widely announce it and provide guidance to the target industries. The technical department staff of the BCE should assist the industries to choose the best technical options not entailing excessive cost. Upon request from factories, the BCE provides laboratory analysis services and charges for the O&M cost of the services.

### **Phase II.**

#### ***Strengthening the BCE***

1. Part of the EPF should be allotted for equipment, including vehicles and computers, necessary for the BCE to execute its mandate.
2. The BCE's laboratory analysis services should be good enough to satisfy clients with improved facilities, sufficient O&M cost allocation and skilled personnel.
3. The "off budget" fund should be transparent as soon as possible, and be abolished in accordance with the plan of the Ministry of Finance, as signed between the President Aliyev and the World Bank.

### ***Environmental Improvement***

4. The BCE should promote the use of the soft loan scheme financed by the EPF. The technical department staff of the BCE should assist industries to choose the best technical options not entailing excessive cost. Upon request from factories, the BCE provides laboratory analysis services and charges them for O&M cost of the services.

### **Phase III.**

#### ***Strengthening the BCE***

1. The BCE should be financially sustained by domestic financial sources in order to execute the environmental management M/P. Investment in environmental projects will be financed by the EPF and the Oil Fund, whilst the O&M of the BCE by the general state budget. The wage system should be restructured to increase the overall payment standard and to pay more for works requiring greater expertise.
2. The BCE should be a sound governmental body without dependence on the "off budget" fund. Maintenance functions in the BCE should be examined to be privatised.

### ***Environmental Improvement***

1. The BCE should propose the environmental use of the Oil Fund and facilitate contaminated land cleanup.
2. The BCE should keep announcing economic incentives for industries to operate environmentally friendly (eg tax exemption, soft loans, etc.) and providing them with information on the best use of such incentives.

# Chapter 8

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*Implementation Plan and  
Evaluation of the Master Plan*

## 8 Implementation Plan and Evaluation of the Master Plan

### 8.1 Implementation Plan

Taking the targets and strategies into consideration, the EM M/P (environmental management master plan) should be implemented in a step-by-step manner. An implementation plan proposed by the JICA team is presented as shown in Table 8-1.

### 8.2 Investment Plan

Based on the implementation plan an investment plan for the EM M/P is proposed and presented in Table 8-2.

### 8.3 Cost Estimation

Based on the investment plan the cost for the implementation of the EM M/P is estimated as shown in Table 8-3.

Table 8-1: Implementation Plan

Items		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
<b>1. Air Protection</b>												
	Phase 1	1. To improve the inspection of factories by referring to documents.	■	■	■							
		2. To strengthen the inspection of factories with large environmental impacts.	■	■	■							
		3. To encourage factories to introduce anti-pollution measures and CPT by developing financial and technical support systems.	■	■	■							
		4. To strengthen the inspection of mobile sources.	■	■	■							
		5. To establish a new monitoring station to monitor air quality influenced by car exhausts.			■							
		6. To support Hydromet to review its monitoring system.	■	■	■							
		7. To raise computer skills of department staff for GIS data input and data presentation.	■	■	■							
	Phase 2	1. To present practical recommendations to all factories if necessary.				■	■	■				
		2. To promote air pollution control industry				■	■	■				
		3. To revise the fines on polluting vehicles.				■	■	■				
	Phase 3	1. To apply the emission standards strictly to existing factories which are changing or expanding their operations.							■	■	■	■
		2. To abolish fines on polluting vehicles.							■	■	■	■
		3. To restructure the air monitoring system.							■	■	■	■
<b>2. Water Resources Protection</b>												
	Phase 1	1. To improve the inspection of factories.	■	■	■							
		2. To strengthen the inspection of factories with large environmental impacts.	■	■	■							

	Items	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	3. To encourage wastewater dischargers to introduce anti-pollution measures and CPT by developing financial and technical support systems.	■	■	■							
	4. To set wastewater discharge standards for each discharge type.			■	■						
	5. To support the implementation of the projects planned in the wastewater M/P.	■	■	■							
	6. To promote the formulation of a watershed protection plan for the Jeiranbatan reservoir.	■	■	■							
	7. To encourage the implementation of priority projects of the water M/P.	■	■	■							
	8. To raise computer skills of department staff for GIS data input and data presentation.	■	■	■							
Phase 2	1. To apply the new discharge standards to new factories.				■	■	■	■			
	2. To present practical recommendations to all factories if necessary.				■	■	■	■			
	3. To promote the full implementation of the watershed protection plan for Jeiranbatan reservoir.				■	■	■	■			
	4. To assist and supervise activities of other organisations for water resources protection.				■	■	■	■			
Phase 3	1. To apply the new discharge standards to existing factories, which are changing or expanding their operations.								■	■	■
	2. To raise awareness concerning the importance of water resource protection among the general public and encourage such actions as the minimisation of water consumption and gray water recycling.								■	■	■

### 3. Land Protection and Waste Control

Phase 1	1. To encourage, supervise and support the formulation of an MSWM M/P.	■	■	■							
	2. To strengthen legislation to control hazardous waste treatment and disposal, in accordance with the UEIP HWM Study. To assist financially and technically the construction of a HW disposal site for mercury contaminated waste.			■	■						
	3. To encourage, supervise and support the formulation of a medical waste management M/P.	■	■	■							
	4. To encourage, supervise and support the development of an illegal dump control system.	■	■	■							
	5. To organise a national work group in co-operation with other organisations for oil contamination cleanup. To integrate data of contaminated land into GIS database.			■	■						
	6. To strengthen the BCE's capacity to control and cope with illegal mining and improper mining operation.	■	■	■							
	7. To raise computer skills of department staff for GIS data input and data presentation. To strengthen the department with equipment necessary to accomplish their works.	■	■	■							
Phase 2	1. To encourage the implementation of the priority projects following the MSWM M/P.				■	■	■	■			
	2. To formulate a HWM M/P and develop a HWM system following the results of the UEIP HWM Study. To encourage feasibility studies for the construction of HW treatment facilities.				■	■	■	■			
	3. To encourage the implementation of the priority projects (separate collection and final disposal) following the medical waste management M/P.				■	■	■	■			

	Items	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	4. To encourage illegal dump cleanup by developing technical support systems.				■	■	■				
	5. To encourage oil contaminated area cleanup. To enforce soil investigation in EIA for development of possibly contaminated area.				■	■	■				
	6. To develop a control system of illegal mining and improper mining operation.				■	■	■				
	7. To promote large waste generators (factories) to minimise waste (e.g. to introduce CPT) by developing financial and technical support systems.				■	■	■				
Phase 3	1. To encourage the introduction of waste minimisation and waste recycling systems of MSW.							■	■	■	■
	2. To encourage the construction of the HW treatment facilities.							■	■	■	■
	3. To encourage central treatment of medical waste.							■	■	■	■
	4. To further encourage illegal dumpsites cleanup.							■	■	■	■
	5. To organise a national work group in co-operation with other organisations for soil contaminated area cleanup in industrial areas.							■	■	■	■
	6. To encourage rehabilitation of damaged areas by illegal mining and improper mining operation.							■	■	■	■
	7. To further encourage factories to minimise waste (e.g. to introduce CPT and to manufacture recyclable products).							■	■	■	■
<b>4. Fauna and Flora Protection and Conservation Areas Management</b>											
<b>4.1 Fauna Protection</b>											
Phase 1	1. To review and improve legislation to protect fauna.	■	■	■							
	2. To raise computer skills of department staff for GIS data input and data presentation.	■	■	■							
	3. To strengthen the institution with equipment for fauna protection.			■							
	4. To widely publicise the legal hunting procedure.	■	■	■							
Phase 2	1. To integrate species record and enter data to the GIS.				■	■	■				
	2. To disseminate the species data in the GIS to the public.				■	■	■				
	3. To utilise the data integrated in the GIS for an appropriate hunting license system.				■	■	■				
Phase 3	1. To complete a routine procedure of data input to the GIS.							■	■	■	■
	2. To improve the data presentation skill to effectively disseminate the species data on the GIS to the public.							■	■	■	■
	3. To assess the fishery resources and to encourage sustainable fishery production.							■	■	■	■
<b>4.2 Flora Protection</b>											
Phase 1	1. To clarify the tasks of BCE for city greenery.	■	■	■							
	2. To review and improve the legislation for the BCE to execute its tasks.	■	■	■							
	3. To raise computer skills of department staff for GIS data input and data presentation.	■	■	■							
	4. To review the greenery data on the GIS.	■	■	■							
Phase 2	1. To communicate with greenery implementing agencies.				■	■	■				

	Items	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	2. To enter greenery information into the GIS.				■	■	■				
	3. To promote public awareness and participation in greenery development.				■	■	■				
	Phase 3										
	1. To keep the GIS data updated.							■	■	■	■
	2. Monitor overall city greenery and give suggestions on greenery development to the implementing agencies.								■	■	■
	3. To cooperate with the EIA personnel of the BCE/SCE to prevent trees from being unnecessarily felled.							■	■	■	■
	4. To promote public participation in greenery development.							■	■	■	■
<b>4.3 Conservation Areas Management</b>											
Phase 1	1. To raise computer skills of department staff for GIS data input and data presentation.	■	■	■							
	2. To urge the relevant local authorities to formulate a conservation plan and/or land use plan for Gobustan Nature Reserve, Boulevard Park, and each natural monument and to report those plans to the BCE.	■	■	■							
	3. To put the Absheron sanctuary development plan into practice.			■							
Phase 2	1. To enter the land use plans for Gobustan Nature Reserve, Boulevard Park and natural monuments into the GIS.				■	■	■				
	2. To urge relevant organisations to implement the conservation plans for some of the natural monuments.				■	■	■				
	3. To complete the Absheron sanctuary park development and start its operation.				■	■	■				
Phase 3	1. To provide information on natural conservation areas to the public for awareness raising.							■	■	■	■
	2. To utilise land use plans for nature conservation areas in the EIA process.							■	■	■	■
	3. To start to examine the Gil Island sanctuary development plan.							■	■	■	■
<b>5. Laboratory (Chemical Analysis)</b>											
Phase 1	1. To improve techniques to analyse wastewater and soil by utilising the existing laboratory facility.	■	■	■							
	2. To install a minimum level of equipment for factory emission gas and food analysis.			■							
	3. To obtain additional equipment for wastewater and soil analysis.			■							
	4. To participate the establishment of a new monitoring station.			■							
Phase 2	1. To start analysis of factory emission gas, and of food.				■	■	■				
	2. To start air monitoring at the new monitoring station.				■	■	■				
	3. To strengthen the laboratory facility for factory emission gas and food analysis.						■				
Phase 3	1. To develop manuals for quality assurance and quality control of analysis.							■	■	■	■
	2. To establish training programmes for laboratory technicians.							■	■	■	■
	3. To take part in environmental projects.							■	■	■	■



Items		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
<b>6. Food Environment Control</b>												
	Phase 1	1. To promote a proper legislative arrangement.	■	■	■							
		2. To clarify the tasks of the BCE and the SCE.	■	■	■							
		3. To review and improve the institution for the defined tasks.	■	■	■							
		4. To develop a sampling procedure.		■	■							
		5. To develop laboratory facilities of the BCE.			■	■						
		6. To collect scientific research results to understand the environmental impact on food and health impact of contaminated food.		■	■							
		7. To assess the current impact of poor environment quality on food quality.		■	■							
		8. To study toxicological researches abroad and in Azerbaijan.		■	■							
	Phase 2	1. To carry out food sampling, analysis, and assessment.				■	■	■	■			
		2. To develop a system within the BCE to respond to the detection of contaminated food.				■	■	■	■			
		3. To strengthen the laboratory facility for food control.						■	■			
		4. To consider the necessity of adding or revising existing regulations.				■	■	■	■			
	Phase 3	1. To improve laboratory work standards and processes.							■	■	■	■
		2. To review and revise the food control system if necessary.							■	■	■	■
		3. To revise/add regulations as necessary.							■	■	■	■
4. To provide information on the possible risks of food contamination to the public.								■	■	■	■	
5. To keep the SCE itself updated with toxicological research.								■	■	■	■	
<b>7. EIA</b>												
	Phase 1	1. To review the demarcation between the SCE and the BCE for environmental review.	■	■	■							
		2. To clarify the screening process.	■	■	■							
		3. To develop a manual for EIA report preparation.	■	■	■							
		4. To review the fee structure for EIA.	■	■	■							
		5. To improve the environmental review documents.	■	■	■							
		6. To raise computer skills of department staff to use information on the environment of Baku in the GIS in order to facilitate EIA review.	■	■	■							
		7. To promote public involvement in the EIA process.	■	■	■							
	Phase 2	1. To develop a manual for environmental project review.				■	■	■	■			
		2. To have the previous EIA reports available for use as reference.				■	■	■	■			
	Phase 3	1. To introduce a system to trace implemented projects in order to compare the assessed environmental impacts and those that have taken place, and to reflect these on the EIA of similar projects.							■	■	■	■
		2. To improve the efficiency of EIA review.							■	■	■	■

Items		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
<b>8. Information, Public Relations and Environmental Education</b>												
	Phase 1	1. To reorganise the department to cover public relations.	█	█	█							
		2. To gain journalist skills.	█	█	█							
		3. To obtain computer skills.	█	█	█							
		4. To open the BCE's homepage.	█	█	█							
		5. To establish an environmental data sharing system among environmental management related organisations.	█	█	█							
		6. To develop a framework to promote environmental education.	█	█	█							
		7. To promote the establishment of a taskforce with the education sector.	█	█	█							
		8. To meet the environmental NGOs on an annual basis to promote publicity and education	█	█	█							
	Phase 2	1. To broaden the information in the BCE's homepage.				█	█	█				
		2. To organise public events.				█	█	█				
		3. To support the education sector by providing environmental information.				█	█	█				
		4. To work more closely with environmental NGOs				█	█	█				
	Phase 3	1. To broaden the information in the BCE's homepage.							█	█	█	█
		2. To organise public events.							█	█	█	█
		3. To evaluate the progress of environmental education							█	█	█	█
<b>9. Administration</b>												
	Phase 1	1. To improve financial information and support to senior managers. The SCE/MOEP to provide clear instructions regarding its financial administration requirements	█	█	█							
		2. To provide a comprehensive human resources development service for all BCE management and staff	█	█	█							
		3. To develop a set of operating guidelines to enable staff to understand the legal issues connected with their work	█	█	█							
		4. To raise computer skills of accounting and HR unit staff	█	█	█							
		5. To manage the computing and related equipment (including GIS) within the BCE	█	█	█							
		6. To streamline the work of the maintenance unit to operate a system of preventative maintenance	█	█	█							
	Phase 2	1. To transfer maintenance and office cleaning work from the BCE to a stand-alone function operating under a service contract				█	█	█				
		2. To Increase use of computers to enable staff reductions				█	█	█				
	Phase 3	1. Continue personal development of all staff with skills and knowledge training inputs as required.							█	█	█	
	<b>10. Financial Management</b>											
	<b>10.1 SCE</b>											

	Items	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
	Phase 1	1. To formulate a long-term financial plan.	■	■	■							
		2. To obtain international financial assistance.	■	■	■							
		3. To improve organisational efficiency.	■	■	■							
		4. To promote the increase of the EPF charges.	■	■	■							
		5. To promote the allocation of the EPF for environmental improvement projects.	■	■	■							
		6. To obtain support of the population.	■	■	■							
	Phase 2	1. To promote the further increase of EPF charges.				■	■	■				
		2. To promote the allocation of the Oil Fund for environmental projects.				■	■	■				
		3. To obtain finance from the EPF for enhancement of the SCE's facility.				■	■	■				
		4. To obtain international financial assistance.				■	■	■				
		5. To raise the transparency of "off budget" fund. To utilise the EPF for environmental improvement projects.				■	■	■				
		6. To utilise the EPF for environmental improvement projects.				■	■	■				
	Phase 3	1. To obtain necessary budget from the state (investment fund from the EPF and Oil Fund; operation and maintenance cost from the national budget).							■	■	■	■
		2. To cease the dependence on the "off budget" fund.							■	■	■	■
		3. To promote the environmental use of the Oil Fund.							■	■	■	■
		4. To utilise the EPF for various environmental projects.							■	■	■	■
<b>10.2 BCE</b>												
	Phase 1	1. To formulate a long-term financial plan.	■	■	■							
		2. To obtain international financial assistance.	■	■	■							
		3. To improve organisational efficiency.	■	■	■							
		4. To improve the collection rate of the EPF charges.	■	■	■							
		5. To assist industries for environmental operation.	■	■	■							
	Phase 2	1. To obtain finance for enhancement of the BCE's facility.				■	■	■				
		2. To improve laboratory analysis services.				■	■	■				
		3. To raise the transparency of "off budget" funds.				■	■	■				
		4. To assist rehabilitation of existing industries for environmental operation.				■	■	■				
	Phase 3	1. To obtain necessary budget.							■	■	■	■
		2. To cease the dependence on the "off budget" fund.							■	■	■	■
		3. To promote the environmental use of the Oil Fund.							■	■	■	■
		4. To utilise the EPF for various environmental projects.							■	■	■	■

Table 8-2: Investment Plan

Categories	Main Purpose	Investment
<b>1. Office equipment</b>	<ul style="list-style-type: none"> <li>Improvement of environmental data management</li> <li>Institutional capacity building</li> </ul>	Procurement of: <ul style="list-style-type: none"> <li>PC and its appurtenances</li> <li>Copy and fax machine</li> <li>Other office appurtenances</li> </ul>
<b>2. Equipment for inspection</b>	<ul style="list-style-type: none"> <li>Development of environmental monitoring system</li> <li>Institutional capacity building</li> <li>Establishment of illegal dumping and mining control system</li> </ul>	Procurement of: <ul style="list-style-type: none"> <li>Vehicle for inspection</li> <li>Inspection boat and its appurtenances</li> <li>Sampling tools for air</li> <li>Sampling tools for water, sediment and soil</li> <li>Other appurtenances (camera, etc.)</li> </ul>
<b>3. Air quality monitoring station</b>	<ul style="list-style-type: none"> <li>Development of environmental monitoring system</li> <li>Institutional capacity building</li> </ul>	Construction of <ul style="list-style-type: none"> <li>Building and its appurtenances for fixed station</li> </ul> Procurement of: <ul style="list-style-type: none"> <li>Mobile monitoring station</li> <li>Equipment for air monitoring</li> </ul>
<b>4. Equipment for chemical analysis</b>	<ul style="list-style-type: none"> <li>Development of environmental monitoring system</li> <li>Institutional capacity building</li> </ul>	Procurement of equipment for: <ul style="list-style-type: none"> <li>Air quality analysis</li> <li>Water and sediment quality analysis</li> <li>Food quality analysis</li> <li>Common use</li> </ul> Expansion of <ul style="list-style-type: none"> <li>Laboratory building</li> </ul>
<b>5. Equipment for information department</b>	<ul style="list-style-type: none"> <li>Improvement of environmental data management</li> <li>Institutional capacity building</li> </ul>	Procurement of equipment for: <ul style="list-style-type: none"> <li>GIS and its appurtenances</li> <li>Public education (video projector, etc.)</li> </ul>
<b>6. Absheron Sanctuary development</b>	<ul style="list-style-type: none"> <li>Development of natural conservation system</li> </ul>	Construction and procurement of: <ul style="list-style-type: none"> <li>Nature centre and its appurtenances</li> <li>Footpath and its appurtenances</li> </ul>
<b>7. For human resources development (O&amp;M cost)</b>	<ul style="list-style-type: none"> <li>Development of environmental monitoring system</li> <li>Institutional capacity building</li> <li>Improvement of environmental data management</li> </ul>	Implementation of: <ul style="list-style-type: none"> <li>Seminar</li> <li>Training</li> </ul>

Table 8-3: Cost Schedule of the EM M/P

Unit: 1,000 US\$

Items		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Office equipment	1.1 PC and its appurtenances			43					43		
	1.2 Copy and fax machine			4					4		
	1.3 Other appurtenances	33					33				
	O&M		0	0	4	4	4	4	4	4	4
2 Equipment for inspection	2.1 Vehicle for inspection			110			110			110	
	2.2 Inspection boat and its appurtenances			172							172
	2.3 Sampling tools for air			759					759		
	2.4 Sampling tools for water, sediment and soil			68					68		
	2.5 Other appurtenances			9					9		
	O&M				7	7	7	20	20	20	23
3 Air quality monitoring station	3.1 Building and its appurtenances for fixed station			652							
	3.2 Equipment for fixed monitoring station			602							
	3.3 Mobile monitoring station						112				
	3.4 Equipment for mobile monitoring station						370				
	O&M			0	5	5	5	16	16	16	16
4 Equipment for chemical analysis	4.1 For air quality						470				
	4.2 For water quality			45			15				
	4.3 For food quality			77							
	4.4 Common use equipment			677			132				
	4.5 Other common materials (reagent etc.)	11	23	34							
	4.6 Expansion of laboratory building						127				
	O&M		1	1	10	10	10	52	52	52	52
5 Equipment for information department	5.1 GIS and its appurtenances			19		40			19		40
	5.2 For public education			3					3		
	O&M	1	1	1	1	1	1	2	2	2	2
6 Absheron Sanctuary development	6.1 Nature centre and its appurtenances			367							
	6.2 Footpath and its appurtenances			186							
	O&M			0	10	10	10	10	10	10	10
7 Human Resources Development	7.1 Seminar O&M	3	6	9	9	9	9	9	9	9	
8 Personnel costs	O&M	92	101	110	118	128	140	168	184	200	218

## 8.4 Financial Planning and Evaluation

### 8.4.1 Financial Planning for Master Plan

#### a. Pre-condition for Financial Planning

The long-term financial plan of the BCE should be formulated for the implementation of M/P. It must aim at the staged improvement of the financial status on the both sides of the initial investment costs and the O&M costs.

#### a.1 Investment Costs

The investment costs are summarised as Table 8-4. Totally US\$ 7 million is needed.

Table 8-4: The Investment Costs for Master Plan

Unit: 1,000 US\$

	Phase I	Phase II*	Phase III*	Total
1. Office equipment	80	33	47	160
2. Equipment for inspection	1,118	110	1,228	2,456
3. Air quality monitoring station	1,254	482	602	2,338
4. Equipment for chemical analysis	867	744	0	1,611
5. Equipment for information	22	40	62	124
6. Absheron Sanctuary development	553	0	0	553
Total	3,894	1,409	1,939	7,242

Note: \* including investment costs for equipment replacement

#### a.2 Operation and Maintenance Costs (O&M Costs)

The O&M costs in the years 2003, 2006 and 2010 to implement the M/P are summarised as below.

Table 8-5: The O&M Costs for the Master Plan

Unit: 1,000 US\$

	Present (2000)*	2003	2006	2010
1. BCE management	0	0	3.6	3.6
2. Inspection	0	0	6.7	23.1
3. Air quality monitoring station	0	0	5.0	16.4
4. Chemical analysis	0	1.0	9.8	52.3
5. GIS	0	1.2	1.4	1.8
6. Absheron Sanctuary	0	0	9.5	9.5
7. Human resources development**	0	9.0	9.0	9.0
8. Personnel Costs	98.8	109.7	139.8	218.3
9. Utilities and etc.	76.9	58.0	32.7	32.7
Total	175.7	178.9	217.5	366.7

Notes: \* Initial plan of BCE (general budget + off budget)

\*\* The cost of seminars to be held by the BCE budget is included. In addition to it, it is necessary to receive training with financial assistance of international agencies.

In the target year, about US\$ 370,000 is needed. About 60% is for the personnel costs including social funds and welfare for the employees.

### a.3 Other major assumptions

It is assumed that the national general budget and the Oil Fund will increase in proportion to GDP.

Table 8-6: Assumed Amount of National General Budget and Oil Fund

Unit: billion manat

	2000	2003	2006	2010
National General Budget	3,931*	5,021	6,592	9,651
Oil Fund	1,365**	1,743	2,289	3,353

Note: \* Main Macroeconomic Indices of Azerbaijan, 1999, TURAN News Agency  
\*\* "Baku Sun" (08, Sep., 2000) reported that the Oil Fund will be \$300 million at the end of 2000. An exchange rate is assumed to be US\$1.00=4,550 manat in 2000.

## b. Revenues Plan

### b.1 Financial Resources for Investment Costs

The financial resources for initial investment required in Phase I are examined in the following two alternatives:

- long term loan;
- grant.

As for the long term loan, the practically softest conditions among loan schemes of various international agencies as below is assumed.

- repayment term: 25 years (including 7-year grace period);
- interest: 1.7% per year.

The investment costs for expansion and replacement will be covered by the EPF and/or Oil Fund in Phase II and Phase III.

It is assumed that the number of factories to be charged for the EPF will increase in proportion to GRDP. The revision of the EPF charges is assumed as follows in order to motivate factories to operate environmentally.

- In 2003: 50 times the amount of the present EPF charges;
- In 2006: 5 times the amount of the EPF charges in 2003.

It is also assumed that the collection rate of EPF charges will be raised gradually up to 95% by 2010 through the enhanced use of the GIS database.

Table 8-7: EPF Charges

		2000	2003	2006	2010
Invoices to charge	Nos.	509*	653	862	1,266
Average charge	million manat	0.772**	38.6	193	193
Collection rate	%	40***	56	73	95
Collected amount	million manat	157	14,115	121,447	232,121

Notes: \* The BCE issued 382 invoices, totalling 295 million manat from January to September 2000. The total number of invoices can be estimated as  $382 \times 4/3 = 509$ . \*\* The average charge is 295 million manat divided by 382.

\*\*\* The actually collected amount divided by charged amount until September 2000.

Source: Financial Department of BCE

## b.2 Financial Resources for O&M Costs

The revenues are examined by revenue sources, such as the national general budget and the “off budget” funds raised from services by the BCE, e.g. EIA (project evaluation), analysis in the laboratory and the GIS.

It is assumed that all the personnel costs including the social funds and welfare for the employees, and the costs for the BCE office, such as telephone, electricity, water and heat supply, will be covered by the national general budget by 2004. And it is assumed that all the O&M costs of the BCE will be covered by the national general budget by 2010.

The share of the budget received by the BCE to the national general budget is calculated as in the following table.

Table 8-8: BCE Budget from National General Budget and its Share

Unit: million manat

	2000	2003	2006	2010
BCE Budget*	427	620	1,012	1,668
Share (%)	0.011	0.012	0.015	0.017
Cf. National Budget (billion manat)	3,931	5,021	6,592	9,651

Notes: \* From the necessity to motivate the BCE staff, alternative 2 of salary level (the gap will be reduced to a certain extent, though not to zero) is proposed in the M/P.

The enlargement of the “off budget” fund is necessary in Phase I, because the national general budget does not cover all the O&M cost of the BCE. The dependence on the “off budget” fund must be phased down in Phase III, and be ceased in 2010.

The “off budget” fund is calculated on the following assumptions.

- The number of operating enterprises, the number of projects subject to EIA review by the BCE and the number of factories inspected by the BCE will increase in proportion to GRDP.
- EIA: The average fee for EIA review is calculated at 808,000 manat per case to the EIA process, based on the total number of cases (112) and the amount of collected fee in 1999 (90.5 million manat).



- Laboratory: out of enterprises which have a environmental passport (they were 288 according to the factory survey by the team), 30% are assumed to request the BCE for wastewater analysis in a year from Phase I, and 20% are assumed to request for emission gas analysis in a year from Phase II.
- GIS: 30% of the operating enterprises, which are assumed to be 775 according to the factory survey by the team), will use the GIS of the BCE every year.

Table 8-9: Revenue Plan of Off Budget

Unit: million manat

Services	Present (2000)	2003	2006	2010
EIA		125.2	164.8	0
Laboratory (water)		41.0	54.1	0
Laboratory (air)		0	36.2	0
GIS		23.2	35.9	0
Total	385.0*	165.0	291.0	0

Note: \* Initial Plan in 2000.

In Phase III, the “off budget” funds will be phased down to be zero by 2010.

### c. Expenditures

The investment costs, personnel expenses and other O&M costs are examined.

#### c.1 Total Expenditure

The yearly expenditure is shown in Figure 8-1.

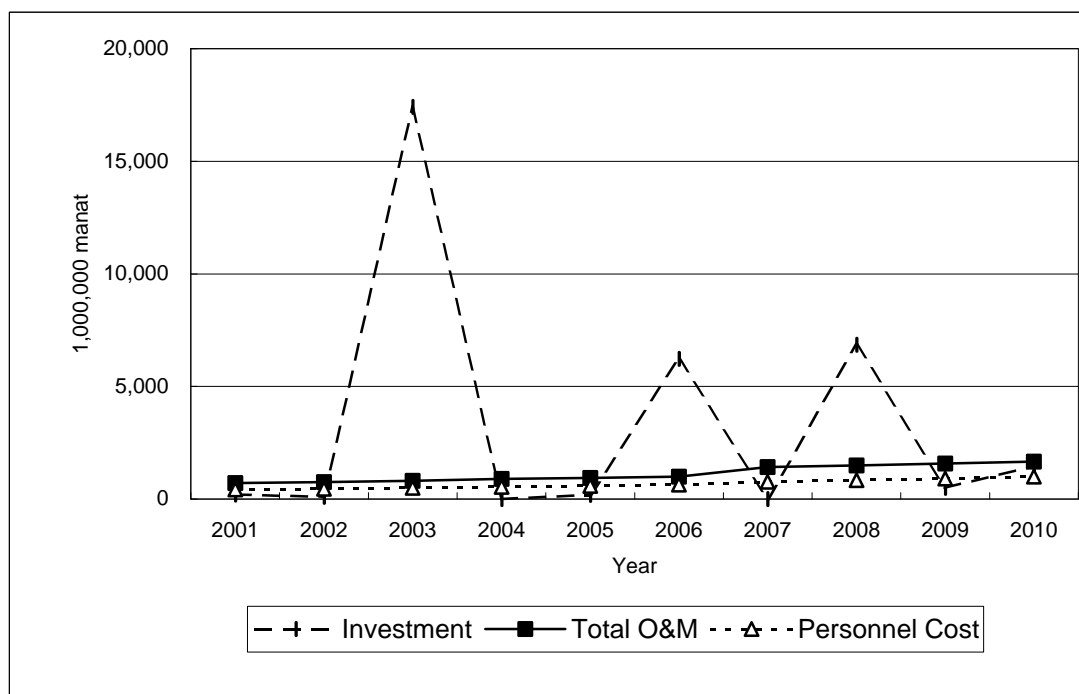


Figure 8-1: Yearly Expenditure

Note: Total O&M includes personnel cost.

## c.2 Personnel expenses

Considering the necessity to motivate the BCE staff, three alternatives are examined.

### *Alternative 1:*

The gap between the salary levels in the public sector and the private sector will remain, though the salary in the public sector will increase in proportion to GRDP/capita

### *Alternative 2:*

The salary gap between the public sector and the private sector will be reduced to a certain extent but not to nil.

### *Alternative 3:*

The gap will be reduced to nil and the salary in the public sector catches up with that in the private sector.

Table 8-10: Assumed Salary Table

Unit: manta/month

Class	Present (2000)	2010		
		Alt1	Alt2	Alt3
A-1	215,000	460,100	510,711	1,141,048
A-2	190,000	406,600	451,326	1,008,368
B-1	170,000	363,800	403,818	902,224
C-1	175,000	374,500	415,695	928,760
C-2	120,000	256,800	285,048	636,864

Salary levels to be used in the financial plan are categorised into five classes to simplify calculation. The total number of BCE staff at present is assumed to be 97.

Total personnel costs including social fund and welfare for the employees are calculated using the following formulae (note: “total salary” here means total salary of the BCE permanent staff):

- wages of temporary workers and other payment: total salary x 0.5;
- social fund: (total salary + wages for temporary workers & other payment) x 0.3;
- welfare for employees: total salary x 0.15.

The multipliers in the formulae were obtained based on the initial budget (general budget + off budget) in 2000.

The result of calculation of the overall personnel costs is shown below.

Table 8-11: Changes of Personnel Costs

Unit: million manat

	Present(2000)	2003	2006	2010
Alt1	423*	484	598	895
Alt2		499	636	993
Alt3		635	1,031	2,219

Notes: \*: Calculated result after summing up personnel costs of 5 classes.  
Source: Based on the initial budget of BCE in 2000.

To motivate the BCE staff and to make the plan realistic, the salary level of Alternative 2 (the salary in the public sector become closer to, but does not catch up with, that in the private sector) is proposed in the M/P (see below).

#### 8.4.2 Financial Evaluation

The six alternatives are presented by combining the above 3 salary levels and cases of loan or grant. They are examined on the assumptions that:

- all the O&M costs including financial costs will be covered by the national general budget;
- the investment costs in Phase II will be covered by the EPF;
- the investment costs in Phase III will be covered by the EPF and Oil Fund;
- the contribution of the EPF is half of the investment costs, though the Oil Fund is more than 14 times or more as large as that of the EPF in size in 2010.

Table 8-12: Calculation Results by Alternatives

Unit: million manat

Case		L-1	L-2	L-3	G-1	G-2	G-3
Financial source		Loan			Grant		
Salary level		Alt1	Alt2	Alt3	Alt1	Alt2	Alt3
Total costs in 2010 including depreciation costs		3,999	4,097	5,324	3,714	3,813	5,039
Portion of general budget allocated		1,855	1,953	3,179	1,570	1,668	2,895
Investment costs in Phase III		8,822	8,822	8,822	8,822	8,822	8,822
FIRR*	%	1	1	-3	51	49	31
Share in general budget	%	0.0192	0.0202	0.0329	0.0163	0.0173	0.0300
Share in EPF	%	0.91	0.91	0.91	0.91	0.91	0.91
Share in Oil Fund	%	0.13	0.13	0.13	0.13	0.13	0.13

\*FIRR: Financial internal rate of return.

FIRR differs considerably depending on whether the financial source of initial investment is loan or grant. It will be, however, possible to implement the M/P with

loan, if its interest rate is fairly low, because the total balance from 2001 to 2010 is more than zero and the BCE is a state organisation not seeking financial surplus.

In regard to salary alternatives, it will be difficult to raise the salary level in the public sector enough to catch up with that in the private sector. This is because the personnel expenses are major items in the national general budget and the changes in salary table effects not only BCE but also other agencies of the government, resulting in an abrupt heavy burden to the government.

Because the difference between Alt1 and Alt2 is not so distinct, it is proposed in the M/P to adopt Alt2.

The cash flow in Case L-2 (i.e. a loan is given, and Alternative 2 of the salary level is adopted) is shown in the following figure.

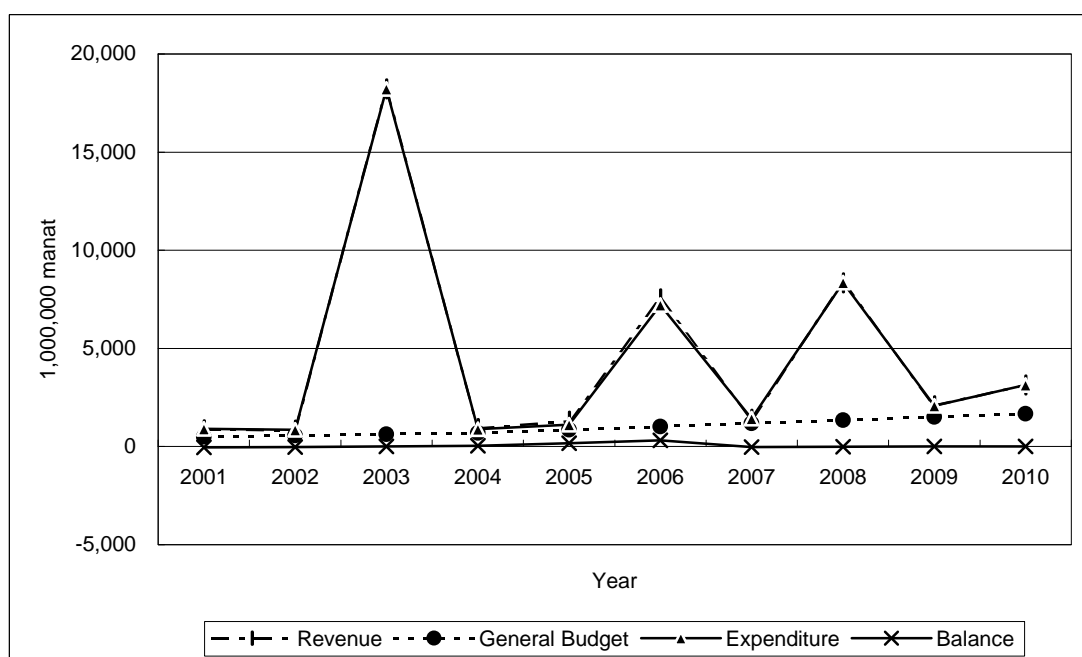


Figure 8-2: Cash Flow in Case L-2

Note: General Budget is part of Revenue.

It has to be stressed, however that this calculation was done on the following major aggressive assumptions;

- the allocation amount from the national budget will increase gradually to be large enough to cover the O&M costs of BCE in 2010,
- the “off budget” fund will increase until 2006, and it covers the O&M costs including personnel costs and other materials,
- the investment costs for expansion and replacement will be allocated from EPF and/or oil fund in Phase II and Phase III.

If any of the above assumptions are not fully satisfied, the FIRR will become minus. Therefore, the BCE should try to receive some grants for the initial investments from donor agencies.

The team also emphasise that the BCE should be eventually financially sustained with domestic sources in order to execute the environmental management M/P, and be a sound governmental body without dependence on the “off budget” fund in Phase III.

## 8.5 Economic Evaluation

### a. Evaluation Method

It is very difficult to evaluate the economic impacts of environmental improvement in a quantitative manner. The proposed M/P aims at the strengthened performance of the BCE, which does not directly take measures for environmental improvement by itself but encourage and enforce the other entities to do so. Therefore, the M/P does not include countermeasures for environmental improvement in a practical sense. Accordingly a qualitative evaluation method is adopted.

### b. Economic Impacts of Environmental Protection

Countermeasures for pollution control can increase production costs, and are often taken as a negative element for industries to run their operation.

On the other hand environmental improvement can have indirect but positive impacts such as improved health condition, beautification of the city, establishment of new environmental industries which raise profit by contributing to the environment, development of tourism, etc.

The improvement of air protection and water resources protection can decrease the occurrence of disease caused by the poor environment. The encouragement of the BCE for factories to introduce CPT will turn to be their financial benefit. Land protection and waste control will result in the protection of air water resources and facilitate the beautification of the city and tourism development.

Fauna and flora protection and conservation areas management will provide improved amenity to the Baku citizen.

The laboratory and the GIS are the strong instruments for the BCE to satisfactorily conduct its responsibility.

The cost for the proposed M/P is in an affordable range of the Azerbaijan economy. Therefore the proposed M/P is judged to be reasonable and recommendable.

## 8.6 Selection of Priority Project

Through the careful examination both the C/P and the team selected the following projects with high priority from those of the EM M/P. The projects should need urgent actions and have high priority for implementation.

Table 8-13: Priority Projects

Priority projects	Outline
1. Development of environmental data management	Collection of environmental data, improvement of GIS, etc.
2. Institutional capacity building for the BCE	Development of administrative structure, development of law enforcement system, staff training etc.
3. Development of environmental monitoring system	Development of environmental monitoring system, establishment of the BCE laboratory, development of pollution source inspection system, etc.
4. Development of natural conservation system	Improvement of BCE's capacity for the development of Absheron sanctuary.
5. Development of illegal dumping control system	Improvement of BCE's capacity to control illegal dumping, development of control system among the BCE, BEP, District EPs and other relevant organizations, etc.
6. Development of supervision and support system for M/P formulation of MSW and waste recycling	Improvement of BCE's capacity to supervise and support the M/P formulation and recycling plans, development of cooperative system among the BCE, BEP, District EPs and other relevant organizations, etc.

# Chapter 9

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*Pilot Projects*

## 9 Pilot Projects

### 9.1 Plan of Pilot Projects

#### 9.1.1 Objectives

The implementation of the plans proposed in the M/P may encounter many difficulties. To determine the problems that may arise and how to overcome these difficulties, pilot projects were carried out during the course of this study with the close co-operation of the counterparts. The objectives of the pilot projects are summarised below:

1. confirm the feasibility of the technical system proposed in the M/P (e.g. feasibility of the BCE laboratory improvement, etc.);
2. acquire base data to devise the design outline for the priority projects implementation programmes (e.g. development of environmental monitoring system, development of illegal dump control system, etc.);
3. raise public awareness and increase public participation in environmental management;
4. demonstrate improvement measures to residents and authorities concerned with environmental management.

#### 9.1.2 Selection of Pilot Projects

The JICA study team and counterpart identified the following two pilot projects during the first study work in Azerbaijan.

##### a. Experiment on Enhancement of the BCE Laboratory

The BCE planned to construct a new laboratory with an area of about 500 m<sup>2</sup>, but the construction was halted due to shortage of funds from the SCE. The structure was completed but there are no doors, windows or piping.

The BCE has laboratory equipment but it was stored in the Academy of Science and not used at all. Without the opportunity to observe the laboratory activities of the BCE, it was impossible for the team to examine its capability to carry out laboratory analysis, which is necessary for monitoring and inspection.

In this pilot project, it was planned that the laboratory facility was arranged, the BCE staff actually conducted chemical analysis, and the team assessed their practices. Through the pilot project, the team would investigate:

- an enhancement plan for the BCE laboratory organisation;
- laboratory equipment needs;
- a training and instruction plan for analytical skill development.

##### b. Experiment on Development of Illegal Dump Control System

There are a great number of illegal dumps in Baku city. There is no doubt that illegal dump cleanup is one of the essential tasks to be accomplished for the amenity of the city.



Therefore, the team and counterpart decided to carry out a pilot project entailing illegal dump cleanup campaign, which included cleaning up at one of the illegal dumps as a main component of a campaign. It was planned that the campaign would be carried out in close co-operation with the residents, the district authority and other relevant bodies, and the team then would attempt to develop a system to keep illegal dumping from taking place again.

### 9.1.3 Implementation Schedule

The pilot projects have been conducted during the second study work in Azerbaijan (mid-August 2000 to end - November 2000), as shown in the table below. However, chemical analysis in accordance with team's advice is being continued by the BCE laboratory staff. Work on park construction at the clean up site behind the Sports Place was continued by the BEP.

Table 9-1: Implementation Schedule of the Pilot Project

Item	00 Jul	00 Aug	00 Sep	00 Oct	00 Nov	00 Dec
1. Draft Plan	■					
2. JICA Approval		▲				
3. Preparatory Work		■				
4. Experiment on Enhancement of the BCE Laboratory				■	■	■
5. Experiment on Development of Illegal Dump Control System			■	■	■	■

## 9.2 Experiment on Enhancement of the BCE Laboratory

### 9.2.1 Objectives

The laboratory is a technical focal point for environmental law enforcement. Therefore the BCE laboratory should be enhanced to support the monitoring activities of other departments in the BCE with reliable analysis. In order to analyse chemical substances accurately, the whole processes of analysis including sample pre-treatment and reagent preparation must be appropriately carried out.

A pilot project of the enhancement of the BCE laboratory was planned in order to:

- assess the accuracy of BCE's laboratory works by observing their analysis practices, and
- make a recommendation for the enhancement of the BCE laboratory.

### 9.2.2 Plan of the Experiment

The experiment on enhancement of the BCE laboratory consisted of completion of BCE laboratory and joint chemical analysis of the C/P and team. The plan is as described below.

**a. Completion of BCE Laboratory**

The BCE planned to construct a new laboratory, but the construction halted due to the shortage of fund from the SCE. The structure was completed but there were no doors, windows or piping. In the pilot project the BCE laboratory would be completed. The new BCE laboratory was planned to have the functions as shown in Table 9-2 and Figure 9-1.

Table 9-2: The Plan of BCE Laboratory

Function	Details of the Function
Pre-treatment 1. Wet Chemistry	Pre-treatment for quantitative analysis of wastewater, solid waste and sludge, etc. and chemical analysis by fundamental handling
2. Organic Analysis	Pre-treatment for extraction of organic component in wastewater, solid waste and sludge, etc.
Analysis 1. Spectrophotometric Analysis	Quantitative analysis of chemical component in test sample solution by spectrophotometer
2. Metal Analysis	Quantitative analysis of heavy metals in test sample solution by spectrophotometer and atomic absorption spectrophotometer, etc.
3. Chromatographic Analysis	Quantitative analysis of organic component and inorganic ion by gas chromatograph, liquid chromatograph and FID gas chromatograph, etc.
Storage of Sample	Storage of laboratory samples taken from industrial waste, wastewater and sludge in wastewater, etc.

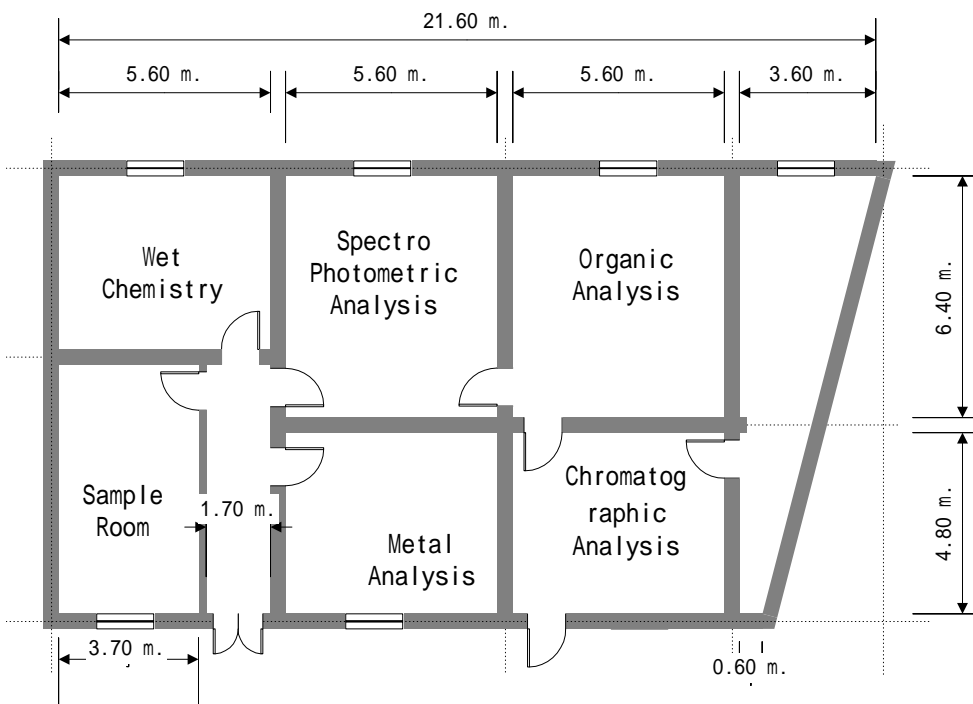


Figure 9-1: Layout of BCE Laboratory

## b. Chemical Analysis

Chemical analysis was planned as described below;

- Measured items:  
Heavy metals (Cd, Pb, As, Cr), Oil content
- Samples:  
3 samples of sediment (in Lakes Beyuk Shor, Zikh and Ganligol)  
3 samples of water (in Lakes Beyuk Shor, Zikh and Ganligol)
- Analysis method:  
Atomic Absorption Spectro-photometry and Gas Chromatography
- Date of analysis practices  
Meeting: 25 October, 2000  
Pre-treatment: 26 October- 1 November, 2000  
Analysis practices:  
1<sup>st</sup> November (Gas Chromatography)  
2<sup>nd</sup> November (Atomic Absorption Spectrophotometry)
- Place of analysis practices
- BCE laboratory Analysts:  
Mr. Aydin Agayev and other BCE staff.
- Adviser:  
JICA study team.

## 9.2.3 Implementation of the Experiment

### a. Division of the Work

The work responsibilities were divided into two parts as follows and conducted in collaboration with the BCE and the JICA study team.

Table 9-3: Descriptions and Responsibilities of the Project

Work Items	Work Responsibilities
1. Internal Finishing	BCE
2. Mechanical and Electricity Work	BCE
3. Lab Furniture Procurement	JICA
4. Installation of Lab Equipment	BCE
5. Training and Instruction of analysis	JICA
6. Chemical Analysis	BCE
7. Assessment	JICA

### b. Implementation Schedule

Implementation schedule is shown in Table 9-4. The BCE staff should have been able to conduct chemical analysis in the new laboratory in BCE. However, the construction of the laboratory was delayed and the experiment of analysis was carried out in the temporary laboratory of the BCE in the Academy of Sciences.

After completion of laboratory, chemical analysis in accordance with team's advise is being continued by the BCE laboratory staff.

Table 9-4: Work Schedule for the Experiment on Enhancement of the BCE Laboratory

Work \ Month	September	October	November
Internal Finishing (BCE)	██████████	██████████	██████████
Mechanical & Electrical Work (BCE)			██████████
Furniture Procurement (JICA)		██████████	██████████
Installation of Equipment (BCE)			██████████
Instruction of Analysis (JICA)		██████████	
Chemical Analysis (BCE)		██████████	
Assessment (JICA)			██████████

**c. Installation of Laboratory Facilities**

Following laboratory facilities were installed in the new BCE laboratory.

Table 9-5: Laboratory Facilities installed in the BCE Laboratory

	Room	Facilities
1	Wet Chemistry Room	Draft chamber, Testing bench, Side table, Cabinet
2	Spectro-photometric Analysis Room	Testing bench, Side table
3	Organic Analysis Room	Draft chamber, Testing bench, Side table, Cabinet
4	Metal Analysis Room	Testing bench, Side table
5	Chromatographic Analysis Room	Testing bench, Side table, Cabinet, Sink
6	Sample Room	Sink, Sample shelf

**d. Analysis Method**

The analysis method and equipment are as shown in Table 9-6 and Table 9-7.

Table 9-6: Analysis Methods

Analytical technique	Testing methods	
Oil Content (Mineral oil)	Soil: IOS / TC 190 / SC 3 N 326	Dutch Standard
	Water: IOS / TC 147 / SC 2 N 359	Dutch Standard
Pb, Cd, As, Cr	Soil: Acid digestion – EPA <sup>1</sup> SW 846 -3050B	
	Water: Acid digestion - EPA SW 846 - 3020A; 3005A	

<sup>1</sup> Environmental Protection Agency, USA

Table 9-7: Specification of Analysis equipment

Instrument	Model	Accessory
AAS	Varian Spectr AA 110	Lamp: As,Cd,Cr, Pb
		Software: SpectrAA
GC	Varian Chrompack CP-3800	Detector: FID <sup>2</sup>
		Column: SimDist DF 0.17
		Software: Star WorkStation

### e Results of Analysis

The results are as shown in Table 9-8 and Table 9-9. Absorbance is shown in the table regarding analysis by the AAS. It should be noted that there are many minus values of absorbance such as those of Pb and As. This indicates that the values of absorbance in case of the blank test were high due to the presence of foreign matters mixed in the beakers or reagent used in the blank test.

Table 9-8: Oil Content

Sample	Water (mg/l)	Sediment (mg/kgdm)
Lake Beyuk-Shor	12.1	210
Lake Zikh	18.1	20,600
Lake Ganli-gol	4.8	162

Table 9-9: Heavy metal (Cd, Pb, As, Cr)

Sample	Cd		Pb		As		Cr	
	Mean Abs.	Dilution Ratio	Mean Abs.	Dilution Ratio	Mean Abs.	Dilution Ratio	Mean Abs.	Dilution Ratio
M1	0.3751	2	0.4905	20	0.1777	20	0.4212	1
M2	0.3227	2	0.3674	20	0.1652	20	---	---
M3	0.0357	2	0.3559	20	0.0532	20	---	---
W2	-0.0034	2	-0.0302	2	-0.0048	1	-0.0279	1
W4	0.0018	2	-0.0149	2	0.0775	1	0.2487	1
W5	0.0102	2	-0.0189	2	0.1044	1	0.3698	1

Abs.: Absorbance

## 9.2.4 Findings

### a. Manual Analysis

#### a.1 General

Pretreatment and analysis using the Gas Chromatograph (GC) and AAS were carried out in accordance with manuals based on the Dutch standards and EPA standards.

#### a.2 Pre-treatment

##### a.2.1 Shortage of Equipment

###### i. Insufficient capacity of sinks

The sinks are too small to wash glassware and there is no space for drying glassware

<sup>2</sup> Flame Ionisation Detector

after washing.

**ii. Shortage of Glassware**

Glassware to be used for analysis like beakers, measuring flasks, separating funnels and pipettes is extremely insufficient. Therefore, the BCE cannot carry out many pretreatment activities simultaneously and this makes it difficult to reduce analytical errors and to shorten the time for analysis. Without glassware suitable for each step of analysis, basic analysis practices cannot be applied.

A pipette or a mess pipette should have been used when 1 ml of solution was taken from the 200 ml flask into the small glass vessel to inject into the FID gas chromatograph. However, neither of them were available.

Instead of a pipette or a mess pipette, a mess flask was used to measure the volume of the sample, leading inaccurate analysis.

**iii. Inappropriate grade of reagent**

The reagent they used in this analysis seemed to be inappropriate due to the unusual colour. The accuracy of analysis depends on securing of reagent of appropriate grade.

Although suitable reagent should have been used to determine pollutants, other kind of reagent was used.

**iv. Inappropriate storage of anhydrous reagent**

Although anhydrous reagent like heated alumina ( $\text{Al}_2\text{O}_3$ ) and anhydrous sodium sulfate ( $\text{Na}_2\text{SO}_4$ ) should be stored in a desiccator to cut off humidity, there was no desiccator. A desiccator is one of the foundations of glassware in the laboratory.

**a.2.2 Insufficiency of Basic Knowledge**

**i. Sampling for analysis**

Samples should be taken from laboratory samples after they are mixed well in order to reduce errors due to sampling.

Since samples of sediment are wet and not homogenous, they should be dried in a electric dryer, crushed and mixed well to be homogeneous by a crusher and an agate mortar, and stored in a desiccator with silica gel or  $\text{CaCl}_2$  anhydrite. However, the BCE does not have crushers or agate mortars.

**ii. Washing of glassware**

Washing of glassware is a basic activity of chemical analysis operation. The glassware to be used in chemical analysis should be washed by distillate water some time after washed by tap water with cleaner, and should be dried by an electric dryer or naturally. Mess flasks, mess pipettes, mess cylinders and pipettes should be dried naturally. In this study washing and drying were not carried out well due to the shortage of glassware. It means that the results of analysis can include some significant errors.

**iii. Chemical Balance**

A chemical balance should be set horizontally on the table in a chemical balance

room, but it is not installed correctly. In weighing a sediment sample, it should be transferred to a glass vessel set in the chemical balance by using a spatula, but there is no spatula in the laboratory.

**iv. Filtration**

There is no funnel stand in the laboratory. Since filter paper was not fixed on the funnel correctly, filtrated solvent did not come down in the foot of funnel. In this case filtration speed becomes very slow and solvent including oil component may overflow the filter paper.

The quality of filter papers was not suitable.

**v. Filling of reagent**

The volume and weight of reagent such as organic solvent and  $MgSO_4$  were not measured in the operation of oil component extraction. If those are not measured, the blank test may be in vain.

In case of purification of solution in the 200 ml elenmyer flask<sub>2</sub>, reagent of same weight and same volume should be added to all samples for the blank test, but neither were measured.

**b. Mechanical Analysis**

There is new equipment, FID Gas Chromatograph and AAS, provided by the Dutch government in January, 2000. Two members of BCE had received special training in the Netherlands.

The AAS has a function to dilute a sample automatically when the concentration of the sample is out of range of working curve. The staff of BCE laboratory seemed to depend on this function too much and not to attempt to dilute the sample by themselves in order to shorten the time of analysis.

The results of analysis by AAS included minus values as shown in Table 9-9. This means that the BCE analysts could have made a mistake when they carried out the blank test and selected a working curve.

**c. Recommendations**

The problems in regard to sink and space for drying of glassware would be solved when a new laboratory, at present under construction in the BCE, is completed. However, the following two problems they confront now should be resolved immediately:

- shortage of analysis equipment;
- insufficiency of basic knowledge for pre-treatment.

Although expendable supplies like glassware and reagent should be obtained by the laboratory itself, there is no budget for it. Not only major equipment but also glassware and reagent may be provided by bilateral or multi-lateral cooperation.

As for the insufficient basic knowledge of pretreatment for chemical analysis, it may be difficult for each analyst to change his/her habitual practice immediately. Therefore an intensive training programme should be conducted over several months. Training in foreign countries such as the Netherlands and Japan might be helpful.

## **9.3 Experiment on Development of Illegal Dump Control System**

### **9.3.1 Background**

According to the BCE inspectors, there are as many as 800 or 850 illegal waste dumps in Baku city. The elimination of such illegal waste dumps is one of the greatest challenges in the environmental management of the city. Therefore, a pilot project entailing illegal dump cleanup was planned. The team and the C/P observed a number of illegal dumps in the city and recognised that most of illegal dumps can be categorised into three:

- 1) large dumps where mainly construction waste and other bulky waste (e.g. steel pipes, cars, etc.) were tipped;
- 2) small dumps of domestic waste beside waste collection containers for the residents (due to their improper approach to waste disposal);
- 3) other small dumps (due to insufficient waste collection services).

Because solving the third type of dumps requires the improvement of collection services, and is not a simple question of illegal dumping, this pilot project considered only type 1 (large dumps) and type 2 (small dumps).

### **9.3.2 Plan of Experiment**

#### **a. Objectives**

The objectives of the experiment are summarised as follows:

- to let people know the presence of a number of illegal dumps in the city and recognize their possible environmental and health risks;
- to involve people in an illegal dump control system in order not to have another new illegal dumps;
- to let people know how costly waste cleanup is.

A campaign with two components, ie public meetings and a campaign tour, was organised in order to achieve the above first and second objectives and the cleanup of a large dump was organised to achieve the second and third objectives.

#### **b. Work Items of the Experiment**

##### **b.1 Site Selection for the Experiment**

###### **b.1.1 Target Areas for the Campaign**

Small dumps in the Narimanov district, where the waste collection service is provided by UP Azerbaijan, and those in the Yasamal district, served by KASCO, were the targets of the campaign.

###### **b.1.2 Large Dump for the Cleanup**

A large dump behind the Sports Palace was selected from four candidate sites (three proposed by the BEP and one by BCE) to carry out a cleanup process considering its high improvement effect, high attraction for nearby residents and relatively low improvement cost.



## **b.2 Campaign logo design contest**

An advertisement for a logo design competition appeared in the newspaper on 7 September. Collected logos were ranked by poll, which was carried out on 25 September. The top six logos were recognised. The first prize logo was used throughout the campaign.

## **b.3 Campaign tools**

The following tools were prepared for the campaign and the logo appeared in every campaign tool, in order to become familiar among Baku people. The campaign banner was used at the inauguration ceremony for the illegal dump cleanup site, public meeting and also attached to the dump trucks which carried wastes from the illegal dump site to the designated disposal site.

- Campaign Badge 1000pcs
- Campaign Sticker 1000pcs
- Campaign Banner 50pcs
- Campaign Ballpoint pen 1000pcs
- Leaflet 2000pcs

## **b.4 Public Meetings**

Leaflets were printed to ask people to discharge their waste properly. Public meetings were held, where the leaflets were distributed and a proper waste discharge manner was explained. An opinion survey was carried out in order to know peoples' awareness of the cleanness of the city.

## **b.5 Visit Tour of Illegal Waste Dump Site**

A bus tour was carried out in order to let people know the current waste dumping situations in Baku City. The tour participants consisted of representatives from residents in the Narimanov and Yasamal districts, mass media and others. Badges with the campaign logo were provided to the participants.

The participants observed several small dumps and took part in clean up of one small dump in Yasamal district, in cooperation with the C/P and the JICA team.

## **b.6 Inauguration Ceremony**

Before the commencement of the cleanup operation at the site, an inauguration ceremony was held. The Baku City Vice Mayor, Head of Greenery Department from BEP, Chairman of BCE Secretary from Japanese Embassy and media such as TV and newspapers were invited. In the ceremony, dump trucks with banners were filled with dumped wastes and left for the Balakhany municipal landfill site.

## **b.7 Cleanup**

Over the following three weeks, the wastes were cleaned up. Fertile soil was imported and trees and bushes were planted in order to prevent further illegal dumping. The site is planned to be developed as a park.

## **b.8 TV Programme for Illegal Dump Elimination**

Some of the most serious illegal dumps in the city, the visit tour, public meetings and cleanup operation at the large illegal dump were introduced on the TV and

newspapers to raise the awareness of the presence of illegal dumps and their elimination among a wider population.

### b.9 Communication with the NGOs

Those campaign activities were presented to the NGOs and campaign tools were distributed in order to help their activities in Baku.

## 9.3.3 Implementation of the Experiments.

### a. Division of Work

The experiment was conducted in collaboration with BCE, BEP and the JICA study team as follows.

Table 9-10: Work Division of Experiment

Work Items	Work Responsibilities
1. Selection of Site	C/P
2. Logo contest	JICA and C/P
3. Campaign tools	JICA
4. Public meetings	C/P and JICA
5. Visit tours	C/P and JICA
6. Cleanup large dump site	C/P and JICA
6-1. Cleanup of wastes	JICA
6-2. Import of fertile soil	JICA
6-3. Planting trees and shrubs	JICA
6-4. Irrigation	C/P
6-5. Masonry work	C/P
6-6. Benches, fences.	C/P
6-7. Assessment	JICA
7. Publicise to TV, News paper, NGOs	JICA

### b. Implementation Schedule

The experiment was conducted according to the schedule as shown in the following table.

Table 9-11: Implementation Schedule

Item	00 Sep	00 Oct	00 Nov	00 Dec
1. Selection of Site	[Bar]			
2. Logo contest	[Bar]			
3. Campaign tools		[Bar]		
4. Public meetings		[Bar]		
5. Visit tours		[Bar]		
6. Cleanup large dump site				
6-1. Cleanup wastes			[Bar]	
6-2. Fertile soil			[Bar]	
6-3. Plant and Shrub			[Bar]	
6-4. Irrigation work			[Bar]	
6-5. Masonry work				[Bar]
6-6. Benches, fences				[Bar]
6-7. Assessment			[Bar]	
7. Publicise to TV, News paper, NGO			[Bar]	

### 9.3.4 Results and Findings

#### a. Public Meetings

- The audiences spoke aggressively and the ladies, who usually dispose of waste, expressed their concern about a lack of services provided by the District Office and KASCO. But there was no opinion expressed by them that the public spaces should be kept clean by the residents themselves.
- It might be the first experience for the BCE staff to organise such kinds of meetings, but they worked hard to prepare for the meetings, calling for audiences, finding places for the meetings, and discussing agendas. In the meetings, they played active roles to chair and freely discuss issues with the audiences.
- the BCE staff gained valuable experience and this pilot project served as an on-the-job training for them to be able to organise same kind of activities in future.

#### b. Questionnaires

A questionnaire survey was executed for the audience of the public meetings. The tour participants filled out post-tour questionnaires. 18 answers from Yasamal district, 58 answers from Narimanov district and 16 answers from tour participants were collected. The following are the results:

- most respondents felt that the city is not clean and the illegal waste dumps are the major reason;
- the main cause of illegal dumps is that there are already a number of illegal dumps in the city and the people have accepted them as an ordinary condition;
- most are waiting for somebody to clean the illegal dumps. Few people think that they have to clean these themselves;
- nearly half of respondents think that they have no responsibility for cleaning the waste collection points by themselves;
- it was observed that the one-day campaign tour did not sufficiently raise the percentage of the respondents who consider that they are responsible for keeping their waste collection points clean. There will need to be continuous promotion to let people know that proper waste disposal, by every resident, every day is the only solution to the problem.

#### c. Cleanup of the Large Illegal Dump

- Total volume of the illegal wastes was around 8,000 m<sup>3</sup> and all were excavated. Every dump truck coming in and going out the site was recorded in order to make sure that all waste was properly transported to and disposed of at the legally operated disposal site in Balakhany.
- In the process of waste disposal, the following machinery was mobilised and used for the duration of around 1.5 months.

Table 9-12: Type of Machinery Used for Cleanup

Type of Machinery	No of unit
Dump Truck	18 units
Excavator	2 units
Bulldozer	1 unit
Grader	1 unit
Truck Crane	1 unit
Trailer	1 unit

- About 2,000 m<sup>3</sup> of fertile soil suitable for tree and shrub plantation was imported from a designated place.
- Five dump trucks were used to transport the fertile soil making around 220 trips.
- Following trees and shrubs were planted considering their adaptability to local climatic conditions.

Trees: Cypress, Pine, Olive-tree and, Eucalyptus:

Shrubs: Oleander, Legustrum and Rose-bush.



Before Cleanup



After Cleanup

- The cost of clean up of this large illegal dump was over 80,000US\$ including fertile soil, plants and shrubs but excluding the construction of the park.
- It is said that over 800 illegal dump sites exist in Baku City. If 10 % of those assumed to be the same size as this site, it will cost over US\$ 6 million to clean only those.
- Therefore people should be aware that illegal dump control and prevention is the cheapest way to clean the city.

# Chapter 10

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*Priority Projects*

## 10 Priority Projects

### 10.1 Development of Environmental Data Management

#### 10.1.1 Targets

In this project, the team developed a GIS database of various types of environmental information including a base map, natural conditions, social conditions and environmental quality of the study area. The development of the database only, however, does not serve much. It should not be kept idle but has to be cared, utilised and regularly maintained. Data management, therefore, becomes vitally important for the BCE.

Furthermore, the BCE has to allow the database to be shared by wide population including the general public, other state organisations and the private sector. For this purpose, a fundamental change in the perception of data is essential: data is a common asset of the society. Accessibility to the environmental data will facilitate environmental education at schools, public awareness raising in the society, environmental friendly operation at factories, and governmental decision making with due consideration of the environment.

Considering the above, the team worked out a set of targets by three phases up to the year 2010 for the BCE's environmental data management as below.

Phase I (2001 – 2003):

- Strengthening the capability of the GIS and data management among the BCE personnel;
- promotion of data collection, digitalisation and sharing.

Phase II (2004 – 2006):

- development of a data management system within the BCE;
- development of a system to collect, digitise and share data.

Phase III (2007 – 2010):

- advanced application of the GIS to policy making, such as:
  - simulation analysis of air, water and soil quality using diffusion models;
  - environmental assessment;
- prediction of environmental improvement effects by specific countermeasures.

As a priority project, this section describes an implementation plan for phase I.

#### 10.1.2 Improvement Plan

##### a. **Strengthening the capability of the GIS and data management among the BCE personnel**

In order to employ the established environmental data effectively, the knowledge regarding computers, GIS and data management is required. Since the BCE has so far little experience to handle digital data, it is necessary to intensively improve the

computer skills of the BCE personnel. Training programmes should be made appropriately for individual needs.

### **a.1 Operational Skills**

Operational skills will be required for all the BCE staff to a different extent depending on his/her responsibilities and current skill level. The skill up training can be planned for three levels.

#### **a.1.1 Primary Level**

This training is for the beginners. It is a minimum prerequisite for every prospective PC users and all the BCE staff should achieve it.

- name of PC components;
- basic operation of the computers (boot and shutdown, use of a mouse, choosing commands of Windows);
- basics of MS Word and MS Excel.

#### **a.1.2 Middle Level**

This is for those who have only limited experience in using PCs. It should be also preferably achieved by all the BCE personnel. The management staff may not need to actually operate computers, but they should at least understand from this training what computers can do and how computers can improve the BCE's performance.

- basics of MS Word and MS Excel;
- making a new database on MS Excel;
- basics of ArcView (displaying data, data layout, data saving, basic calculation of areas, etc.).

#### **a.1.3 Advanced Level**

The advanced level training is for those who have sufficient basic computer skills and need to fully operate computers for their duty. The trainees will include information department staff and some others.

- revising a database (data addition, update and deletion) on MS Excel and/or MS Access;
- use of advanced functions of ArcView (overlay, three dimensional analysis, rearranging a database, export and import of data to and from an external database,
- computer networking (setting up a local area network (LAN), data security control, etc.).

### **a.2 Managerial Skill**

Along with actually running the computers with data, it is necessary to carefully examine what types of data should be entered to the database and how they should be used. This is an important responsibility of the BCE management staff.

The issues to be considered will include:

- what types of data are needed for the execution of each of the BCE's duties and for M/P implementation;
- where those data are available and how they can be obtained;

- which data of those are suitable to deal with on the GIS;
- who will be responsible for the management of each type of data (the team considers in the M/P that data entry/update/deletion is done by sector departments and overall database management is done by Information Department);
- how often they should be updated and reviewed.

It is to be noted that data management can be a large burden for the BCE if, for example, data volume is huge, data require frequent revision, or data are difficult to obtain. The BCE is advised not to attempt to enter as many data as possible, but to be selective in consideration of necessity, usefulness and the availability of its resources (i.e. manpower, hardware, and finance for data management) and to expand the database gradually.

## **b. Promotion of data collection, digitalisation and sharing**

### **b.1 Data Collection and Digitalisation**

Some of the data in the database established by the team are not complete and further data entry will be needed. The following is data required to be digitised in Phase I as a team's proposal. As stated above, the final decision about which data are to be integrated on the GIS database is left to the BCE management personnel.

Table 10-1: Data Digitalisation Requirement

Type of Data	New Input	Addition	Update	Deletion if unnecessary
Environmental passport <sup>1)</sup>		o	o	o
Factory information <sup>2)</sup>		o	o	o
Environmental protection fund		o	o	o
City greenery <sup>3)</sup>		o	o	o
Others <sup>4)</sup>		o	o	o
Water quality of the Caspian Sea	o			
Wastewater quality from each factory to the Caspian Sea	o			
Data of contaminated land <sup>5)</sup>	o			
Data of illegal dumps <sup>6)</sup>	o			

Note: 1) information on environmental passports, which the BCE will receive regularly.

2) information received from factory inspection.

3) see Section 7.4.

4) data on Meteorology, population, environmental quality and others which were entered in the GIS by the team.

5) data obtained in the EIA process by developers.

6) see Section 10.5.

### **b.2 Data sharing**

Data are to be shared and used by the society as a whole. Internet should be an essential tool for this purpose. The establishment and maintenance of a BCE's homepage will be the responsibility of the information department staff who have mastered computer skills of an advanced level. The skills that they need are:



- homepage creation (discussion with the BCE sector departments about what data are to be presented and how is necessary);
- homepage update (homepage contents should be reviewed regularly together with the BCE sector departments and feedbacks from homepage visitors should be taken into account);
- use of internet (access to internet, maintenance of the server, prevention and remedy of viruses and hackers, etc.).

### 10.1.3 Facilities and Equipment Plan

#### a. Strength of BCE personnel for the GIS and data management

The following facilities and equipment are needed to strengthen the BCE personnel for the use of the GIS and data management.

Facilities and Equipment	Purpose
DVD-ROM (5.2GB)	To store the database with huge volume
Air conditioner	To keep a suitable condition for the PC and other digital equipment

#### b. Promotion of data collection, digitalisation and its sharing

The following facilities and equipment are required to promote data digitalisation and sharing.

Facilities and equipment	Purpose
Software for home page creation	To create and edit a homepage
Modem	To connect a internet provider
Telephone line	To connect to an internet provider
LAN equipment (cables, LAN cards, simple drilling work)	To establish a network connecting all the computers in the BCE

## 10.2 Institutional Capacity Building for the BCE

### 10.2.1 Background

It is widely accepted that the structure of the environmental management in Azerbaijan generally is not conducive to optimising the balance between the economic demands of industry and polluters with the health needs of the population as a whole and the conservation requirements generally.

It is anticipated that the SCE will undergo a major transition to Ministry status (Ministry of Environmental Protection) and that the BCE will become a branch of the ministry as a direct consequence. The BCE will become the largest branch office of the new ministry. The ministry at central level will be concerned with policy matters, whilst the main focus of the Baku branch will be environmental compliance.

The BCE/ministry branch needs to balance four key factors to ensure sustained constructive environmental management and compliance. These are described in the table below.

Table 10-2: Environmental Management and Compliance - Key Factors

Key Factor	Issue	Comment
Staffing	Numbers	It is essential that there are sufficient staff to conduct the mandate of the BCE
	Responsibilities	Each staff member should have an up-to-date job description defining their responsibilities
	Employment terms	Salaries and working conditions should be sufficient to attract well educated and motivated individuals to public service
	Organisation and reporting, individual and team competence, management and leadership	Departmental responsibilities need to be supported with clear targets and management structures capable of providing leadership and direction
Finance	Budget planning	The BCE has historically found it difficult to plan its activities in the absence of reliable budget plans
	Security of receipts (on and off budget) <sup>1</sup>	It is essential that the BCE receives the funds allocated in the budget process
	Management and control of expenditure	Investments in equipment may need to be planned over a number of years. Investment in environmental management should be financially worthwhile
Industry and polluters	Environmental economics	Environmental economics must be better understood to provide realistic pollution control advice to existing and potential industries
	Performance improvement targets	These must be realistic and reflect best practice and the current state of industry in Baku region
	Monitoring and enforcement	In order to provide support to industry, accurate monitoring and appropriate enforcement measures are required
	Knowledge of relevant technologies	The BCE staff require knowledge of both production and pollution control techniques
Public concerns	Health	The investment in environmental management should show demonstrable health benefits
	Information	There is a need for accurate and timely environmental information to be available to and from the BCE and more widely distributed
	Relations with other branches of government	A more open exchange of ideas, strategies and practices is required with data and information sharing across central and local government
	Disaster management	A programme is required to deal with the environmental aspects of natural or man-made disasters

<sup>1</sup> historically it has not always been possible for the SCE at central level to pass the full budget allocation to the BCE

It is clear that over-emphasis in any one area by the BCE endangers stability elsewhere. For example, insufficient staff numbers and skills makes monitoring and enforcement difficult, and in any event, large staff numbers could not be supported without financial stability.

It will be essential that managers and staff within the BCE are competent and operate with a clear vision of what is expected of them to achieve the ministry's goals.

## 10.2.2 Targets

By the end of the first phase (ie by end 2003) the following should be achieved:

Table 10-3: Achievement of Targets

Target	BCE action	Comment
1. Transition to MoEP status and integration of policy responsibilities from other government bodies <sup>2</sup>	Transition of all departments and units to the new structure (diagram in Chapter 6.2.5 refers). Completion by end 2002	Agreement for transition to MoEP is dependent on presidential and Cabinet of Ministers decisions. Anticipated during 2001 Integration of other bodies may involve some enhanced monitoring activity
2. Internal reorganisation	Allocation of existing BCE and newly absorbed staff to new posts, release of surplus staff and recruitment of new staff where appropriate	Policy for redundancy required from labour code and legislation
3. Manager and staff training and development	Manager training to ensure professional management and leadership. Staff training to ensure relevant and up-to-date knowledge, competencies and skills available and utilised. This training to include all necessary technical matters identified elsewhere in this report	Training with SCE and other regional staff as appropriate
4. Improved Financial management	Budget planning and financial control procedures to be better developed	Financial stability and clear forward budget plans will facilitate organisational progress
5. Development of relations with other organisations and individuals	Development and implementation of education and public relations programmes	Enforcement actions to follow extensive compliance assistance and support for industry and government, as a result of a well focussed management and staff team

<sup>2</sup> eg Azerbaliq, Azerbmeshe, Hydromet, etc

### 10.2.3 Improvement Plan Methodology

#### a. Target 1 : Transition to MoEP

This is totally dependent on the SCE being reformed as the Ministry of Environmental Protection. This should be concluded during 2001. The BCE will be part of the transitional activity which will require primary legislation, presidential decrees and new charters to be developed for the MoEP, its branches and for organisations being absorbed as part of the transition. There is no specific action the BCE can take to instigate or expedite this process.

##### *Measures of success*

Not appropriate for BCE as outcome wholly dependent on others

#### b. Target 2 : Internal reorganisation - Organisation structure

It is imperative that the BCE's organisational needs are addressed *regardless* of whether or when the MoEP is established (or not). Clearly, the new organisation structure could be introduced, as the main focus of the BCE (or the branch office of the MoEP) should be pollution control through inspection and enforcement. In the event that transition does take place, it will be imperative that the senior management team considers which staff are appointed to which positions within the ministry branch. There is a need for appropriate job descriptions to be in place for each staff member and that each position can be justified, ie by having no more staff than are necessary to achieve the BCE/branch mission efficiently and effectively.

##### *Measures of success: Achievement does not depend on transition to ministry status*

The specification of a clear vision and mission for the BCE/ministry branch, understood and supported by its staff and publicly available.

The availability of a coherent, justified organisation structure, with job and person descriptions for each post, showing clear responsibilities and reporting lines. A clear plan for the release of surplus staff and the recruitment of any specialists required.

#### c. Target 3 : Management and staff training and development

As identified elsewhere, many of the management skills required by the senior team and department heads have not been evident and a comprehensive training programme is required to enable the personal development of the branch leadership, including the chairman, deputies and heads of department.

Skills and knowledge training and development is required by many technical staff including inspectors and others and a programme should be adopted to ensure all staff, at whatever level, receive the training each requires to conduct their work rôles efficiently and effectively. This will require enhanced use of computers and safe operation of a range of tools and equipment as specified elsewhere.

##### *Measures of success*

The completion of a range of professional training modules by all managers and staff and assessment by each staff member, their managers and subordinates of the competencies of each individual as part of an annual appraisal process.

The appraisal process should identify a development plan for each individual for the year ahead.

**d. Target 4 : Improved financial management**

The BCE/MoEP must review its budget planning procedures to enable it to prepare for capital investments and recurring expenditure over the short and medium term. In particular as new monitoring equipment, laboratory enhancements, computer maintenance and software enhancements, funding for external educational programmes, internal management and staff training are required, careful consideration must be given to financial planning to meet these and the fixed costs (staffing, heating, telephone, transport etc) of operation. As the MoEP becomes more proactive in the provision of environmental information, costs can be anticipated to increase. There should be a rolling three year budget plan in place<sup>3</sup>.

However, with greater emphasis on compliance and enforcement, income to the State (whether directly or to the Environmental Protection Fund) from licensing and enforcement measures should increase.

*Measures of success*

Evidence of budget planning process, with realistic assumptions and plans for expenditure and income.

Income from penalties, compensation payments (“isks”) and fines increased during M/P Phase I.

Funds agreed within budget process transferred promptly and in full from MoEP central function (SCE).

**e. Target 5 : Relationships with external organisations and individuals**

The relations with industry should be better orchestrated, using project management and risk assessment skills and tools to compare and contrast environmental impacts to ensure that inspections, EIA reviews and all other branch activities are focussed on the key problem areas and are undertaken efficiently and effectively, in a timely and professional manner. The BCE/MoEP should be seen as a centre of excellence and an information resource, not as an obstacle to economic development.

Relations with sectoral ministries, state committees, other branches of central or local government, NGOs and publicly owned bodies should be on an open and constructive basis. This includes the finance function of the Ministry itself, from which a firm budget allocation should be secured. Data should be freely obtained and shared.

Public awareness of the key environmental issues affecting human health should be increased as a result of public relations activity.

*Measures of success*

A risk evaluation model and project management tools<sup>4</sup> should be in place and used by all inspectors and department heads. The data for decision making should be

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<sup>3</sup> ie a new three-year plan produced every year

<sup>4</sup> A number of environmental agencies internationally use models and tools to compare and evaluate risks in order to focus limited resources in area of maximum impact. BCE should liaise with UK, German and other governments through the Azerbaijan Embassies to obtain assistance in implementing these tools.

based on outputs from the GIS.

Data on all aspects of environment should be received from and provided to government departments in a timely manner, free of charge.

Inspections should be more accurately focussed on the worst (or potentially the worst) polluters of air, soil and water. The inspection process should be strictly defined.

Individual inspectors should be completing a greater number of inspections each week and completing their reports on site.

There should be an increase in the number of organisations introducing or enhancing pollution control or abatement measures and of the number of prosecutions for major breaches of environmental law.<sup>5</sup>

Public relations activities should be regular and effective, with appropriate measures in place to quantify effects (for example, articles published, illegal dump sites cleaned up, sites remediated, litter reduction etc).

#### 10.2.4 Facilities and Equipment Plan

The management of the BCE (or branch of MoEP) should develop a training plan for each individual member of staff (based on their knowledge, experience, skills level and position), as a matter of urgency and secure the training content to introduce the plan as quickly as possible. Training should be conducted at or near the BCE premises wherever possible and be augmented with field visits and inspections where these are appropriate. The BCE/branch will require the following equipment for training workshops:

- overhead projector and screen;
- computer with external projection facility;
- appropriate management and operational software tools;
- video cassette recorder and monitor;
- photocopier;
- flip charts or whiteboards (or both).

A comprehensive range of training facility consumables will also be required (eg blank acetates, felt pens etc). The trainer and trainees will require access to the laboratory and to transport facilities on an “as necessary” basis.

In order to support the information dissemination activity, a web site presence is required and this is identified elsewhere (eg Chapter 7.8).

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<sup>5</sup> It is anticipated that the number of enterprises breaching environmental laws will decrease in due course as pollution control measures become more widely adopted during later phases of the M/P

## 10.3 Development of Environmental Monitoring System

### 10.3.1 Targets

Constant monitoring is essential for the success of environmental control. Environmental monitoring has two types: monitoring of ambient quality and monitoring at pollution sources. The latter has been, and will continue to be, one of the main BCE's duties. The former, although it has not been well executed by the BCE, should be also taken into consideration, because the preservation of sound ambient quality is beyond pollution sources control.

For the implementation of the M/P, monitoring of the following five environmental categories will be required:

- air protection;
- water resources protection;
- contaminated soil and mineral resources;
- fauna and flora protection and conservation areas management;
- food environment control.

The team set targets of monitoring improvement for each of these by phases as shown in Table 10-4.

Among those above, air and water monitoring will be particularly important and explained in detail.

#### ***Air Protection:***

Factory emission is controlled aiming at clean air quality not exceeding the ambient standards in the surroundings. In theory, therefore, controlling factory emission should be enough to protect the air, and monitoring should focus on factory emission. Ambient air quality is, however, influenced by wind direction, wind velocity, temperature and other climate conditions. It is necessary to also monitor air quality to ensure clean air all the time.

The presently existing air monitoring stations are well located to generally cover the city centre where large population concentrates and to monitor the influences by the factories on the air. On the other hand, vehicle exhausts are not monitored, either directly at source or indirectly on roadsides. The team proposes the establishment of a new monitoring station which monitors the influence on air quality by vehicles.

#### ***Water Resources Protection***

Similarly to air protection, monitoring of wastewater discharge, rather than monitoring of water quality of water bodies, will be mainly focused. However, the importance of water quality monitoring at the Jeiranbatan reservoir can not be stressed enough.

The current monitoring at lakes by Hydromet should be continued and its monitoring network should be extended to include Lakes Khojasan and Zyxh. In those lakes, sediments, in addition to water quality, should be analysed once a year. Items to be analysed should include Cd, Pb, As, Hg and oil content. As for the water quality in the Caspian Sea, two types of monitoring are proposed:

wastewater at the outlets along the Baku Bay into which large volume of industrial wastewater flows, and sea water off the coast of Pirsagi and Buzovna which are in a health resort area highlighted in environmental zoning by the team

As a priority project, this section further describes the components in Phase I.

The underlying key concepts are as follows.

**Air protection:**

- factory emission gas is controlled in a systematic manner (unlike the current practice in which even a factory list is not prepared);
- the BCE is always kept informed of current air quality;
- vehicle exhausts monitoring is included (see Figure 10-1).

**Water resources protection:**

- wastewater from factories and treated wastewater from the wastewater treatment plants (WWTP) are controlled in a systematic manner (unlike the current practice in which even a factory list is not prepared);
- the BCE is always kept informed of current water quality;
- the monitoring network expands over the M/P period (see Figure 10-2).

**Contaminated soil and mineral resources:**

- the BCE receives soil data obtained by developers in the EIA process and soil database develops.

**Fauna and flora protection and conservation areas management:**

- data of fauna and flora resources are maintained on the GIS and the trend is monitored;
- conservation areas are preserved by individual plans.

**Food environment control:**

- food safety is improved.



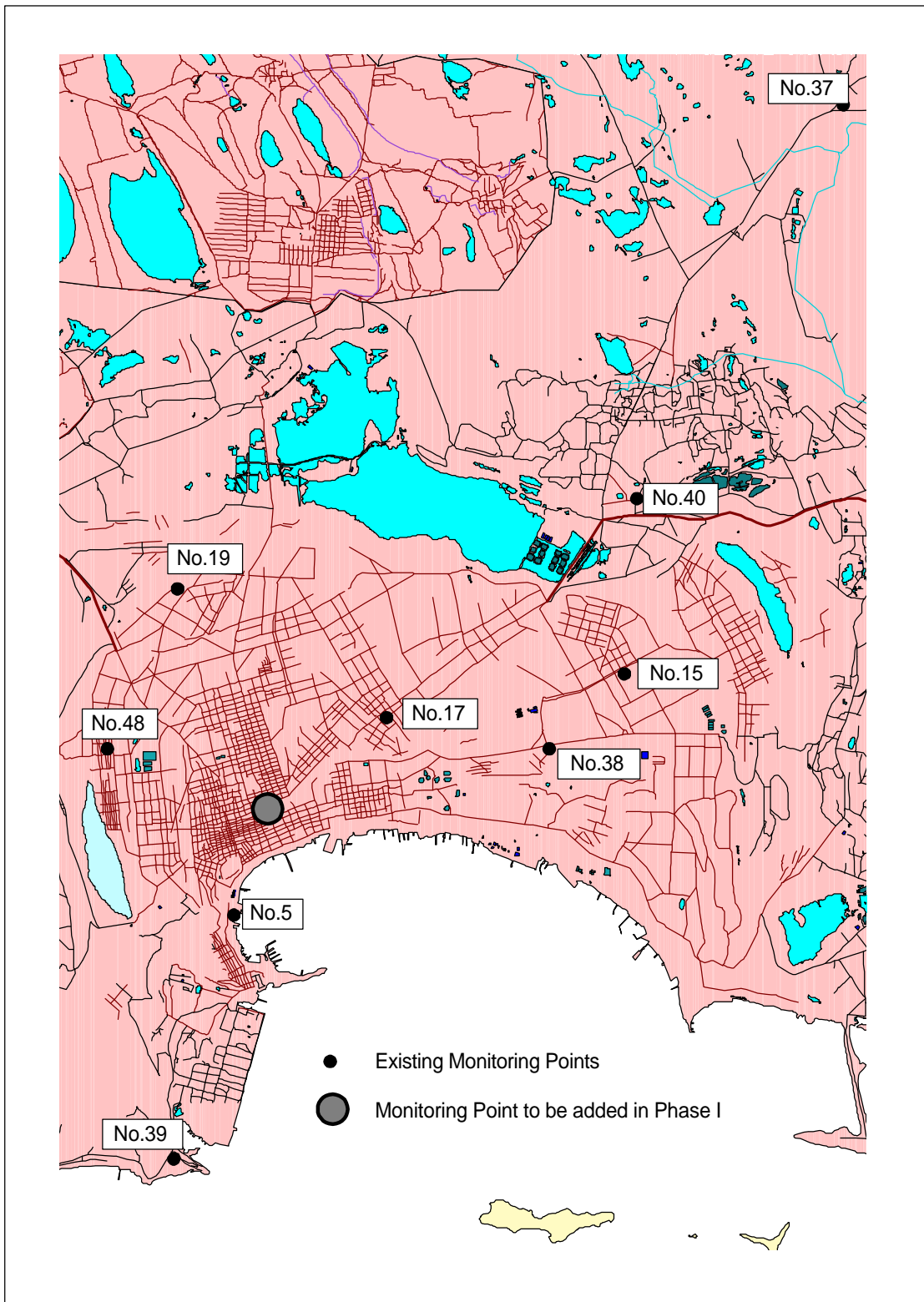


Figure 10-1: Air Quality Monitoring Network

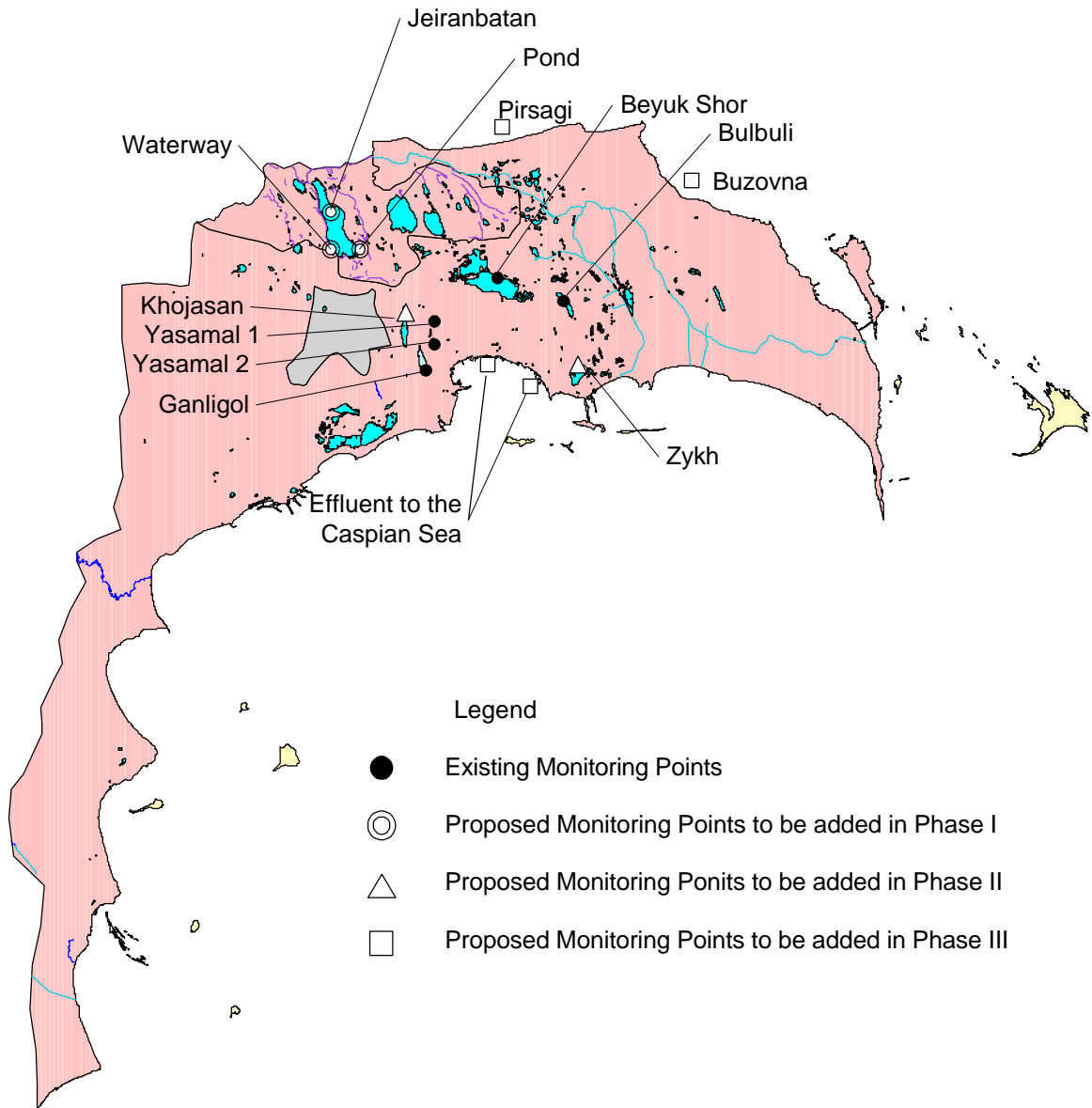


Figure 10-2: Water Quality Monitoring Network

Table 10-4: Targets for Environmental Monitoring

		Phase I	Phase II	Phase III
1.	Air protection	<ol style="list-style-type: none"> <li>1. Factories are systematically controlled with evidence (environmental passport).</li> <li>2. Law is enforced to likely polluting factories.</li> <li>3. The BCE obtains data of air quality influenced by vehicle exhausts.</li> <li>4. The BCE understands the level of air quality in Baku.</li> </ol>	<ol style="list-style-type: none"> <li>1. Polluting factories are detected at inspection and necessary countermeasures are applied.</li> <li>2. The BCE understands the level of influence by vehicle exhausts to air quality.</li> </ol>	<ol style="list-style-type: none"> <li>1. Polluting factories are detected immediately and necessary countermeasures are applied.</li> <li>2. The BCE continues to obtain data of air quality influenced by vehicle exhausts, understand the trend, and consider countermeasures.</li> </ol>
2.	Water resources protection	<ol style="list-style-type: none"> <li>1. Factories and WWTPs are systematically controlled with evidence (environmental passports and others).</li> <li>2. Law is enforced to likely polluting factories and WWTPs.</li> <li>3. The safety of the Jeiranbatan reservoir as a water source is ensured.</li> <li>4. The BCE understands the level of water quality in Baku.</li> </ol>	<ol style="list-style-type: none"> <li>1. Polluting factories are detected at inspection and necessary countermeasures are applied.</li> <li>2. The understanding of the BCE about water quality is widened.</li> </ol>	<ol style="list-style-type: none"> <li>1. The understanding of the BCE about water quality is widened.</li> </ol>
3.	Contaminated soil and mineral resources	<ol style="list-style-type: none"> <li>1. The understanding of the BCE about soil quality is increased.</li> <li>2. The work efficiency of the BCE staff in charge of mineral resources control is improved.</li> </ol>	<ol style="list-style-type: none"> <li>1. The understanding of the BCE about soil quality is widened.</li> <li>2. A method to monitor illegal or inappropriate mining is developed.</li> </ol>	<ol style="list-style-type: none"> <li>1. The BCE plays a role as a soil information centre.</li> <li>2. Illegal or inappropriate mining is controlled.</li> </ol>
4.	Fauna and flora protection	Fauna	<ol style="list-style-type: none"> <li>1. Fauna registration work is strengthened.</li> <li>2. Illegal hunting is controlled.</li> </ol>	<ol style="list-style-type: none"> <li>1. The increase/decrease in fauna resource and its distribution is assessed.</li> </ol>

		Phase I	Phase II	Phase III
and conservation areas management	Flora	1. The BCE understands the current situation of city greenery.	1. Greenery data are integrated.	1. The increase/decrease in greenery resource and its distribution is assessed.
	Cons. Areas Manag.	1. The conservation plans are developed.	1. The conservation plans are reflected to the EIA process.	1. to continue to monitor the conservation areas.
5. Food environment control		1. The BCE understands the current food environment in Baku. 2. The basis for food analysis is established.	1. Law is enforced to food risks.	1. Food contamination is detected more and necessary countermeasures are applied.

### 10.3.2 Improvement Plan and Facilities and Equipment Plan for the Priority Project

#### a. Air Protection

In the present study, information in the environmental passports, which should have been a fundamental material for factory inspection but which the BCE did not possess, was entered into the GIS by the team. Not the environmental passports of all factories were available, and the database is incomplete, but it should be still an effective tool for factory emission control. In the M/P, the team proposed that major factories should submit the environmental passport every year to the BCE, and those should be entered to the GIS to update the database.

The BCE currently does not own equipment for the analysis of factory emission gas. Because it is inevitable for inspection and law enforcement, the BCE should be equipped with it. The details of necessary equipment is in Table 10-5

Since air quality monitoring by Hydromet does not monitor the influence by vehicle exhausts, a new monitoring station is needed at an appropriate place in the city centre where vehicle exhausts likely seriously deteriorate air quality. The monitoring items will be NO<sub>x</sub>, SPM, HC and CO. The details of necessary equipment is in Table 10-5

Air quality monitoring data by Hydromet were entered to the GIS. A system in which the BCE constantly receives data hereafter should be developed and the air monitoring database thus developed must be fully utilised.

#### b. Water Resources Protection

As in the case of air protection, factory wastewater will be controlled using the environmental passports. Wastewater samples should be taken from factories which seem to be discharging wastewater with pollutants exceeding the standards, brought back to the BCE and analysed at the BCE laboratory newly developed in this study. Therefore, the whole analytical procedure and existing equipment and chemicals must be thoroughly reviewed and strengthened.

The water quality of the Jeiranbatan reservoir is not regularly monitored. Due to the significance of the Jeiranbatan reservoir as a major water resource for the capital, monitoring of its water quality should be started. In order to facilitate a quick response to water pollution risks, water quality at the wastewater ponds in its vicinity and surface runoff interceptive canals should be also monitored. The monitoring frequency will be four times a year and monitoring items will include pH, BOD, COD, SS, DO and oil content. The existence of plural stakeholders may complicate the Jeiranbatan monitoring system: Hydromet monitors surface water quality in general in the Republic; CAWF controls the Jeiranbatan reservoir, the reservoir is in the territory of the Absheron environment committee, and the BCE is responsible for the healthy environment of Baku. The BCE should taken an initiative to determine an implementation body of the Jeiranbatan monitoring together with the other three organisations.

Water quality data by Hydromet were entered to the GIS. A system in which the BCE constantly receives data hereafter should be developed and the water monitoring database thus developed must be fully utilised.

The BCE must be equipped with adequate analytical equipment. A list of equipment necessary to be newly obtained is in Table 10-5.

**c. Contaminated Soil and Mineral Resources**

It is necessary to make sure that for all the development activities subject to the EIA process, the developers carry out soil survey and the results are reported to the BCE. This enables the BCE to integrate soil data on the GIS and to play as a soil quality information centre in future.

The soil analysis capacity of the BCE in terms of equipment, consumables and techniques (i.e. reliability of methodology) must be expanded so that it can be meet a request for soil analysis. The capacity expansion should well follow the increase in demand for analysis.

The control and monitoring of illegal or inappropriate mining, the responsible staff must be able to make field visits frequently enough. Vehicles, although shared with other staff, should be available to them.

**d. Fauna and Flora Protection and Conservation Areas Management**

Important fauna resources of the study area are found along the coast and on islands. The BCE needs to own new equipment as shown in Table 10-5 to understand and protect them.

As stated in the M/P for flora protection, it is proposed that the BCE should look at not individual trees but city greenery as a whole by communicating with other state bodies which actually implement city greenery development. The BCE should secure such position.

National parks, nature reserves and natural monuments should be controlled by certain state organisations, as stated elsewhere, and the BCE should monitor their conservation practices including the formulation of conservation plans. The BCE itself is responsible for the sanctuaries: conservation of the Absheron sanctuary will be enhanced by the Absheron sanctuary development plan (see Section 10.4) and experience from this plan should be reflected in the conservation of the Gil island sanctuary in future.

**e. Food Environment Control**

Equipment for food analysis is required as shown in Table 10-5.

**f. Chemical Analysis (Laboratory)**

The laboratory is the base of monitoring but is in a seriously poor condition at present. Its reinforcement is vital for the BCE and for the Baku environment. It lacks fundamental equipment that is to be commonly used for different purposes. It is listed in Table 10-5.

Table 10-5: Improvement Plan and Facilities and Equipment Plan for the Priority Project

	Targets of Priority Project	Improvement Plan	Facilities and Equipment Plan
1. Air protection	1. Factories are systematically controlled with evidence (environmental passport).	<ul style="list-style-type: none"> <li>to receive environmental passports.</li> <li>to update the GIS database of environmental passports.</li> </ul>	A. Emission gas analysis 1. Pitot tube 2. Inclined tube manometer 3. Thermocouple thermometer 4. Orsat gas analyser 5. pH meter 6. Vacuum pump 7. Gas meter 8. Nitrogen oxides analyser 9. Carbon monoxide analyser 10. Sulphur oxides analyser 11. Dust sampler, etc. B. Monitoring station for vehicle exhausts 1. Cabinet 2. Balance with upper plate 3. Vacuum pump 4. Nitrogen oxides analyser 5. Dust sampler 6. Hydrocarbon analyser 7. Carbon monoxide analyser 8. Diesel generator, etc.
	2. Law is enforced to likely polluting factories.	<ul style="list-style-type: none"> <li>to introduce stack emission samplers.</li> </ul>	
	3. The BCE obtains data of air quality influenced by vehicle exhausts.	<ul style="list-style-type: none"> <li>to establish a monitoring station to monitor the influence of vehicle exhausts.</li> </ul>	
	4. The BCE understands the level of air quality in Baku.	<ul style="list-style-type: none"> <li>to develop a system to receive data from Hydromet.</li> <li>to update the GIS database of air quality.</li> </ul>	
2. Water resources protection	1. Factories and WWTPs are systematically controlled with evidence (environmental passports and others).	<ul style="list-style-type: none"> <li>to receive environmental passports.</li> <li>to update the GIS database of environmental passports.</li> </ul>	A. Newly introduced equipment 1. Water sampler 2. Sediment sampler 3. Glassware 4. pH meter 5. Chemical oxygen demand meter 6. Water velocity meter
	2. Law is enforced to likely polluting factories and WWTPs.	<ul style="list-style-type: none"> <li>to analyse suspected wastewater with existing equipment.</li> <li>to introduce new equipment for analysis of certain items.</li> </ul>	

		Targets of Priority Project	Improvement Plan	Facilities and Equipment Plan
		3. The safety of the Jeiranbatan reservoir as a water source is ensured.	<ul style="list-style-type: none"> <li>to monitor water quality of the reservoir, nearby wastewater ponds and interceptor canals.</li> </ul>	7. DO meter 8. Others for common use (see below)
		4. The BCE understands the level of water quality in Baku.	<ul style="list-style-type: none"> <li>to develop a system to receive data from Hydromet.</li> <li>to update the GIS database of air quality.</li> </ul>	
3. Contaminated soil and mineral resources		1. The understanding of the BCE about soil quality is increased.	<ul style="list-style-type: none"> <li>to receive soil data obtained by developers during the EIA process.</li> <li>To enter the soil data into the GIS.</li> </ul>	1. Equipment for common use (see below). 2. Vehicle (shared in the BCE).
		2. The work efficiency of the BCE staff in charge of mineral resources control is improved.	<ul style="list-style-type: none"> <li>to increase the mobility of the BCE staff.</li> </ul>	
4. Fauna and flora protection and conservation areas management	Fauna	1. Fauna registration work is strengthened.	<ul style="list-style-type: none"> <li>to introduce new equipment.</li> </ul>	1. Motor boat 2. Trailer to tow the boat 3. Others (radio telephones, cameras, etc.)
	Flora	1. The BCE understands the current situation of city greenery.	<ul style="list-style-type: none"> <li>to review the city greenery data in the GIS.</li> </ul>	
	Cons. Areas Manag.	1. The basis for monitoring is developed.	<ul style="list-style-type: none"> <li>to formulate a conservation plan for each conservation area.</li> </ul>	
5. Food environment control		1. The BCE understands the current food environment in Baku.	<ul style="list-style-type: none"> <li>to develop knowledge base about food contamination.</li> </ul>	1. Radio nuclides analyser 2. Multipurpose radiometer 3. Others for common use (see below)
		2. The basis for food analysis is established.	<ul style="list-style-type: none"> <li>to develop a food sampling procedure.</li> <li>to install new equipment.</li> </ul>	
6. Chemical analysis (Laboratory)				1. Chemical balance 2. Balance with upper plate 3. Vibrator for 8 funnel 4. Water bath 5. Sand bath



	Targets of Priority Project	Improvement Plan	Facilities and Equipment Plan
			<ol style="list-style-type: none"><li>6. Hot plate</li><li>7. Incubator</li><li>8. pH meter</li><li>9. Optical microscope</li><li>10. Auto-still for distilled water</li><li>11. Electric furnace</li><li>12. Low temperature dryer</li><li>13. Pt crucible and scissors</li><li>14. Ultra sound wave washer</li><li>15. Still for cyan analysis</li><li>16. Soxley type extractor</li><li>17. Refrigerator for sample conservation</li><li>18. Vacuum pump</li><li>19. Liquid chromatograph</li><li>20. Calorimeter</li><li>21. Diesel generator, etc.</li></ol>

## 10.4 Development of Nature Conservation System

### 10.4.1 Background

The nature conservation work by the BCE is limited to the minimum control of human intrusion to the nature resources (e.g. hunting control by issuing licences). As repeatedly stressed in this report, environmental awareness raising among the general public is one of the essential elements for environmental improvement of Baku City. The BCE's nature conservation work will, therefore, also have to pay much attention to the encouragement of close relationships between humans and the nature.

The team understand, however, that because of the severe natural conditions in Baku, the city dwellers have little opportunities to enjoy nature value. This may cause a lack of appreciation of the environment among the public and may hamper the future environmental improvement.

The Absheron sanctuary, where a number of migratory birds enjoy its wetlands, is the unique place in such Baku. The sanctuary, if installed with necessary facilities, can become a precious site for the citizens to experience and learn the nature.

Therefore the JICA team recognised the importance of the Absheron sanctuary development and proposed a sanctuary park development plan. The wider population is expected to visit the sanctuary to come in touch with wild nature and to nourish their interests in the environment. The team expects that Absheron sanctuary development will be a model to be followed by the BCE in coming years to enhance its nature conservation work in other areas in Baku City.

### 10.4.2 Absheron Sanctuary Development Plan

#### a. The Site

The Absheron sanctuary, located at the east end of the Absheron peninsula, was established in July 1969. According to the BCE, the total area is 815 ha, including 364 ha of littoral area (500 m wide off the sea shore), 152 ha of salty area, 95ha of reed-beds and 190 ha of lands with rich soil and groundwater supply, but because of the Caspian sea level fluctuation, the recent land area is reduced to be 300 ha based on a satellite picture taken in May 2000 (shown in Figure 10-3).

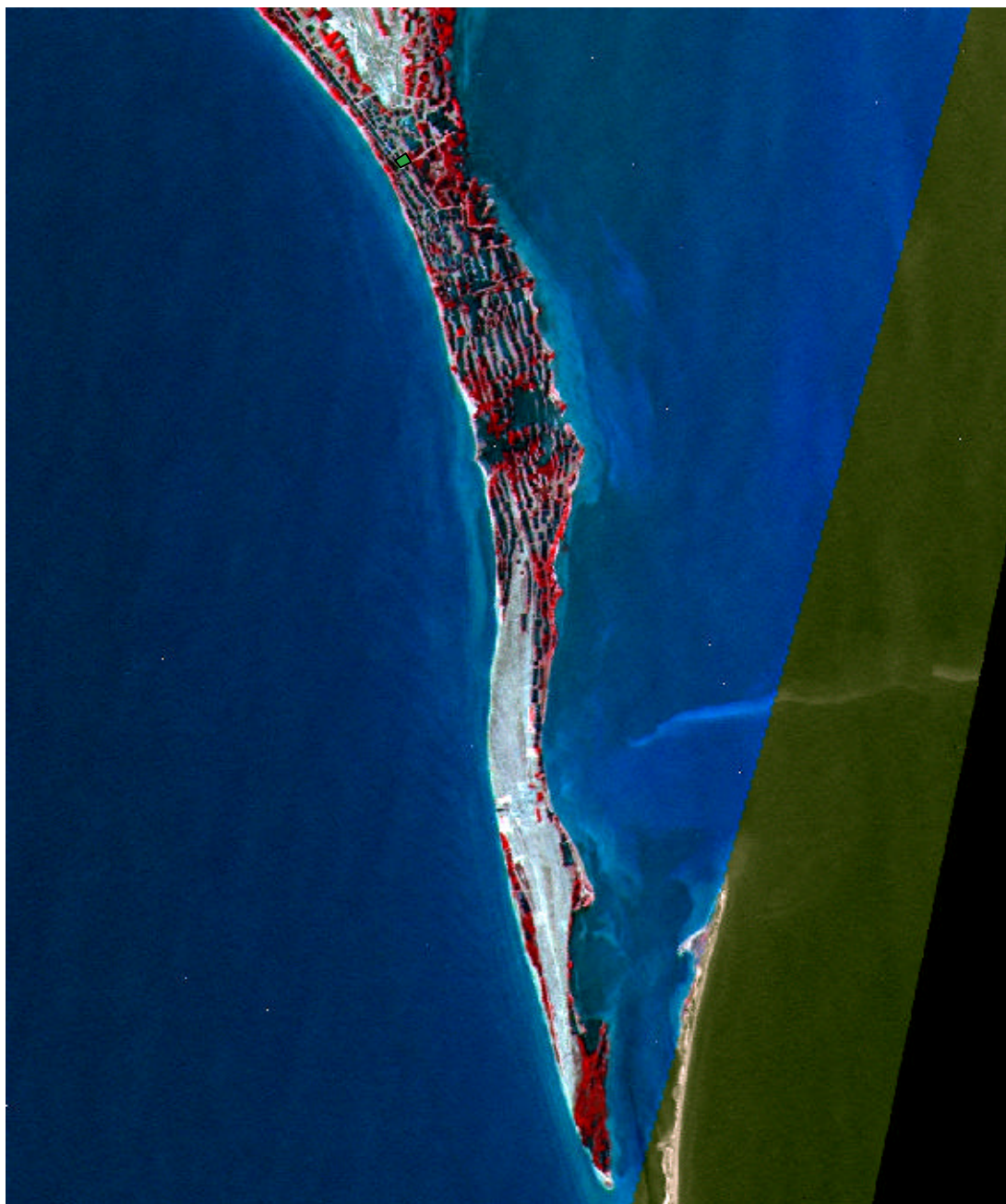


Figure 10-3: Satellite Image of Absheron Sanctuary

(See also Plate 8)

A number of long and narrow ponds can be seen in a northern half of the sanctuary. According to the BCE staff, those are the artificially excavated fields where watermelons were planted before. Due to the fluctuation of the water level of Caspian Sea, the salinity in water increased and cultivation was ceased. Based on the analysis of this satellite image, current land use was mapped as in Figure 10-4 and summarised as below.

Table 10-6: Current Land Use

Land Use Title	Area (ha)
Vegetation	80
Bare land (desert)	152
Water	66
Road	2
Total	300

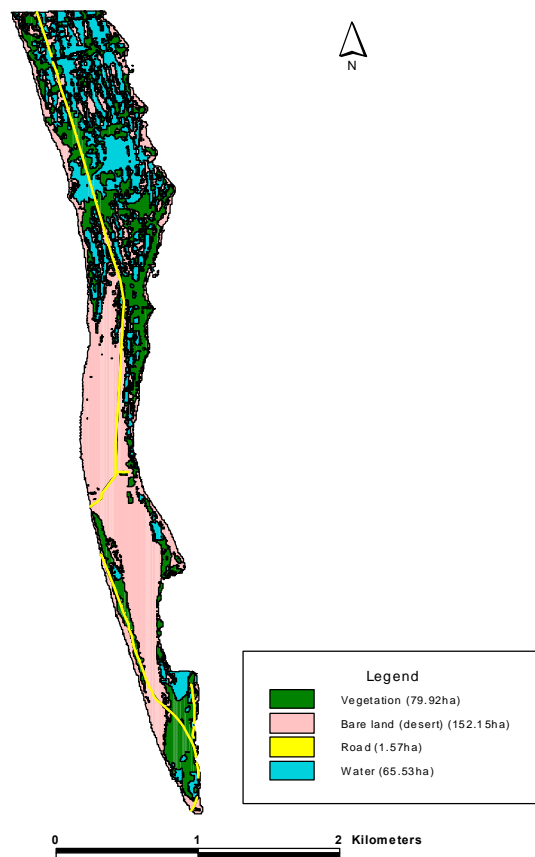


Figure 10-4: Current Land Use

Species of fauna protected in this area are a number of migratory and wintering waterfowl and other mammals including jackals, foxes, Caspian seals, seagulls, mute swans, coots, flamingos, and peacocks.

**b. Basic Policies of Park Development**

The team developed a park development plan which is based on the following basic policies.

- The safety of the visitors must be secured.
- The natural conditions in the sanctuary should be maintained as far as possible.
- Educational value should be maximised.

**c. Facilities**

At present there are merely no facility to receive visitors on the site. The only facility is a lodge for the BCE guards but it is in a badly poor condition.

The team planned to develop an area of about 0.5 ha in the sanctuary to locate main facilities. A nature trail starts and ends this area, and the visitors are allowed to enter only this area (to be referred to as “the sanctuary park” shown in Figure 10-5) and the trail.

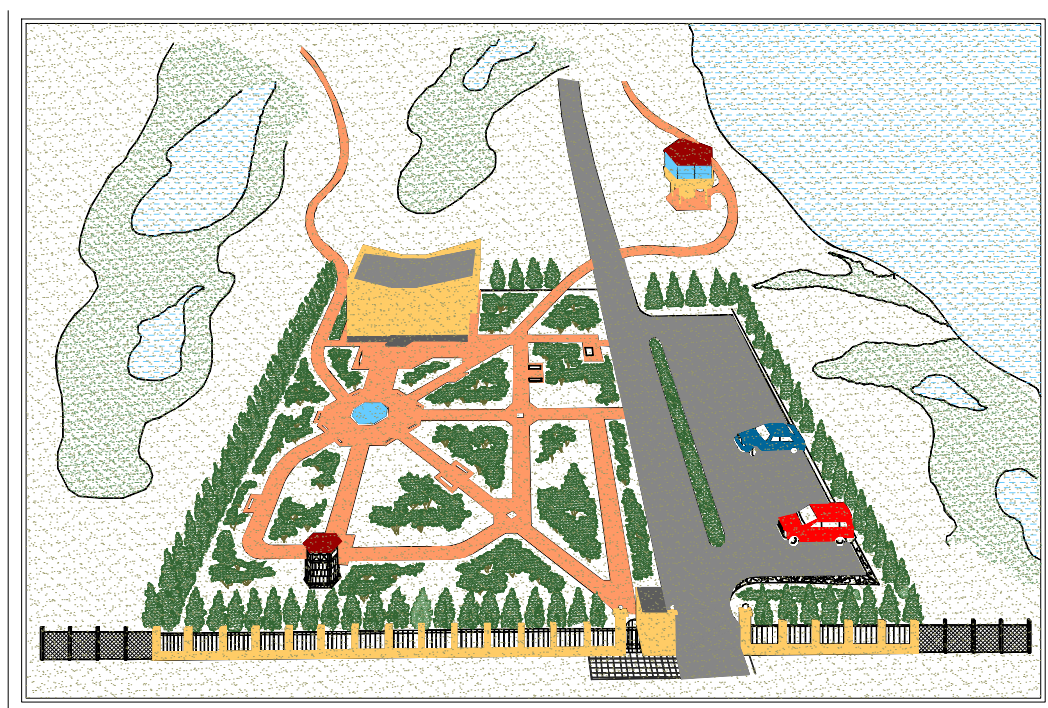


Figure 10-5: Perspective View of Sanctuary Park

In the sanctuary park, the following facilities are to be developed. It should be noted that all facilities should have appearance that fits the landscape of the sanctuary.

**c.1 Fence, Entry Gate and Guard Post**

A fence is installed on the west boundary of the sanctuary. At the entrance there are a guard post and a gate with a clear and attractive sign of the park and an information board. The information board should present the following information together with the illustration of the sanctuary layout:

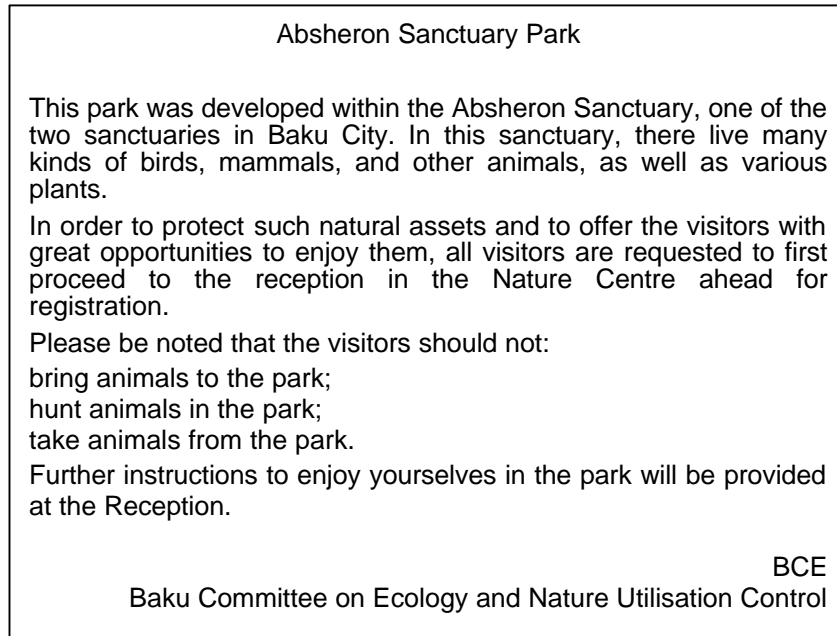


Figure 10-6: Example of Information Board

### **c.2 Parking Area**

The parking area for 15 vehicles is located near the gate.

### **c.3 Nature Centre**

A nature centre will be a two-storied building with the total floor area of 400 m<sup>2</sup> for the purposes of environmental education and park management. The proposed design is in Figure 10-7.

The first floor is a management space. There are:

- a reception and inquiry counter where sits a nature guide(s) who registers the visitors, receives questions and other inquiries, instructs the visitors “dos and don’ts”, distributes booklets/leaflets, gives first aid, lends binoculars in exchange of ID cards, etc.;
- an office room where the BCE staff, nature guides and other relevant park staff work;
- a dining kitchen and a bedroom for the guards.

The second floor is an educational space. There are:

- panels presenting information on:
  - history of the sanctuary and the park;
  - maps showing the sanctuary as a whole, park layout, vegetation, and which animal species are likely found where and when;
  - description of ecological characters and photos of animals and plants that can be found in the sanctuary and the park.

Section 6.3 of the Supporting Report will be of great help to prepare such materials. The visitors will also be able to participate information presentation,

for example, by writing a message about what they found where and when for the next visitors. Questions from the visitors and answers by the nature guides will be also presented.

- materials to explain the sanctuary ecology (specimens of feathers, models of bird nests, pictures, reference books);
- a lecture room.

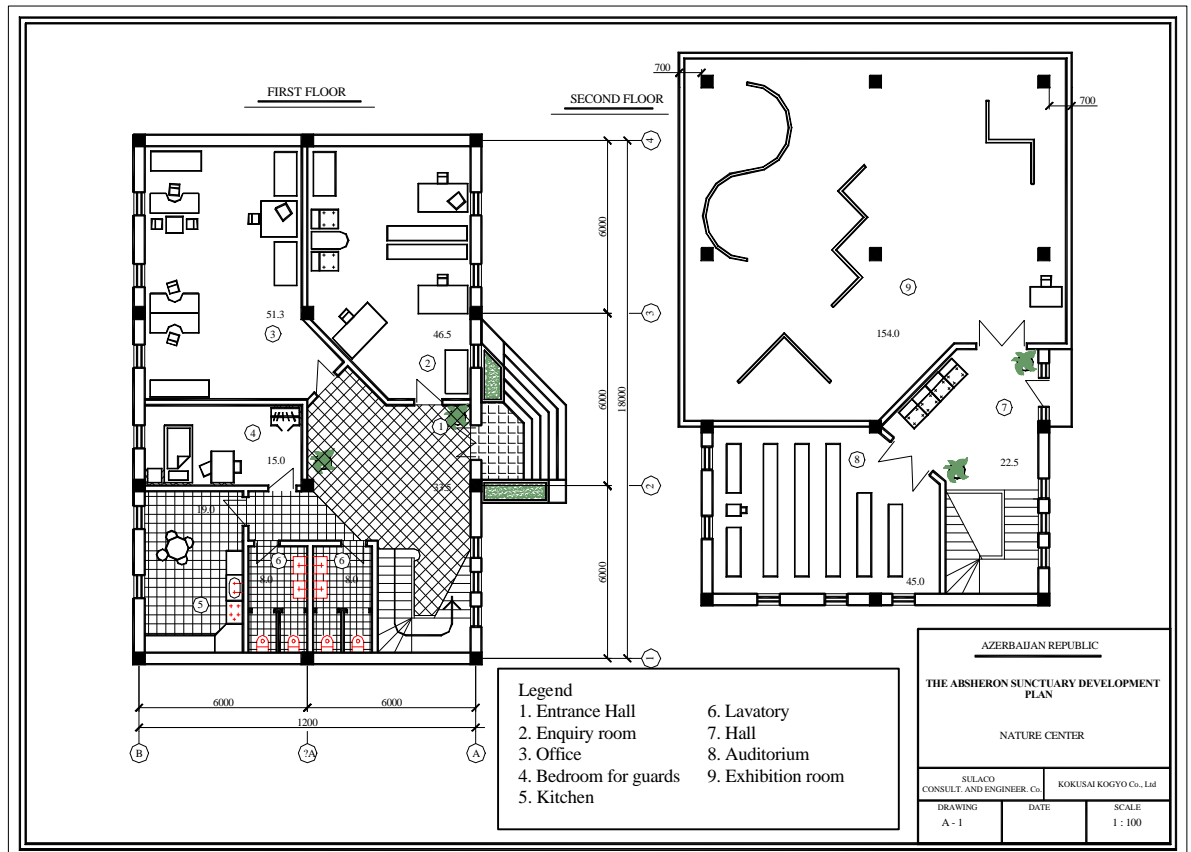


Figure 10-7: Proposed Design of Nature Centre

#### c.4 Observation houses

The observation houses are the place where the visitors enjoy bird watching and become familiar to the nature world. Three of them are located along the nature trail near the water body and have observation rooms with a wide view of waterfront. See Figure 10-8 and Figure 10-11.

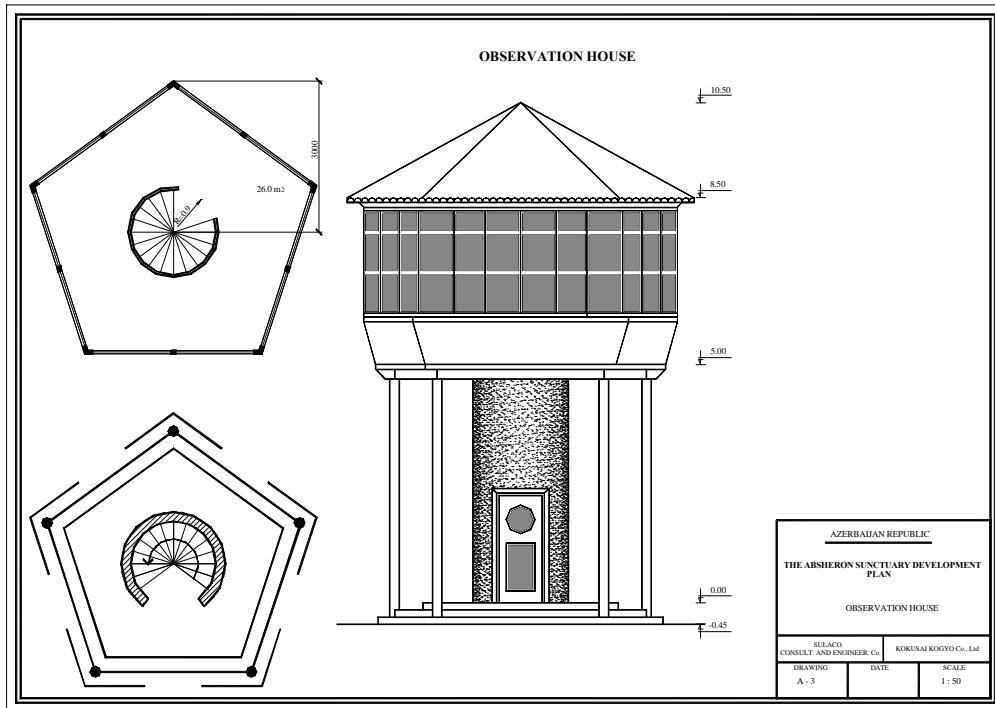


Figure 10-8: Observation House

### c.5 Nature Trail (Footpath)

Footpath with total length of about 4 km is arranged in the park. The path allows visitors to see different features of the area (sand dune, wetland, reed bed, and sea). It is in principle to be paved with stone, but is partly provided with flyovers if the land is vulnerable to inundation. See Figure 10-11.

### c.6 Signboards

Along the footpath, signboards should be placed with 100m to 200m intervals. They have to be made of tolerable material and well visible. The expression of information on the signboards should be simple and easy for children.

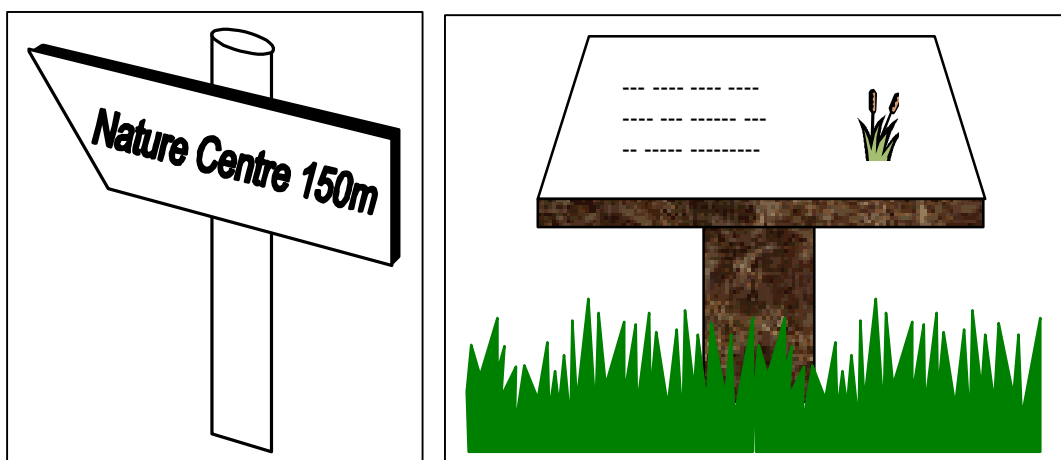


Figure 10-9: Example of Signboards



The signboards will provide the visitors with following information.

- park map and the location of the signboard;
- direction;
- distance to the observation houses and/or the Nature Centre;
- species likely found at the point;
- ecological characters at the point;
- cautions (eg “watch your step”, “do not enter”, “do not litter”, etc.).

### c.7 Open Space and Benches

An open space with benches is located beside the Nature Centre. Benches will be also placed along the nature trail.

### d. Layout

Figure 10-10 shows a layout plan of sanctuary park facilities and Figure 10-11 shows a layout of footpath and observation houses.

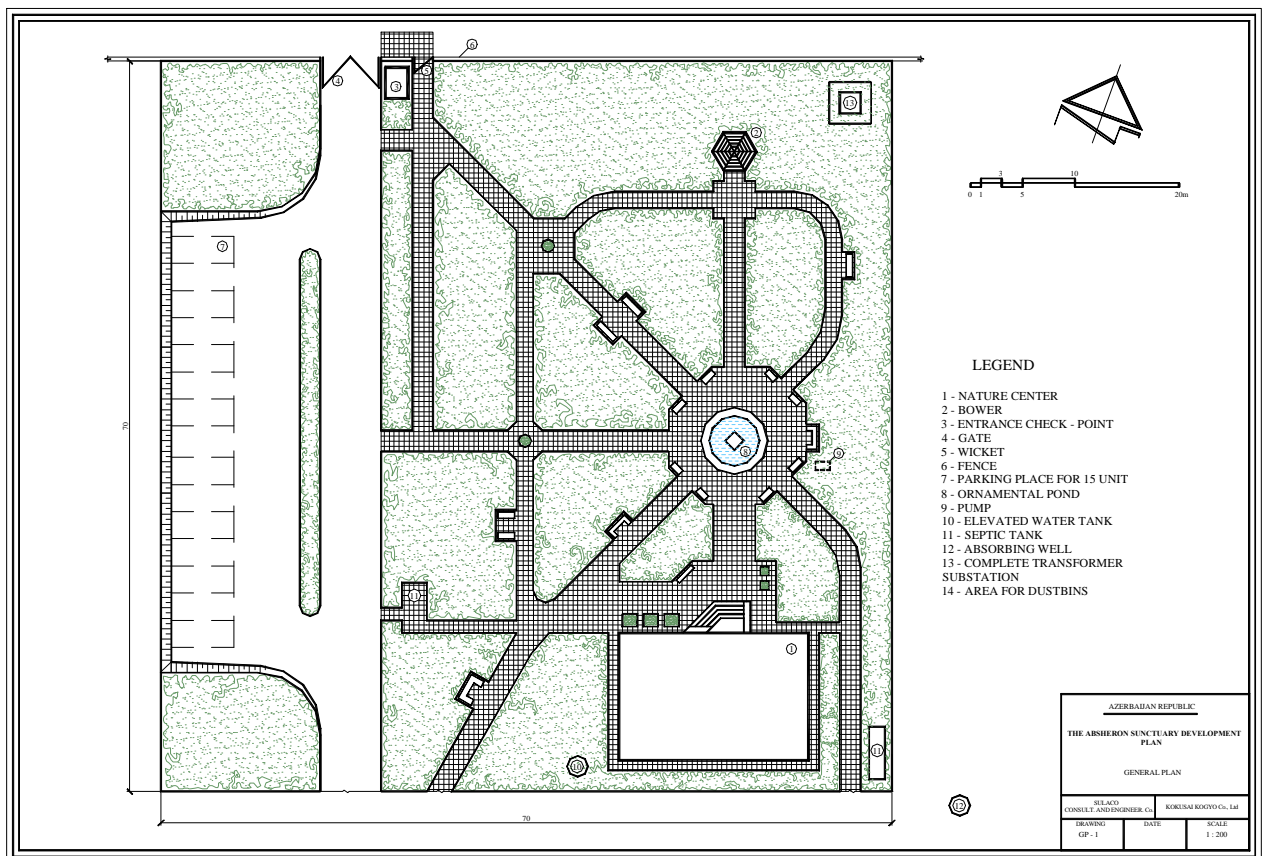


Figure 10-10: Layout Plan of Absheron Sanctuary

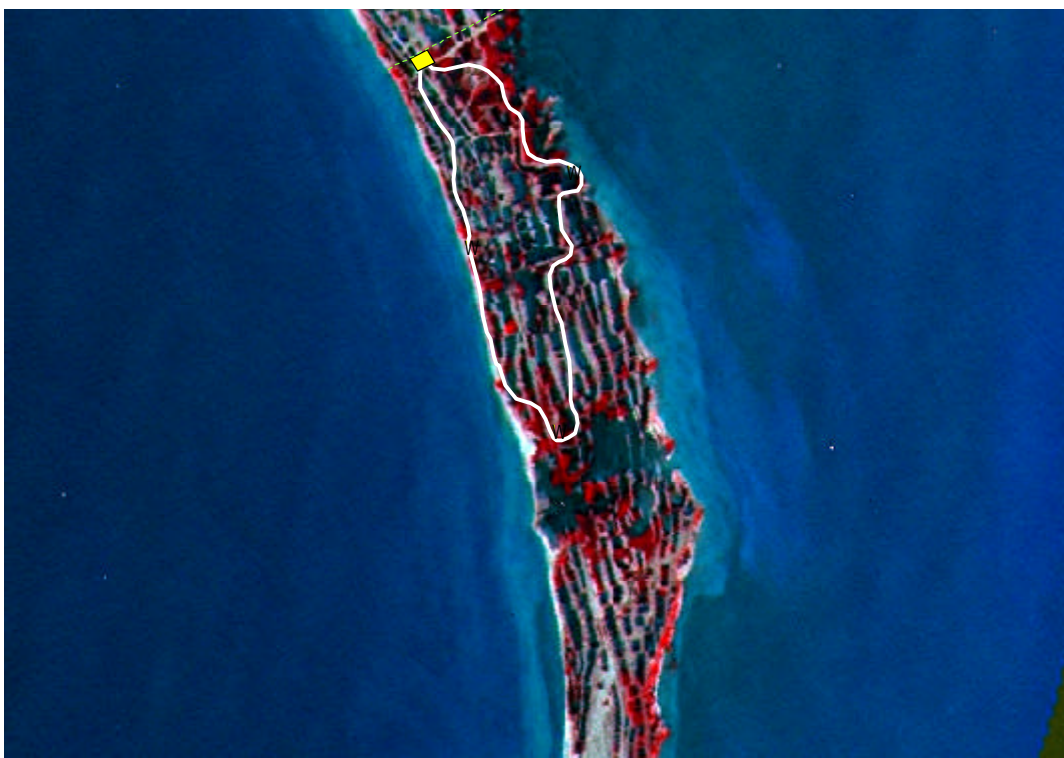


Figure 10-11: Layout Plan of Footpath and Observation Houses

### 10.4.3 Operation

#### a. Opening Seasons and Hours

When to open the park to the public will by and large depends on how many visitors will be and how many park staff are available. In the early stage after the park is developed, the park may open only limited time, and the more widely it is known to the public, the longer it will open.

#### b. Operational Body

The BCE bears the responsibility to operate the park, but it may entrust actual operational works to private bodies including NGOs on a contract basis.

#### c. Personnel Management

One BCE staff will look over the overall management of the park, and three BCE staff work as guard. External human resources should be utilised as:

- nature guide(s) --- at least one every opening day, who will instruct the visitors how they can enjoy themselves in the park, what is likely found and where, and answer questions from the visitors, (in phase 3, a guide will be employed by the BCE);
- extra nature guides --- who will work when an occasional event is planned;
- technicians to maintain the park facilities (In phase 3, a technician will be employed by the BCE).

#### d. Educational Activities

In general, education at a nature park will be in two types: self-guiding and guided. In the former, the visitors are supposed to learn nature by themselves with a help of presented materials; in the latter, they are guided by a nature guide and listen to his/her explanation. In the earlier stages, the main education type at the Absheron Sanctuary park will be the self-guiding one because the guided type requires an input of experienced guides.

The self-guiding type, however, needs thorough preparation of educational materials (signboards, panels, leaflets, etc.). They have to be well organised, interesting and easy to understand even for school children. They should be reviewed and partly replaced every a few months (probably by season) to provide timely information and for the benefit of repeated visitors. Results of species registration works by the BCE, with cooperation of Academy of Sciences and other organisations, should be reflected to the materials.

The preparation of educational materials will be a good exercise for the prospective nature guides who will, after obtaining enough experience and knowledge about the park, provide the visitors with services such as guided tours, lectures and instructions.

#### e. Publicity

The opening of the park has to be widely and repeatedly publicised. Schools will be the main target of publicity. The BCE may need to organise a park visit tour after the park is opened.

### 10.4.4 Maintenance

For the enjoyment and safety of the visitors and the protection of ecological values, the park facilities should be properly maintained. The visitors are encouraged to bring back their waste with them and not to dispose waste in the park.

The table below presents a proposed maintenance plan.

Table 10-7: Park Maintenance - Items and Frequency

	Facilities	Check Items	Frequency
1.	Fence	Breakages and collapses	Twice a year
2.	Entry gate	Breakages and collapses	Yearly
3.	Nature centre	Utilities, safety, convenience	Twice a year
4.	Observation houses	Collapses, water facility	Twice a year
5.	Nature trail	Collapses, safety, convenience	Monthly
6.	Signboards, information boards at the gate	Collapses, fade of colour, visibility	Yearly
7.	Benches	Collapses	Monthly
8.	Park as a whole	Cleanness	Every day

## 10.5 Development of Illegal Dump Control System

### 10.5.1 Background

According to the BCE inspectors, there are as many as 850 illegal waste dumps in Baku city. They may cause environmental and health risks and, at the same time, they have spoiled the dignity and beauty of the city.

The team executed a public awareness campaign and illegal dump cleanup as a pilot project in order to examine possible measures to eliminate illegal dumps and provide the BCE/SCE staff experiences to organise such activities.

The following is findings of the pilot project:

- most people in Baku feel that the city is dirty. The main reason is the existence of a large number of illegal dumps.
- it is costly to execute illegal dump cleanup and the first priority should be put on the prevention of further new illegal dumps from now on.
- it is essential to seek for public participation to eliminate illegal dumps.

Based on the findings above, the team developed a improvement plan as a priority project of the study as follows.

### 10.5.2 Target

A long term target for 2010 was set at the cleanup of 50% of illegal dumps (see Chapter 6). It will require a large amount of finance, and should be implemented in a step-by-step manner. The following is the target set for the priority project to be put into effect in a short term up to 2003.

- The BCE/SCE will work out a plan in order to prevent further illegal dumps and they will encourage, supervise and support the BEP and District EPs which are responsible for managing municipal solid waste.

### 10.5.3 Improvement Plan

The team and the C/P observed a number of illegal dumps in the city and recognized that most of illegal dumps can be categorised into three:

- 1) large dumps where mainly construction waste and other bulky waste (e.g. steel pipes, cars, etc.) were tipped;
- 2) small dumps of domestic waste and construction wastes beside waste collection containers for the residents due to their improper approach to waste disposal;
- 3) other small dumps due to insufficient waste collection services.

In order to develop the improvement plan, the team considered large dumps and small ones separately.

#### a. Large Dumps

It was found in the pilot project that cleanup of this type of illegal dumps costs significantly. Although the current financial conditions of the relevant authorities

cannot bear such expenditure, budget for cleanup must be secured in a middle and long term.

For the moment it is more practical and cost-effective to pay more attention to the prevention of further illegal dumps rather than to cleanup of existing ones. Prevention saves cost that would be otherwise imposed additionally on the authorities.. Following were the counter measures to prevent this type of illegal dumps.

- Stringent penalties for illegal dumps
- Most wastes at large dumps are those which were generated from business operations, particularly construction. The main reason why illegal tipping takes place is that it is economical to do so than to dispose of wastes legally. Waste generators and/or waste transport contractors try to find out places nearby to dispose of wastes so that they can save the cost for disposal and transportation to the authorised disposal site. The fines for illegal dumps, therefore, should be raised to give an economic incentive to observe the law and to make it unfeasible to take a risk of illegal dumping.
- Public participation for illegal dump surveillance

However high the fine is, illegal dumping must be first detected and it is necessary to establish a surveillance system. The BEP and District EPs have to establish an inspection department to inspect and monitor the illegal dumps together with the BCE/SCE. Surveillance activities by those bodies, however, can not be large enough to cover the entire city. The general public should be involved to make the surveillance system effectively work.

For this purpose, the BEP and District EPs need to organize public campaigns and keep on asking them to cooperate in surveillance and report to the relevant authorities when they found illegal dumpers. Furthermore, legislation should be strengthened and enforced so that the penalties can be imposed rapidly. It may be required to introduce incentives for the public to increase their attention to illegal dumps and to be mobilised as part of the surveillance system.

- Establishment of the database

An appropriate database is essential in planning, design and implementation of the development of the illegal dump control system. The BCE inspectors states that 800 or 850 illegal dumps exist in Baku, but there is no firm ground for this statement: where and how serious each of them is, how large the volume of wastes is in each and in total, or whether the number is increasing is unknown.

Therefore, information on the illegal dumps in the city must be integrated and organised on a database. This will be the entry point for practical planning whereby priority sites for cleanup are examined, necessary cost is estimated, and the cleanup progress is controlled. It is recommended to establish such database on the GIS which can show attribute information of each dump (eg size, type of waste, etc) on a city map.

The following is the diagram showing the relation among the BCE/SCE, the BEP/District EPs and the general public in the illegal dump control system.

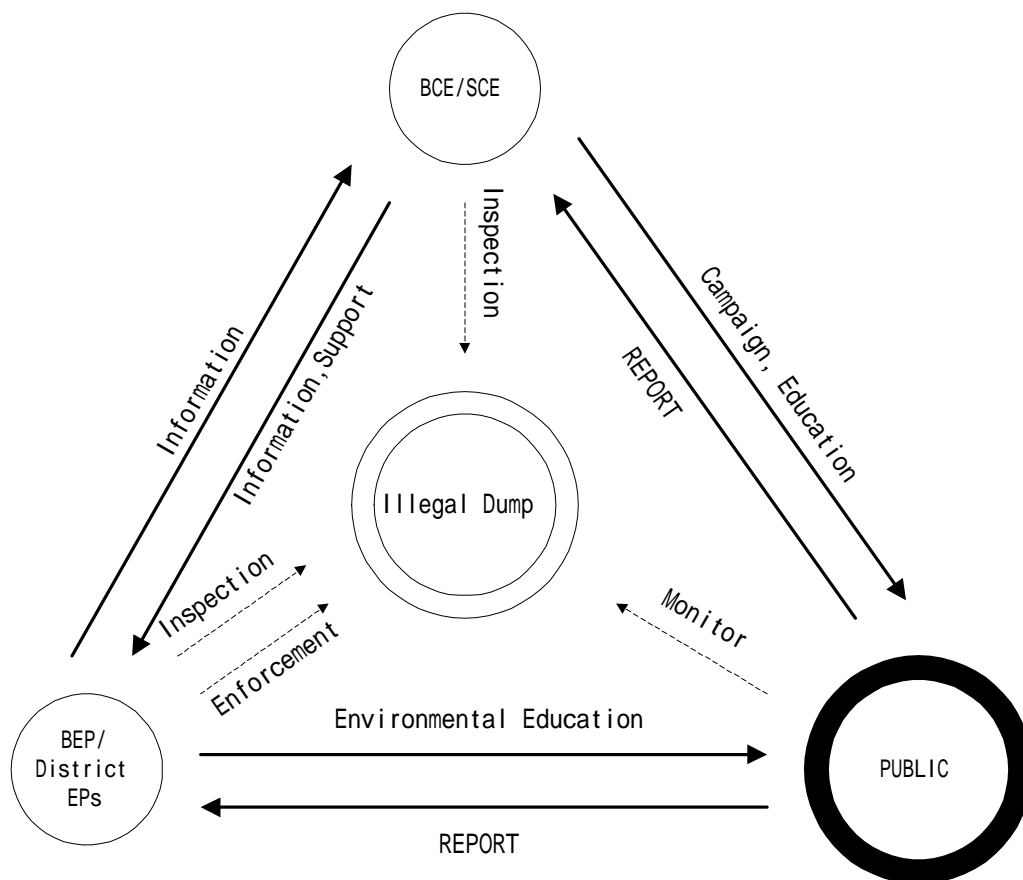


Figure 10-12: Schematic Illegal Dump Control System

### b. Small Dumps

This type of illegal dumps can be separated into two. One is small dumps generated due to insufficient waste collection services. They can be seen beside the waste containers, refuse chutes or other collection points where too much waste is littered because of the irregular and insufficient waste collection services. The other can be seen beside the waste containers because of an improper waste disposal instead practices of the residents instead of the sufficient waste collection services.

Because solving the former requires the improvement of collection services, and is a not a simple question of illegal dumping, the team will discuss about the latter here.

- Environmental education

The collaboration of the general public is essential for the successful attainment of the objectives of the solid waste management service. Collaboration is best obtained by convincing the public that their cooperation is the key to the successful conduct of the service and, furthermore, that the good service in return brings benefit to them by improving the sanitary living environment. One of the most effective means of securing such a conviction is education<sup>6</sup>.

<sup>6</sup> Furedy, C and M.S. Shivakumar, "Reforming Solid Waste Management Practices of Concerned Citizens"

It must be highlighted in environmental education that the general public can enjoy many benefits through proper solid waste management; poor sanitary condition attracts and breeds flies, rats and other vermin that could transfer diseases; and they are not simple service recipients but players in the waste management system as waste generators. It must be also emphasised that inadequate public cooperation will pose additional work loads to waste collection service providers, either public or private, and end up with increased waste collection fee.

- Cleanup campaign

On top of environmental education carried out at school, informal education such as a cleanup campaign will be effective in order to raise public motivation towards clean city. The BCE and the team carried out a “one-shot” campaign during the study, but such propagation must be iterative making the best use of experience and the materials prepared by the team.

- Public meetings

The BCE and the study team organized the public meetings and visit tours as a pilot project. Such activities should be iterative to diffuse messages to the wide population. The BEP and District EPs should organize these in cooperation with the BCE/SCE. Less than 10 percents of the participants were female at the meetings and the tour during the project and this percentage should be increased in future because they are the persons who daily deal with wastes.

- Collaboration of NGO

There is an international organization “ISAR (Initiative for Social Action and Renewal in Eurasia)” in Azerbaijan and it has supported more than 200 NGOs which are active here. This organization started operation in December 1995 and monthly meetings have been held with environmental NGOs. In order to obtain collaboration of the public, involving the NGOs in campaign activities can be effective and ISAR would be a contact point where the BCE and the NGOs could develop cooperative relationship. In fact some of the NGOs expressed their concern about future participation in such activities.

#### **10.5.4 Facilities and Equipment Plan**

The development of the illegal dump control system does not require large investment because the majority of the works are what is supposed to be done during daily works. Furthermore, the BCE/SCE are the authorities that merely control and supervise the BEP and District EPs who are obliged to tackle the waste problems.

Facilities and equipment which are required for the BCE/SCE are as follows. Those are the supplemental facilities and equipment used to encourage, supervise and support the BEP and District EPs to eliminate further illegal dumps.

- Campaign tools
- Vehicles for surveillance
- Personal computers for database establishment
- Educational tools

## **10.6 Development of Supervision and Support System for M/P Formulation of MSWM and Waste Recycling**

### **10.6.1 Important Issues for MSWM M/P and Waste Recycling**

The formulation of a MSWM (municipal solid waste management) M/P rests with the BEP and district EPs. However, as proposed in the Environmental Management M/P, the BCE/SCE shall encourage, supervise and support them in the smooth formulation and implementation of the MSWM M/P.

The team considers that the following five issues must be taken into account for MSWM M/P formulation:

- because of severe financial restrictions, the improvement of MSWM must be a phased process;
- the main focus of the short- and middle-term improvement must be on (i) the provision of a sufficient waste collection service throughout the city, (ii) the prevention of city environment degradation due to illegal waste dumps, and (iii) the execution of sanitary disposal of all collected waste;
- meanwhile, there is a strong need to re-establish waste recycling systems (which hardly function after the collapse of the FSU), particularly those for used paper and steel scrap;
- the introduction of intermediate treatment technology for municipal solid waste such as incineration and composting should be carefully examined from a long-term viewpoint. The introduction of treatment facilities for toxic waste and medical waste must be a priority;
- to enable and support the privatisation of MSWM, it will be necessary to develop legislation to promote, supervise and control the private sector, and to strengthen the governmental institution and financial base.

### **10.6.2 Outlines of Recommended MSWM M/P**

In order for the BCE/SCE to encourage, supervise and support the BEP and district EPs in the smooth formulation and implementation of the MSWM M/P, the team outlines a recommended approach for the MSWM M/P below.

#### **a. Scope of the Study**

The MSWM M/P study will be formulated by foreign and/or local consultants in collaboration with the BEP and district EPs. The scope of the work for the consultant is described below.

##### **a.1 Objectives of the Study**

The objectives of the study are to:

- formulate a master plan (M/P) to improve MSWM by 2010 for Baku city;
- conduct a feasibility study (F/S) on the priority project(s) to be selected from the M/P.



## a.2 Study Area

The study covers the entire area of the Greater Baku consisting of the 11 districts.

## a.3 Solid Waste to be Covered

The types of wastes covered by the MSWM M/P are household waste, market waste, commercial waste (restaurants, hotels, and others), institutional waste, general waste from medical institutions and street sweeping waste.

## a.4 Study Period

The study will require one year.

## b. Identification of Present MSWM

For the identification of present MSWM, the consultants will carry out a study on a technical system (MSW generation, collection, transportation, final disposal, etc.) as well as institutional system (organisation, legislation, finance, etc.). Some of the important issues for the identification of present MSWM were studied by the JICA team and presented below for the reference to the consultants.

### b.1 Population

The population of the Baku city, the study area, was identified by the Study and 2.052 million in 2000.

### b.2 MSW Discharge Rate and Amount

The MSW discharge rate and amount were surveyed and identified by the WACS (Waste Amount Composition Survey) by the team as shown in the tables below. However the team recommends the consultant to carry out the WACS at least once more to understand a seasonal fluctuation and confirm or modify these figures.

#### b.2.1 MSW Discharge Rate

The MSW discharge rates obtained by the WACS are shown in the table below.

Table 10-8: MSW Discharge Rate

Category	Unit	In 2000
Household	g/person/day	233
Restaurant	g/table/day	1,770
Other Shops	g/shop/day	540
Institution	g/Institution	540
Market	g/stall/day	1,110
Street Sweeping	g/km/day	70,600

The MSW discharge rate of households in Baku and those obtained from other JICA SWM studies are shown in the following table. The average household waste discharge rate in Baku is quite lower than in other economically comparable countries: 233 g/person/day (weighted average by population in accordance with the income level).

Table 10-9: Comparison of Waste Generation and Discharge

Items		Population	Study Year	GNP per Capita in 1997	Generation Rate of Household Waste	Discharge Rate of Household Waste*1	Generation Rate of MSW	Discharge (Collection) Rate of MSW
Country/City	Unit	Person	Year	US\$/Year	g/person/day	g/person/day	g/person/day	g/person/day
*5 Malaysia	Penang	559,300	1989	4,680	N/A	504	N/A	726
*6 Laos	Vientiane	142,700	1991	400	753	653	970	105
*7 Poland	Poznan	590,500	1992	3,590	N/A	654 (470, 913)*2	N/A	721
	Lublin	352,500	1992	3,590	N/A	399 (336, 542)*2	N/A	501
*8 Paraguay	Asuncion	510,500	1994	2,010	961	883	1,312	834
	F.Mora	99,201	1994	2,010	961	883	1,098	454
*9 Philippines	Quezon	1,989,400	1997	1,220	423	388	565	508
*10 Tanzania	Dar es Salaam	2,030,000	1996	210	698	321*3	873	70 (141)*4
*11 Honduras	Tegucigalpa	848,859	1998	580	375	352*3	566	341
Turkey	Adana	1,196,620	1999	3,130	498	473*3	696	671
	Mersin	634,850	1998	3,130	473	439*3	703	669

Notes MSW : Municipal Solid Waste

\*1: The discharge rate is the number of households receiving collection services.

\*2: The figures in parentheses are discharge rates of Central Heat Supply household and Non-heat Supply household respectively.

\*3: The discharge rate is all the households including non-collection service area.

\*4: The figure in parenthesis is the rate including the collection service done by informal sector which does not transport the waste collected to the municipal landfill but results illegal dumping.

Sources :

\*5: Solid Waste Management Study for Pulau Pinang and Seberang Perai Municipality, Final Report, August, 1989

\*6: The Study on the Solid Waste Management System Improvement Project in Vientiane, Lao People's Democratic Republic, Final Report, August 1992

\*7: The Study on the Solid Waste Management for Poznan City, the Republic of Poland, Final Report, May 1993

\*8: The Study on the Solid Waste Management for the Metropolitan Area of Asuncion in the Republic of Paraguay, Final Report, August 1994

\*9: The Study on Solid Waste Management for Metro Manila in the Republic of the Philippines, March 1998

\*10: The Study on the Solid Waste Management for Dar es Salaam City, Final Report, September 1997

\*11: The Study on Solid Waste Management of the urban area of Tegucigalpa's Central District in the Republic of Honduras, Final Report, March 1999

## b.2.2 MSW Discharge Amount

Based on the MSW discharge rate the MSW discharge amount is calculated as shown in the table below. The team recommends the consultant will review the number of unit.

Table 10-10: MSW Discharge Amount

Category	Discharge Rate	Number of Unit	Waste Amount (ton/day)
Household	233 g/person/day	2,051,600 persons	478.0
Commercial (Restaurant)	1,770 g/table/day	4,035 tables	7.1
Commercial (Other Shops)	540 g/shop/day	11,438 shops	6.2
Institution	540 g/Institution	11,438 institutions	6.2
Market	1,110 g/stall/day	3,393 stalls	3.8
Street	70,600 g/km/day	1,105 km	78.0
General Waste from Medical Institutions	---	---	24.5
<b>Total MSW</b>			<b>603.8</b>

unit : ton/day

### **b.2.3 Composition of Discharged Waste**

The composition of currently discharged household waste in the study area and those obtained from other JICA SWM studies, are as shown in the following table. A prominent feature of the waste composition in Baku is a high content of kitchen waste. The proportion of kitchen waste in MSW is 51.8 %.

Table 10-11: Composition of Discharged Waste

Classification			Household				Commercial		Market	Street Sweeping	MSW*1		
			High Income	Middle Income	Low Income	Weighted Average	Restaurant	Other Shops					
Physical Composition (Wet Base)	Apparent Specific Gravity (ASG)		Kg/l	0.25	0.29	0.24	0.26	0.49	0.07	0.31	0.20	0.25	
	Combustible Wastes	Kitchen Waste		(%)	55.1	63.2	57.9	59.4	61.0	8.2	63.9	6.9	51.8
		Paper		(%)	11.7	7.8	9.1	8.9	9.7	70.6	19.6	19.2	11.1
		Textile		(%)	2.8	4.3	2.7	3.2	1.3	0.8	0.3	5.1	3.3
		Grass and Wood		(%)	2.5	1.1	1.5	1.5	1.7	0.0	2.6	24.7	4.5
		Plastic		(%)	8.0	11.7	7.1	8.7	5.3	15.5	4.6	13.6	9.2
		Leather and Rubber		(%)	1.6	1.2	0.8	1.0	0.2	1.1	0.1	0.0	0.9
		Sub-total		(%)	81.7	89.3	79.1	82.7	79.2	96.2	91.1	69.5	80.8
	Incombustible Wastes	Metal		(%)	4.4	1.9	2.2	2.3	2.4	2.9	1.7	3.5	2.5
		Bottle and Glass		(%)	8.4	4.6	11.9	9.1	8.5	0.9	6.0	4.8	8.7
		Ceramic and Stone		(%)	4.4	4.2	6.7	5.7	8.9	0.0	0.1	3.2	5.3
		Miscellaneous		(%)	1.1	0.0	0.1	0.2	1.0	0.0	1.1	19.0	2.7
		Sub-total		(%)	18.3	10.7	20.9	17.3	20.8	3.8	8.9	30.5	19.2
	Total			(%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note : \*1. Waste Composition of MSW is calculated as composition ratio multiplied by total amount of waste in each category divided by total amount of waste generation, i.e.  $[\sum ( \text{composition rate of waste from each category} ) \times ( \text{total waste amount of each category} )] / \text{total waste amount}$ , where  $\Sigma$  means the sum for all the categories.

Table 10-12: Comparison of Composition of Discharged Waste

Country	Unit	Azerbaijan	Turkey		Poland		Paraguay	Philippines	Tanzania	Honduras	Japan
		Baku	Adana GM	Mersin GM	Lublin		Asuncion	Manila	Dar es Salaam	Tegucigalpa	Tokyo 1994
					With ash	Without ash					
Kitchen waste	%	51.8	64.41	63.01	33.96	61.11	37.40	45.35	45.03	46.00	2511
Paper	%	11.1	14.80	18.42	19.34	14.18	10.20	16.80	4.07	12.00	35.64
Textile	%	3.3	1.62	2.60	7.27	3.10	1.20	3.88	1.10	3.00	3.44
Grass & Wood	%	4.5	2.66	2.18	5.90	2.33	19.20	15.62	25.11	12.00	4.42
Plastic	%	9.2	5.92	6.69	7.89	4.41	4.20	6.71	2.01	7.00	15.16
Leather & Rubber	%	0.9	0.30	0.25	2.26	2.09	0.60	0.74	0.71	2.00	1.38
Metal	%	2.5	1.40	1.25	3.76	3.29	1.30	5.21	1.65	2.00	6.43
Bottle & Glass	%	8.7	3.08	3.08	15.16	6.69	3.50	3.37	2.90	3.00	5.46
Ceramic & Stone	%	5.3	2.17	1.38	1.53	2.81	2.50	1.12	0.33	13.00	0.40
Miscellaneous	%	2.7	3.64	1.14	2.93	-	19.90	1.20	17.09	0.00	2.56
Total	%	100.0	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
ASG	kg/l	0.25	0.29	0.28	---	---	---	0.18	---	---	---

Note: The figure in parentheses is the composition of MSW (Municipal Solid Waste).

### b.3 Current Waste Flow

The current MSW stream in 2000 is presented below. It should be noted that in this flow, the actual final disposal amount including non-hazardous industrial solid waste and construction waste is lacking and “illegal dumping” does not include non-hazardous industrial solid waste or construction waste, although these are the main components of illegally tipped waste, but only includes waste illegally dumped by households. For the identification of the final disposal and illegally dumped waste amount, the team recommends the consultants to conduct a final disposal amount survey at the current municipal landfills and an illegally dumped waste amount survey at major illegal dumpsites.

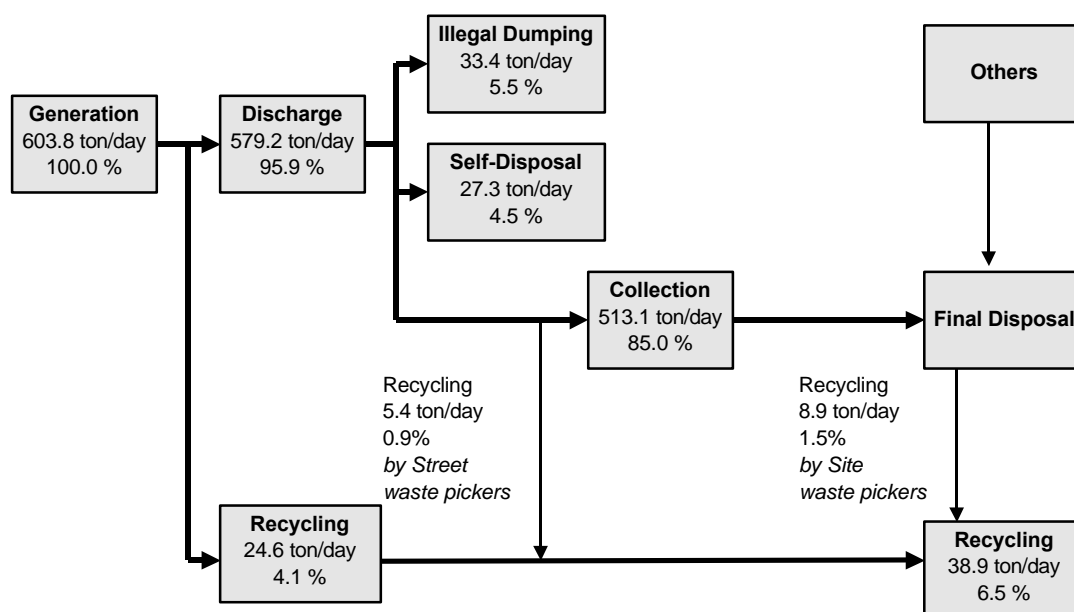


Figure 10-13: Waste Stream in 2000

#### b.4 Assessment of Present MSWM

Current MSWM should be assessed by the consultants based on the work results for the full understanding of the current system. The team present a table below that summarises the team's assessment of present MSWM with some of the important issues identified by the team. The consultants may refer this table for their work.

Table 10-13: Assessment of Current SWM

Item		Assessment
Technical System	1. Municipal SW Discharge	<ul style="list-style-type: none"> <li>In contrast with other economically comparable countries, the household waste discharge rate is as small as 233 g/person/day (weighted average of three income levels), as the people mainly live in condominiums and do not discharge garden waste.</li> <li>Kitchen waste accounts for, on average, 51.8 % of the MSW.</li> </ul>
	2. Collection and Haulage	<ul style="list-style-type: none"> <li>Municipal SWM aims to maintain healthy living environment by properly dealing with waste. A collection service is not yet sufficient to achieve this objective.</li> <li>Current collection capability in the areas served by the district EPs is very limited due to insufficient vehicles and equipment</li> <li>There is no separate collection system, which is important for waste minimisation and resource-recovery.</li> </ul>
	3. Cleansing of Streets	<ul style="list-style-type: none"> <li>The present cleansing services contribute to city cleanliness.</li> <li>Although the cleansing system is labour intensive, it creates jobs.</li> </ul>
	4. Intermediate Treatment	<ul style="list-style-type: none"> <li>There is no intermediate treatment facility except for a dilapidated compost plant that has not been operated for long time.</li> </ul>
	5. Recycling	<ul style="list-style-type: none"> <li>There were well-established recycling systems and markets for recyclable wastes before 1991 in the FSU. However, the collapse of the FSU resulted in the absence or insufficiency of final users of recycled materials in Azerbaijan.</li> <li>Without sufficient final users, the recycling system and market for recycled materials such as a paper, plastics, textiles and metals were seriously damaged.</li> <li>The items currently recycled are almost limited to bottles and non-ferrous metals.</li> </ul>
	6. Final Disposal	<ul style="list-style-type: none"> <li>There are four authorised MSW landfills in the city but there are many illegal dumps that receive MSW constantly.</li> <li>None of the four landfills is a sanitary landfill.</li> <li>The incoming vehicles are monitored at the Balakhani and Lockbatan landfills operated by private contractors, but not monitored at the other two landfills.</li> </ul>
	7. Equipment Maintenance	<ul style="list-style-type: none"> <li>The private contractors has an operation and maintenance (O&amp;M) system of vehicles and equipment used in waste collection and haulage.</li> </ul>
Institutional System	8. Operational & Organisational System	<ul style="list-style-type: none"> <li><u>To be assessed by the consultants.</u></li> </ul>

Item	Assessment
9. Financial Matters	<ul style="list-style-type: none"> <li>• Budget for MSWM is insufficient.</li> <li>• The BEP intended to strengthen MSWM capacity through the privatisation of collection and disposal operations. UPA obtained concession for nine districts in 1998 but they are operating only in Narimanov district as of May 2000, due to financial problems mainly caused by an insufficient refuse collection fee. KASCO-RCP, the contractor of Yasamal and Sabayil districts, cannot provide sanitary landfill operations as well as UPA due to financial constraints.</li> </ul>
10. Contract-out system	<ul style="list-style-type: none"> <li>• The BEP and district EPs intend to privatise the collection services and final disposal operations. However, the progress of the privatisation is not smooth as expected due to financial constrain.</li> </ul>
11. Legislation	<ul style="list-style-type: none"> <li>• Although laws, regulations, and standards related to MSWM are gradually being established, there is a problem with enforcement. For instance there are four authorised MSW landfills in the city but there are 800 to 850 illegal dumps according to a report made by an inspector of the BCE.</li> </ul>
12. Public Co-operation	<ul style="list-style-type: none"> <li>• Public co-operation to waste discharge is very weak: their discharge manner is often rough and lax.</li> <li>• As wastes are discharged and collected using mainly communal containers, the residents do not care about the fate of waste generated by them and are hardly aware of the MSWM problems.</li> <li>• Separate collection is important for waste volume reduction and resource recovery. However, its introduction is presumed to be considerably difficult.</li> </ul>

### c. The MSWM Master Plan

#### c.1 Planning Frameworks for a MSWM Master Plan

##### c.1.1 Siting of Future MSWM Facilities

Sites for future MSWM facilities, such as a transfer station, final disposal site, etc., should be determined by the responsible organisations, i.e. BEP and district EPs. In order to facilitate the determination the consultants should examine social, economic, technical and environmental aspects for each of the alternative sites for the facilities, and make a comprehensive report.

##### c.1.2 Forecast of Future Waste Amount and Composition

###### i. Population Forecast

The population was forecast by the team as shown in the table below.

Table 10-14: Baku Population Projection

Year	Population (1000)	Ratio (2000=1.000)
2000	2,051.6	1.000
2001	2,078.3	1.013
2002	2,105.3	1.026
2003	2,132.7	1.040
2004	2,160.4	1.053
2005	2,188.5	1.067
2006	2,221.3	1.083
2007	2,254.6	1.099
2008	2,288.5	1.115
2009	2,322.8	1.132
2010	2,357.6	1.149

**ii. Economic Growth Rate**

The team forecasted the economic growth rate, GDP and GRDP, as follows:

- 8.5 % per annum, the growth rate in the first half of 2000, is assumed until 2004;
- 10 % per annum growth rate from 2005 to 2010.

**iii. Waste Amount Forecast**

Waste discharge amount ( $WD_x$ ) is calculated by multiplying a discharge rate ( $DR_x$ ) at a given time x by then population ( $P_x$ ) (i.e.  $WD_x = P_x \times DR_x$ ).

The future waste discharge rate is deemed to increase in proportion with economic growth. Accordingly, based on the relationship between the GNP and the increase in waste discharge (obtained in Japan), the waste discharge increase rate is forecast as shown below. (The growth rates of the GNP, GDP, and GRDP are assumed to be exactly linked, i.e. they increase by the same rate.)

- Phase 1 (2000 - 2003) 4.7 %/year
- Phase 2 (2004 - 2006) 5.2 %/year
- Phase 3 (2007 - 2010) 5.5 %/year

Using the above forecasts, the future waste discharge amount is estimated as shown in the following two tables.

Table 10-15: Forecast of Waste Discharge Amount

unit : ton/day

Category	2000	2003	2006	2010
Household	478.0	569.4	690.8	907.7
Commercial (Restaurant)	7.1	8.5	10.4	13.6
Commercial (Other Shops)	6.2	7.5	9.0	11.8
Institution	6.2	7.5	9.0	11.8
Market	3.8	4.5	5.4	7.2
Street	78.0	81.1	84.5	89.7
General Waste from Medical Institutions	24.5	25.5	26.6	28.2
<b>MSW Total</b>	<b>603.8</b>	<b>704.0</b>	<b>835.7</b>	<b>1,070.0</b>



## vi. Forecast of Waste Composition

The future waste composition is forecast as shown in the following table.

Table 10-16: Forecast of Waste Composition of MSWM

Type of Waste	Year 2000			Year 2010		
	MSW (%)	Total Discharge Amount (ton/day)	Discharge Ratio Per Capita (g.)	MSW (%)	Total Discharge Amount (ton/day)	Discharge Ratio Per Capita (g.)
Population (person)	2,051,600			2,357,600		
Kitchen Waste	51.8	312.9	152.5	46.8	500.8	212.4
Paper	11.1	67.0	32.6	15.0	159.6	67.7
Textile	3.3	19.9	9.7	2.1	22.9	9.7
Grass and Wood	4.5	27.2	13.3	2.9	31.4	13.3
Plastic	9.2	55.5	27.1	12.4	132.4	56.2
Leather and Rubber	0.9	5.4	2.6	0.6	6.1	2.6
<b>Combustibles</b>	<b>80.8</b>	<b>487.9</b>	<b>237.8</b>	<b>79.8</b>	<b>853.2</b>	<b>361.9</b>
Metal	2.5	15.1	7.4	3.4	36.3	15.4
Bottle and Glass	8.7	52.5	25.6	11.7	125.1	53.1
Ceramic and Stone	5.3	32.0	15.6	3.4	36.8	15.6
Miscellaneous	2.7	16.3	7.9	1.7	18.6	7.9
<b>Non-combustibles</b>	<b>19.2</b>	<b>115.9</b>	<b>56.5</b>	<b>20.2</b>	<b>216.8</b>	<b>92.0</b>
Total	100.0	603.8	294.3	100.0	1,070.0	453.9

### c.2 Selection of Appropriate Technical System

Taking the current situation and background of MSWM in the target area into account, an appropriate technical system will be worked out. The team recommends the following policies for this process:

- proposals for the technical system have to contribute to the achievement of goals set in the MSWM master plan to be established by the consultants in collaboration with the BEP and district EPs;
- the implementation of the technical proposals has to be affordable by the responsible organisations in the target areas, and justified in terms of national economy;
- systems and technologies to be adopted should be simple so that O&M would be easy and inexpensive;
- foreign currency requirements for the purchase and O&M of systems should be minimised. The use of locally available materials and services should be maximised;
- the proposed technical system should be consistent with the existing conditions and existing practices, in order to be easily introduced.

The team presents a table below for the examination of MSWM technical system and recommend the consultants to refer the table for the designing of the appropriate technical system.

Table 10-17: Examination Table for Appropriate Technical System Design

Technical system elements	Issues to be Considered	System Options	Recommendations
Discharge and Storage	<ul style="list-style-type: none"> <li>Type of Storage Equipment</li> </ul>	<ul style="list-style-type: none"> <li>Minor containers</li> <li>Disposable containers</li> <li>Medium containers</li> <li>Large-bulk containers</li> </ul>	If the current communal container system will be continuously applied, the container shall be unified.
	<ul style="list-style-type: none"> <li>Source Separation</li> </ul>	<ul style="list-style-type: none"> <li>Mixed discharge</li> <li>Separate discharge</li> <li>Delivery by home-owner to deposit centres</li> </ul>	Source Separation is desirable if public cooperation will be achieved.
Collection and Haulage	<ul style="list-style-type: none"> <li>Collection Frequency</li> </ul>	<ul style="list-style-type: none"> <li>1 to 7 times a week</li> </ul>	The improvement of collection capability in the areas currently served by the district EPs should be the first priority.
	<ul style="list-style-type: none"> <li>Collection Method</li> </ul>	<ul style="list-style-type: none"> <li>Mixed collection</li> <li>Separate collection</li> </ul>	
	<ul style="list-style-type: none"> <li>Type of Collection Service</li> </ul>	<ul style="list-style-type: none"> <li>Communal container</li> <li>Block (Bell) collection</li> <li>Curb side collection</li> <li>Door-to-door collection</li> </ul>	
	<ul style="list-style-type: none"> <li>Collection Schedule</li> </ul>	<ul style="list-style-type: none"> <li>Day collection</li> <li>Night collection</li> </ul>	
	<ul style="list-style-type: none"> <li>Type of Collection Vehicle</li> </ul>		
	<ul style="list-style-type: none"> <li>Waste load transfer</li> </ul>	<ul style="list-style-type: none"> <li>Without transfer (direct haulage from the source to the disposal sites)</li> <li>With transfer at (a) transfer station(s)</li> </ul>	Examine direct haulage and the introduction of a transfer station in accordance with the disposal site location.
Street Sweeping	<ul style="list-style-type: none"> <li>Cleansing Method</li> </ul>	<ul style="list-style-type: none"> <li>Manual street sweeping</li> <li>Mechanical cleaning</li> <li>Vacuum cleaning</li> <li>Flushing</li> </ul>	Introduction of mechanical street sweeping system is not recommended under the current economic condition but it should be re-examined considering future labour forces and costs in view of a cost/benefits relation in future.
Recycling	<ul style="list-style-type: none"> <li>Method</li> </ul>	<ul style="list-style-type: none"> <li>Manual</li> <li>Mechanical system as mentioned in the intermediate treatment system (see below)</li> </ul>	Recycling by private sector should be promoted. However, the following government related recycling systems would be preferred. <ul style="list-style-type: none"> <li>A governmental support system that promote the production of goods/products that are easy to be recycled in order to minimise waste generation (generation control) as much as possible.</li> <li>A system that promotes recycling, in particular, separate discharge at source, and promote the recycling of segregated waste materials.</li> </ul>
	<ul style="list-style-type: none"> <li>Leading Institution</li> </ul>	<ul style="list-style-type: none"> <li>Government Centred</li> <li>Private Sector Centred</li> </ul>	

Technical system elements	Issues to be Considered	System Options	Recommendations
Intermediate treatment	<ul style="list-style-type: none"> <li>Waste Reduction</li> <li>Waste Stabilisation</li> <li>Resource recovery</li> </ul>	<ul style="list-style-type: none"> <li>Incineration</li> <li>Refuse Drive Fuel (RDF)</li> <li>Composting                             <ul style="list-style-type: none"> <li>Centralised windrow composing</li> <li>Centralised digester/windrow composting</li> <li>Decentralised windrow composting</li> </ul> </li> <li>Biogas Production</li> <li>Pyrolysis</li> <li>Size Reduction</li> <li>Mechanical and Manual Sorting</li> </ul>	In the current situation no intermediate treatment facility seems to be necessary except for small and simple equipment for recycling. Priority shall be given to the recycling and/or treatment of hazardous and/or medical wastes.
Final Disposal	<ul style="list-style-type: none"> <li>Location of final disposal sites</li> </ul>	<ul style="list-style-type: none"> <li>Quarry site after mined, flat land or valley</li> </ul>	Promote as the first priority project the construction of a sanitary landfill site that meets the standards. The selection of an appropriate site is very important in the development of a final disposal site. The use of one of the quarry previously used for soil extraction can be a good candidate. Whether the landfill is operated anaerobically or aerobically depends on the intermediate treatment system to be selected. If there is no treatment system, an anaerobic system will be preferred so that landfill gas can be utilised.
	<ul style="list-style-type: none"> <li>Final disposal methods</li> </ul>	<ul style="list-style-type: none"> <li>Sanitary disposal</li> <li>Open dump</li> </ul>	
	<ul style="list-style-type: none"> <li>Landfill structure</li> </ul>	<ul style="list-style-type: none"> <li>Anaerobic, semi-aerobic or aerobic structure</li> </ul>	
	<ul style="list-style-type: none"> <li>Sanitary level of landfill development and operation</li> </ul>	<ul style="list-style-type: none"> <li>With or without liner</li> <li>With or without leachate treatment facilities</li> </ul>	
Maintenance of Vehicles and Equipment	<ul style="list-style-type: none"> <li>Level of service</li> </ul>	<ul style="list-style-type: none"> <li>Routine maintenance</li> <li>Full maintenance</li> </ul>	In case where the public sector provides maintenance service, it is recommended to be a preventive one, and heavy maintenance such as overhaul, etc. shall be entrusted to the private workshop.
	<ul style="list-style-type: none"> <li>Service provider</li> </ul>	<ul style="list-style-type: none"> <li>Private</li> <li>Public</li> </ul>	

#### d. Outline of the Master Plan

##### d.1. Goals

The principal goal of the MSWM master plan should be established by the consultants in collaboration with the BEP and district EPs. The goal of the master plan (M/P) might be:

**“To establish a sound municipal solid waste management system by the target year 2010 in Greater Baku”**, where the major population and economic activities of the country are centred.

The master plan aims to:

- promote the citizens’ well-being and public health;

- implement sustainable MSWM; and
- contribute to environmental conservation.

### d.2 Targets

The M/P is recommended to be implemented by phases, as shown below, to achieve the above-mentioned objective.

Phase 1:	2000 - 2003 (target year for the F/S)
Phase 2:	2004 - 2006
Phase 3:	2007 - 2010

In order to achieve the principle goal of the master plan, the targets for the key indicators of MSWM are proposed as shown in the table below.

Table 10-18: Targets of MSWM M/P

Items	Present (2000)	Phase I (2003)	Phase II (2006)	Phase III (2010)
Refuse Collection Rate	87.3 %* <sup>1</sup>	95 %	100 %	100 %
Rate of Improper Disposal to Generation Amount	10.6 %* <sup>1</sup>	6.4 %	0 %	0 %
Recycle Rate of Metal Scrap	0 %	14 %	35 %	70 %
Recycle Rate of Waste Paper	0 %	10 %	25 %	50 %
Rate of Sanitarily Landfilled Waste	Open Dumping	Open Dumping	70 %	100 %

Note \*1: The figure is estimated based on the results of the POS

### d.3 Strategies

The team presents strategies to be adopted in the three planning stages below. It should be minded that this strategy is only based on the study by the team and not complete especially regarding the institutional part, which needs to be followed up by the consultants.

Table 10-19: Strategy for Realisation of the MSWM M/P

Items	Descriptions
<b>Phase 1 (2001-2003)</b>	
<b>Technical Aspects</b>	<ul style="list-style-type: none"> <li>• An MSWM M/P will be formulated by foreign and/or local consultants in collaboration with the BEP and districts EPs, and based on the M/P feasibility studies of priority projects will be conducted.</li> <li>• Improper disposal at generation, such as illegal dump and inappropriate self-disposal, should be decreased to 6.4 % by 2003 with the provision of a sufficient collection service.</li> <li>• Through the strengthening the collection capabilities of the districts EPs refuse collection will be extended to cover 95 % of the population.</li> <li>• A feasibility study and detailed design for the construction of recycling facilities especially for metal scrap and used paper will be conducted.</li> <li>• Prevention of littering/illegal dumping in the city will be achieved through intensive public education campaigns and law enforcement.</li> <li>• After the site selection a feasibility study of the construction of sanitary landfill(s) will be carried out.</li> </ul>

Items	Descriptions
<b>Institutional Aspects</b>	<ul style="list-style-type: none"> <li>• The current administrative system of the BEP and the district EPs will be reviewed and the tasks/assignments will be redefined</li> <li>• Present organisations responsible for MSWM should be strengthened both in quantity and quality.</li> <li>• Carefully taking the capability of the private sector into consideration, the involvement of the private sector into MSWM will be encouraged. Contracts to be signed must stipulate detailed requirement for the performance of the concerned private enterprise.</li> <li>• A systematic monitoring and information management system regarding MSWM should be established in the BEP and the district EPs. First, unit costs of operations need be identified to evaluate cost/benefit, cost/efficiency and cost/effectiveness. Along with this a database on all MSWM activities will be developed and maintained to continuously check the quality and costs of the cleansing services by both public and private sectors.</li> <li>• The current scattered legal provisions in various and complex laws and regulations should be consolidated into an integrated and transparent package.</li> </ul>
<b>Phase 2 (2004-2006)</b>	
<b>Technical Aspects</b>	<ul style="list-style-type: none"> <li>• Improper disposal at generation shall be eliminated by 2006 through an intensive public education campaign and enforcement with the provision of sufficient collection service.</li> <li>• By further strengthening the collection capabilities of the districts EPs, refuse collection coverage rate will be raised to 100 %.</li> <li>• The introduction of a transfer station in accordance with disposal site location will be examined.</li> <li>• A government related recycling system should be examined to encourage waste minimisation and source separation for reuse, recycling, and recovery should be examined.</li> <li>• Recycling facilities for metal scrap and waste paper will be constructed and recycling rates will reach to 35 % and 25 % respectively.</li> <li>• Sanitary landfill(s) will be constructed following the feasibility study and 70 % of the MSW discharged in the city will be disposed of there.</li> </ul>
<b>Institutional Aspects</b>	<ul style="list-style-type: none"> <li>• The current administrative system of the BEP and the district EPs should be improved in order to meet with the proposed technical systems, i.e., government related recycling system and sanitary landfill</li> <li>• Present organisations responsible for MSWM should be strengthened both in quantity and quality to properly administer and control the proposed technical systems, e.g. sanitary landfill, recycling facilities, etc.</li> <li>• The involvement of the private sector will be further encouraged in order to achieve more efficient but less costly MSWM.</li> <li>• The database on MSWM activities will be maintained. The comparative cost data and other performance data obtained by the database will be used to measure the efficiency of the services, and to enable good management and decision-making.</li> <li>• A human resources development program should be developed in order to train professionals involved in MSWM. The program will cover a broad spectrum of professionals and employees, from management to operational levels, including those responsible for supporting activities.</li> <li>• In order to further prevent littering/illegal dumping and promote recycling the intensive public education and campaigns will be continued to raise public co-operation.</li> </ul>

Items	Descriptions
<b>Phase 3 (2013-2020)</b>	
<b>Technical Aspects</b>	<ul style="list-style-type: none"> <li>• The separate discharge and collection system will be introduced based on the recommendation made by the examination of government related recycling system.</li> <li>• Transfer station(s) will be constructed if it is feasible in consideration of disposal site location.</li> <li>• Introduction of mechanical street sweeping system will be examined considering labour forces and costs in view of cost/benefits relation in future.</li> <li>• A government related recycling system will be established to encourage waste minimisation and begin source separation for reuse, recycling, and recovery.</li> <li>• Recycling facilities for metal scrap and waste paper will be further strengthened and recycling rate will be raised to 70 % and 50 % respectively.</li> <li>• Sanitary landfill operation will be expanded and 100 % of the MSW discharged in the city will be disposed of sanitarly.</li> </ul>
<b>Institutional Aspects</b>	<ul style="list-style-type: none"> <li>• The administrative system will be reviewed and improved in order to meet with the change of the public perception of MSWM. For example, the government may need to cope with the growth of the NIMBY (Not In My Back Yard) syndrome.</li> <li>• The maximum involvement of the private sector not only in operation of cleansing services but also in the provision of MSWM facilities will be achieved. The government will be able to properly control and monitor all the activities of the private sector.</li> <li>• The database on all SWM activities will fully function to provide all data necessary for administration, policy decision, control/monitoring, public relation, financial management, etc.</li> <li>• All staff concerned with MSWM including private employees should undergo a programme for proper training and professional development. Vocational qualifications will be set up to act as a means of assessing the competence of persons responsible for MSWM facilities and operations.</li> <li>• The public should be encouraged to co-operate for sustainable MSWM through continuous public education and campaigns.</li> </ul>

#### d.4 Future Waste Stream

The waste stream in year 2010 is provided assuming no transfer station and intermediate treatment facilities will be introduced and illustrated in the following figures.

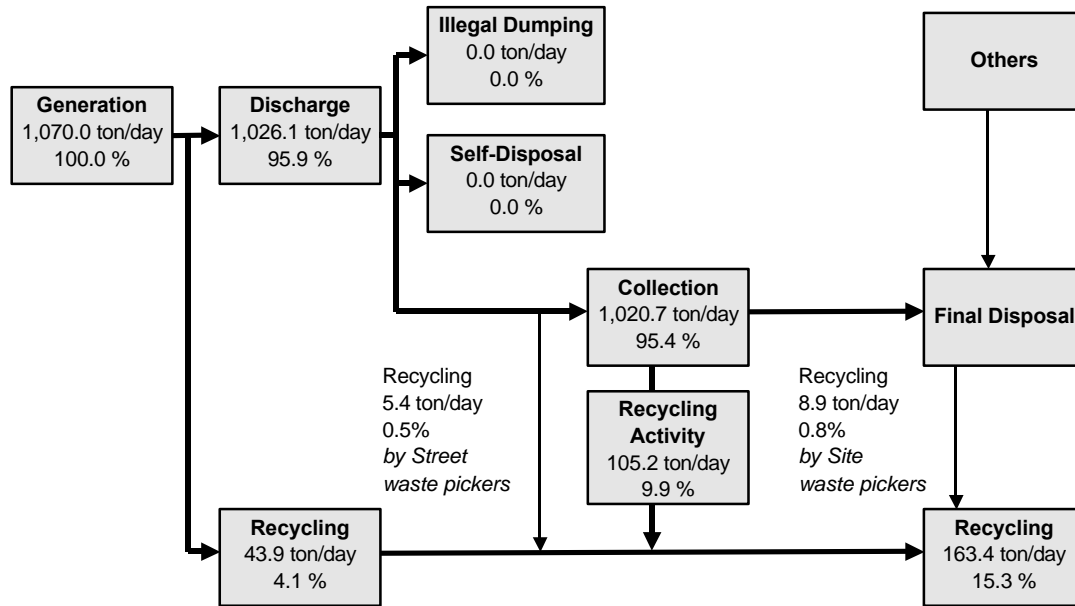


Figure 10-14: Waste Stream in 2010

e. The MSWM Master Plan

Table 10-20: The MSWM Master Plan for Greater Baku

Components	Phase	Present (2000)	Phase 1 (2001 - 2003)	Phase 2 (2004 - 2006)	Phase 3 (2007 - 2010)
<b>1. MSW Generation</b>					
Population		2,051,600	2,132,700	2,221,300	2,357,600
MSW Amount (ton/day)					
Generation		603.8	704.0	835.7	1,070.0
Discharge		579.2	675.1	801.4	1,026.1
Collection		513.1	627.5	796.0	1,020.7
MSW Composition (%)					
Non-compostable		32.6	33.4	34.3	35.0
Compostable		67.4	66.6	65.7	65.0
<b>2. Refuse Collection &amp; Transportation</b>					
Collection rate		87.3 by POS	95 %	100 %	100 %
Ratio of improper disposal to generation		10.6 %	6.4 %	0 %	0 %
Separate collection rate to refuse collection		0 %	To be planned	To be planned	To be planned
Collection system		Mainly communal container collection	To be planned	To be planned	To be planned
Types of communal container		Various kinds of containers are mixed	To be planned	To be planned	To be planned
Major types of vehicles (units)		Compactor trucks, dump trucks, lorry: etc.	To be planned	To be planned	To be planned
Transportation system		Direct haulage	To be planned	To be planned	To be planned
Executing organisation		BEP, district EPs, private contractors	To be planned	To be planned	To be planned
Unit cost (US\$/ton)		Not identified	To be planned	To be planned	To be planned
<b>3. Public Area Cleansing</b>					
Method of sweeping		Manual labour	To be planned	To be planned	To be planned
Length of served road (km)		1,105	To be planned	To be planned	To be planned
Operation by		BEP, district EPs, private contractors	To be planned	To be planned	To be planned
Unit cost (US\$/ton)		Not identified	To be planned	To be planned	To be planned

Components	Phase	Present (2000)	Phase 1 (2001 - 2003)	Phase 2 (2004 - 2006)	Phase 3 (2007 - 2010)
<b>4. Recycling and Intermediate Treatment</b>					
Intermediate treatment facilities		None	To be planned	To be planned	To be planned
Recycling at generation		24.6 (ton/day)	28.9 (ton/day)	34.3 (ton/day)	43.9 (ton/day)
Overall recycling rate		38.9 (ton/day)	To be planned	To be planned	To be planned
Recycling system		No organised recycling and mainly done by the private sector	To be planned	To be planned	To be planned
<b>5. Final Disposal</b>					
Sanitary landfill ratio		0 %	0 %	70 %	100 %
Final disposal site		4 sites (Balakhani, Shuvelan, Surakhani, Lockbatan)	To be planned	To be planned	To be planned
Distance from city (km)		10 – 40 km	To be planned	To be planned	To be planned
Operation by		Private contractors and district EPs	To be planned	To be planned	To be planned
Nos. of workers at a site		0 - 5	To be planned	To be planned	To be planned
Tipping fee (US\$/ton)		0 – 300 manats/m <sup>3</sup>	To be planned	To be planned	To be planned
Unit cost (US\$/ton)		Not identified	To be planned	To be planned	To be planned
<b>6. Maintenance &amp; Repair</b>					
Preventive Maintenance		Municipal and private workshop	To be planned	To be planned	To be planned
Major repair		Municipal and private workshop	To be planned	To be planned	To be planned
Operation by		District EPs and private	To be planned	To be planned	To be planned
7. Public Organisations Responsible on MSWM		BEP and District EPs	To be planned	To be planned	To be planned
<b>8. Financial Matters</b>					
Unit MSWM Cost (US\$/ton)		Not identified	To be planned	To be planned	To be planned
Revenue Source		♦ Waste collection fee	To be planned	To be planned	To be planned
		♦ Tipping fee for disposal sites			
Collection rate of waste collection fee (%)		Not identified	To be planned	To be planned	To be planned
Ratio of collection fee to MSWM expense		Not identified	To be planned	To be planned	To be planned
Total revenue (US\$ 1,000)		Not identified	To be planned	To be planned	To be planned
Waste collection fee (%)		Not identified	To be planned	To be planned	To be planned
Budget allocation from general finance (%)		Not identified	To be planned	To be planned	To be planned
Tipping fee (%)		Not identified	To be planned	To be planned	To be planned
Total revenue per capita (US\$)		Not identified	To be planned	To be planned	To be planned
BEP Budget (thousand US\$)		86,200 in 1999	To be planned	To be planned	To be planned
Share of MSWM budget to BEP budget		Not identified	To be planned	To be planned	To be planned
9. Privatisation		Waste collection in 3 districts, road sweeping in 1 district and disposal of waste from 9 districts are contracted out to private companies.	To be planned	To be planned	To be planned
10. Public Co-operation		There are very few public education programs and little co-operation	To be planned	To be planned	To be planned



#### f. Feasibility Study

Some of the projects identified in the MSWM M/P should need urgent actions and have high priority. For those projects, a F/S (feasibility study) should be carried out for implementation. The team considers that the following would be subject to the F/S:

- improvement of refuse collection capability of the districts EPs;
- construction of sanitary landfill(s);
- re-establishment of the waste recycling system.

#### 10.6.3 Action Plan for BCE

In order for the BCE/SCE to encourage, supervise and support the BEP and district EPs in the smooth formulation and implementation of the MSWM M/P, an action plan for BCE base on MSWM M/P are proposed and presented in the table below.

Table 10-21: Action Plan for BCE

Works	Description
<b>PHASE I: 2001 – 2003</b>	
To encourage, supervise and support the formulation of an MSWM M/P to be prepared by the BEP and District EPs	The BCE/SCE will make full use of the data obtained by the WACS (waste amount and composition survey) and the Survey on Recycling Activities, both of which were carried out by the team. In addition, referring to the outlines of recommended MSWM M/P presented in this chapter the BCE/SCE will supervise the BEP and District EPs or the consultants employed by them and give advices and instructions to them.
<b>PHASE II: 2004 – 2006</b>	
To encourage the implementation of the priority projects following the MSWM M/P.	Priority projects to be identified in the MSWM M/P will be the improvement of refuse collection capability, and the construction of sanitary landfills and recycling facilities, which must be licensed by the SCE together with MOH and inspected by the BCE. The BCE/SCE should encourage the implementation of the priority projects following the MSWM M/P by giving suggestions and advices on site selection, facility design, and the prevention of adverse environmental impacts.
<b>PHASE III: 2007 - 2010</b>	
To encourage the introduction of waste minimisation and waste recycling systems of MSW.	The most concerned issues of MSWM in the developed countries are to minimise waste generation, to recycle or reuse generated waste and to stabilise non-recyclable or non-reusable waste in an environmentally friendly manner either by incineration, landfill disposal or any other measures. Therefore, after the establishment of an adequate refuse collection service and sanitary disposal, the BCE/SCE should encourage the introduction of a system to tackle with those issues.

## 10.7 Project Evaluation

### 10.7.1 Project Cost

The estimated project costs summarized in Table 10-22.

Table 10-22: Cost Schedule of the Priority Projects

		Unit:1000 US\$		
Items		2001	2002	2003
1 Office equipment	PC and its appurtenances			43
	Copy and fax machine			4
	Other appurtenances	33		
2 Equipment for inspection	Vehicle for inspection			110
	Inspection boat and its appurtenances			172
	Sampling tools for air			759
	Sampling tools for water, sediment and soil			68
	Other appurtenances			9
3 Air quality monitoring station	Building and its appurtenances			652
	Equipment for monitoring			602
4 Equipment for chemical analysis	For air quality			45
	For water quality			77
	For food quality			677
	Common use (Equipment)			34
	Common use (Reagent etc.)	11	23	
5 Equipment for information department	GIS and its appurtenances			19
	For public education			3
6 Absheron Sanctuary development	Nature centre and its appurtenances			367
	Footpath and its appurtenances			186
Total		44	23	3,827

### 10.7.2 Technical Evaluation

#### a. Technical Evaluation

Among the six propriety projects, the following five projects are subject of technical evaluation.

1. Development of environmental data management
2. Development of environmental monitoring system
3. Development of Absheron Sanctuary
4. Development of illegal dumping control system
5. Development of supervision and support system for M/P formulation of MSW and waste recycling

The feasibility of these priority projects was assessed with reference to the present technical capabilities of the BCE.

#### b. Development of environmental data management

The team established a GIS database with sufficient equipment within the BCE in the present study. However, in order to employ the established environmental data effectively, the knowledge regarding computers, GIS and data management is

required. Since the BCE had little experience to handle digital data, it was necessary to give training to the BCE staff. The team gave an intensive training to the three BCE trainees for about five months regarding the following knowledge:

- knowledge necessary for GIS maintenance;
- knowledge necessary for GIS application;
- knowledge necessary for GIS management.

With the above training the three trainees obtained basic knowledge to operate and maintain the GIS database. However for the further improvement of environmental data management it is necessary to intensively improve the computer skills of the BCE personnel. To overcome this difficulty, training programmes should be made appropriately for individual needs and the training should be given to the staff in accordance with their capability.

The development of environmental data management would be feasible by making full use of the three trainees and giving training programmes to the staff. It is strongly recommended to ask aid agencies for training assistance.

#### **c. Development of environmental monitoring system**

The air monitoring stations and water monitoring points were established by the Hydromet and have been maintained for a long time. If the BCE succeeds to receive cooperation from the Hydromet the proposed monitoring system will operate smoothly.

The BCE have a laboratory and staff for analysis, although analytical capability is not high enough. In addition through the pilot project on the enhancement of the BCE laboratory, the analytical capability of the BCE staff was improved and the technical shortages to be tackled were clarified. As for food quality analysis the BCE may need technical assistance from overseas, such as the dispatch of foreign experts and the training of the BCE staffs.

Regarding the inspection and enforcement of the pollution sources, now the BCE staff have a summary of the environmental passports of 288 factories, which they did not have before, as an output of the study. Their inspection work is expected to improve sufficiently.

The team concludes that the development of the environmental monitoring system would be feasible with cooperation of foreign and local relevant organisations.

#### **d. Development of Absheron Sanctuary**

The team designed the sanctuary park in consideration of the availability of local materials and technical simplicity. It believes that the park and associated facilities can be constructed with local input.

For the maximum use of the park facility by the visitors, the BCE will need the assistance of external fauna/flora experts. Institutions within the Academy of the Sciences will be a good source of such experts. By working with them, the BCE will obtain further knowledge of ecological systems of the sanctuary.

Using physical and human resources in Azerbaijan, there should be no technical problems with the development of Absheron Sanctuary.

**e. Development of illegal dumping control system**

Based on the pilot project on the development of the illegal dump control system, the C/P and the team identified what is necessary for the control of dumpsites. In addition through the pilot project the BCE staff obtained know-how to raise public cooperation, to give an environmental education and to organise campaign.

It is concluded that the development of the illegal dumping control system is possible by making full use of the experiences gained by the pilot project.

**f. Development of supervision and support system for M/P formulation of MSW and waste recycling**

Proposals made in the present study for the formulation of the M/Ps of MSWM and waste recycling is based on practical field studies, which closely looked at waste generated in the study area by waste generators of different types. Therefore, by making full use of the recommended MSWM M/P prepared by the team, the BCE will be able to supervise and support the BEP and district EPs to formulate the M/Ps

### **10.7.3 Social Evaluation**

**a. Social Evaluation**

The priority projects would incur various social positive impacts. The tangible impacts presented below are evaluated.

- Improvements in sanitary and public health conditions of the Baku city
- Reduction of wage gap between public and private sector
- Promotion of investment and tourism
- Increase in land value

**b. Improvements in sanitary and public health conditions of Baku city**

According to the BCE inspectors, there are as many as 850 illegal waste dumps in Baku city. They may cause environmental and health risks and, at the same time, they have spoiled the dignity and beauty of the city. In addition the number of such illegal waste dumps seems to be increasing year by year.

The priority project (development of illegal dumping control system) will bring various benefits; the number of such illegal waste dumps, which will adversely affects dumpsite and its surrounding area, will not increase. The project (development of supervision and support system for M/P formulation of MSW and waste recycling) will facilitate the formulation of a MSWM M/P, which should contribute to improve the sanitary and public health conditions of Baku city if it is implemented. The provision of sufficient waste collection services to the whole population, which should be one of the major components of the MSWM M/P, will reduce the number of such illegal waste dumps, and change the current open dumping disposal site to a sanitary landfill.

The implementation of the priority projects, therefore, will improve the sanitary and public health conditions of Baku city.

**c. Reduction of wage gap between public and private sector**

At present the salary level of the public sector is quite low compared with the private sector; less than half. This has caused a lack of motivation and inefficient work.

In the priority projects the team proposes that the salary level of the BCE personnel should be raised. Though it will not be easy at all to raise it to the level of the private sector, the gradual reduction of the gap between the two sectors will enhance the motivation of the BCE staffs for their works, thus resulting in a functional organisation for the improvement of the environment in Baku city.

**d. Promotion of Investment and Tourism**

In addition to the health effects, the implementation of the priority projects will provide Baku city with a favourable environment that would eventually promote investment and tourism. Since Baku city is the centre of economic and social activities in Azerbaijan Republic, the improvement of its environment will enhance its image and eventually contribute to attracting more investors and tourists to the area.

Furthermore, nowadays investors, particularly those from developed countries, are cautious not to be blamed for breaching environmental regulations. Therefore, output of the priority projects, such as a clear administrative and legislative system and data availability, should be a positive factor for investment promotion.

**e. Increase in Land Value**

Well-managed waste disposal operation will improve the living environment, which in turn will increase the value of the land in the area. A study on the relationship between the living environment and land value suggests that, other factors being constant, housing values rise with distance from a landfill (an illegal dumpsite as well) at an average rate of 6.2 % a mile within a two-mile radius of the landfill.<sup>7</sup> This is presumably because the environmental and aesthetic problems associated with life near the landfill diminish as distance from it increases. Thus, the implementation of the priority projects will increase the land value around the present landfills and illegal dumps spreading all over the city.

#### **10.7.4 Financial Evaluation**

**a. Aims of Financial Evaluation and Usage of Result**

The priority projects proposed in this study intend to improve the fundamental elements that compose an environmental management system, and do not entail large and tangible development factors, except Absheron Sanctuary development. Therefore, they are by nature to be implemented in a staged manner within the national budget. In Azerbaijan, however, there are following constraints:

- the investment amount required in Phase I is about 40 times of the BCE budget: the investment amount is about US\$ 4 million, while the BCE budget is only US\$ 100,000 (BCE 1999 actual including off budget);
- it is considerably difficult to obtain budget for investment because of the present severe financial situations of the Central Government;

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<sup>7</sup> Beede, D.N. and Bloom, D.E. 1995, The Economics of Municipal Solid Waste, The World Bank

- the yearly collected amount of the EPF, which should be allocated for environmental improvement, is only US\$ 200,000 (SCE 1999 actual); and
- there is no institutional framework to use the EPF for environmental improvement investments.

The team believes considers that the implementation of priority projects proposed in this study is essential in order to improve and to protect the environment in Baku. With the above-mentioned constraints, therefore, it is badly crucial how to secure a financial source for initial investment in order to implement them. In this chapter, financial evaluation was conducted in case where the BCE is financed by loan for the initial investment of Phase I. Proposals for the implementation of the priority projects were then made.

The evaluation term is from 2001 to 2010. The Financial Internal Rate of Return (FIRR) was calculated for reference.

The major assumptions of financial evaluation of the priority projects are as the following table.

Table 10-23: Major Assumptions of Financial Evaluation

Items	Assumptions
Evaluation Term	2001 – 2010
Executive body	BCE
Investment	<p>Items to be invested for the priority projects in Phase I:</p> <ul style="list-style-type: none"> <li>• office equipment;</li> <li>• equipment for inspection;</li> <li>• air quality monitoring station;</li> <li>• equipment for chemical analysis;</li> <li>• equipment for information department;</li> <li>• Absheron Sanctuary development.</li> </ul> <p>The investment costs for replacement are considered based on the life span of equipment/facilities. Salvaged value after 2010 is counted as minus costs in 2011.</p>
Revenue	<p>1) Financial sources for investment:</p> <ul style="list-style-type: none"> <li>• soft loan with a low interest rate is assumed for the initial investment;</li> <li>• EPF is assumed to be used for the replacement of equipment.</li> </ul> <p>2) Revenue sources for O&amp;M costs:</p> <ul style="list-style-type: none"> <li>• general budget from the Central Government;</li> <li>• “off budget” for services such as EIA examination, Chemical analysis in Laboratory and GIS.</li> </ul> <p>The revenue for O&amp;M from 2007 to 2010 is assumed to be equal to the total of general budget and off-budget in 2006.</p>
Alternatives of general budget fund	<p>As for the allocation of general budget from the Central Government, two alternatives are examined.</p> <ul style="list-style-type: none"> <li>• Alt-A: general budget will cover total personnel costs and O&amp;M costs for office (utilities, building maintenance etc.) by 2004, and total O&amp;M costs by 2010, as shown in M/P;</li> <li>• Alt-B: the share of the portion to BCE is as same as present (2000).</li> </ul>

Expenditure	Investment costs, personnel costs and other O&M costs are considered. Alt-2 of the salary table examined in M/P is assumed for financial evaluation. The O&M expenses from 2007 to 2010 are assumed to be equal to the expenses in 2006.
Evaluation Method	Total balance from 2001 to 2010 (Total Revenue-Total Expenditure) > 0 The following items are also calculated for reference: <ul style="list-style-type: none"> <li>• FIRR;</li> <li>• share of BCE budget in the National General Budget;</li> <li>• share of BCE's investment into equipment replacement in the EPF.</li> </ul>
Cut-off rate	7–8 %, which is used by the World Bank and European Development Bank.
Inflation	The constant price in 2000 is used (no inflation is considered).

## b. Revenue Plan

### b.1 Investment Costs

A soft loan with a low interest rate is assumed as a financial source. The practically softest conditions will be:

- repayment term: 25 years (including 7-year grace period);
- interest rate: 1.7% per year.

The investment costs for replacement will be covered by the EPF in Phase II and Phase III.

It is assumed that the number of factories to be charged for the EPF will increase in proportion to GRDP. The revision of the EPF charges is assumed as follows in order to motivate factories to operate environmentally.

- In 2003: 50 times the amount of the present EPF charges.

How many times the charge should be raised is subject to sensitivity analysis.

### b.2 Revenue Sources for O&M Costs

The revenues are examined by revenue sources, such as the national general budget, the “off budget” funds for services by BCE, e.g. EIA, analysis in the laboratory and GIS. In M/P, it is proposed that all “off budget” revenue in Phase II should be transferred to Ministry Of Finance to be transparent. For the financial evaluation, it is assumed that the “off budget” is returned to the BCE after authorised by Ministry of Finance and the BCE can use its full amount. It is also assumed that the total amount of general budget and “off budget” in 2006 will be gained from 2007 to 2010, while “off budget” will be phased down in Phase III.

As general budget allocated from the Central Government, two alternatives are examined.

- Alternative A: General budget will cover total personnel costs and O&M costs for office (utilities, building maintenance etc.) by 2004, and total O&M costs by 2010, as shown in M/P.
- Alternative B: The share of the portion to BCE is as same as present (2000).

The “off budget” revenues are calculated under the following assumptions:

- The number of operating enterprises, the number of projects subject to EIA review by the BCE and the number of factories inspected by the BCE will increase in proportion to GRDP.
- EIA: The average fee for EIA review is calculated at 808,000 manat per case to the EIA process, based on the total number of cases (112) and the amount of collected fee in 1999 (90.5 million manat).
- Laboratory: out of enterprises which have a environmental passport (they were 288 according to the factory survey by the team), 30% are assumed to request the BCE for wastewater analysis in a year from Phase I, and 20% are assumed to request for emission gas analysis in a year from Phase II.
- GIS: 30% of the operating enterprises, which are assumed to be 775 according to the factory survey by the team), will use the GIS of the BCE every year.

The fees for each service are calculated to cover the O&M costs including personnel costs in 2004 as shown in the following table.

Table 10-24: Revenue Plan of Off Budget

Year	No. of enterprises		No. of Users (C)	O&M costs (D: including personnel cost) Million manat	Average cost/ user (D/C) 1,000 manat
	2000 (A)	2004 (B)**	2004	2004	2004
EIA	122*	168	168	-	808
Laboratory (water)	288	399	120	74.5	373
Laboratory (air)			80		
GIS	755	1,074	322	29.5	92

Note: \* 112 x 7,925 billion manat (GRDP in 2000) divided by 7,305 billion manat (GRDP in 1999).

\*\* B = A x 10,984 billion manat (GRDP in 2004) divided by 7,925 billion manat (GRDP in 2000).

GRDP in each year is estimated by the study team.

The “off budget” revenue calculated under the above assumptions is as follows.



Table 10-25: Revenue of Off Budget

Unit: million manat

	1999	2001	2003	2006
EIA	90.5	106.7	125.2	164.8
Laboratory (water)	0	35.1	41.0	54.1
Laboratory (air)	0	0	0	36.2
GIS	0	23.2	27.3	35.9
Others*	38.9	0	0	0
Total	129.4	165.0	193.5	291.0

Note: These figures are larger than the actual revenue in 1999, 129.4 million manat, but are less than the initial plan of 2000, 385.0 million manat.

\* EIA document, which was transferred to Eco-centre in SCE in 2000.

### c. Expenditure

The investment costs, personnel expenses and other O&M costs are examined.

#### c.1 Investment Costs

The investment costs for the priority projects are based on the cost estimation shown in Chapter 10.7.1. The replacement investment costs and salvaged value at the end of 2010 are considered in Table 10-26.

Table 10-26: Investment Costs for Financial Evaluation

Unit: million manat

	2001	2002	2003	Replacement (2004 – 2010)	Salvaged value
Office equipment	150	0	214	364	158
Equipment for Inspection	0	0	5,087	5,087	3,565
Air quality monitoring station	0	0	5,706	2,739	6,109
Equipment for chemical analysis	50	105	3,790	0	2,090
Equipment for information	0	0	100	464	242
Absheron Sanctuary development	0	0	2,516	0	1,280
Total	200	105	17,413	8,654	13,444

Note: 1US\$=4,550 manat

The investment costs for replacement are considered according to the life span (usable years) of facilities and equipment as shown in the following table. The salvaged value is also based on the life span.

Table 10-27: Life Span by Facilities and Equipment

	Life Span (year)	Salvaged Value (%)
Civil works and building	30	0
Laboratory equipment, plant facilities	15	0
Vehicles, boats	7	10
Sampling tools, office equipment and others	5	10

## c.2 Personnel Costs

Considering the necessity to economically motivate the BCE staff, the personnel costs are calculated based on Alt-2 examined in Chapter 8.

- Alternative 2: The salary gap between the public sector and the private sector will be reduced to a certain extent but not to zero.

Salary levels to be used in the financial plan are categorised into five classes to simplify calculation. The total number of BCE staff at present is assumed to be 97.

Table 10-28: Assumed Salary Table

Class	Unit: manat/month	
	Present	In 2006
A-1	215,000	353,245
A-2	190,000	312,170
B-1	170,000	279,310
C-1	175,000	287,525
C-2	120,000	197,160

Notes: The GRDP/capita in 2006 (US\$ 1,453) is about 1.55 times of that in 2000 (US\$ 938). The ratio of salary of the public sector to the overall average salary of the public and private sectors is 1.06. Therefore, the factor 1.64 (= 1.55 x 1.06) is used as a multiplier.

Total personnel costs including social fund and welfare for the employees are calculated using the following formulae (note: "total salary" here means total salary of the BCE permanent staff):

- wages of temporary workers and other payment: total salary x 0.5;
- social fund: (total salary + wages for temporary workers & other payment) x 0.3;
- welfare for employees: total salary x 0.15.

The multipliers in the formulae were obtained based on the initial budget (general budget + off budget) in 2000.

The result of calculation of the overall personnel costs is shown below.

Table 10-29: Personnel Costs for Financial Evaluation

	Unit: million manat			
	2000	2001	2003	2006
No. of BCE staff	97	94	91	100
Salary	200.2	199.9	237.6	303.0
Personnel cost including Social Fund and welfare for employees	423.4	419.8	499.0	636.3

## c.3 Other O&M Costs

Other O&M costs except personnel costs are summarized below.

Table 10-30: Other O&M Costs

Unit: million manat

Priority Projects	2001	2003	2006
Office	0.0	0.0	16.4
Inspection	0.0	0.0	30.5
Air quality monitoring station	0.0	0.0	22.8
Chemical analysis	1.4	4.6	44.6
Information (GIS)	5.5	5.5	6.4
Absheron Sanctuary	0	0	43.2
PR & Environmental Education (Seminar etc.)	13.7	41.0	41.0
<b>Sub-total of priority projects</b>	<b>20.6</b>	<b>51.1</b>	<b>204.9</b>
Other O&M for Office (Electricity, Telephone etc.)	149.0	149.0	149.0
<b>Total</b>	<b>169.6</b>	<b>200.1</b>	<b>353.9</b>

#### d. Financial Evaluation

##### d.1 Financial Internal Rate of Return (FIRR)

The FIRR of two alternatives on the general budget fund are calculated as following:

Table 10-31: Result of IRR Calculation

Alternatives of Allocation of General Budget	FIRR
Alt-A	-2.6%
Alt-B	-3.5%

Both alternatives make the FIRR below zero, as far as initial investment is financed by loan. In case of Alt-B, when the share of BCE's general budget to the whole central budget does not change, the financial condition is worse than in case of Alt-A.

##### d.2 Share of BCE Budget in Central Budget

Table 10-32: Share of BCE Budget in Central Budget

Case		2000	2001	2003	2006	
C.G.Budget	Billion manat	3,931	4,265	5,021	6,592	
Alt-A	BCE Budget	Million manat	427	491	620	1,012
	Share	%	0.0109	0.0115	0.0123	0.0154
Alt-B	BCE Budget	Million manat	427	463	545	716
	Share	%	0.0109	0.0109	0.0109	0.0109

##### d.3 Share of Investment Cost for Replacement in EPF

As the investment costs for replacement are same in two alternatives, its share in the EPF is the same.

Table 10-33: Share of Investment Cost for Replacement in EPF

		Phase I (2001 – 2003)	Phase II (2004 – 2006)	Phase III (2007 – 2010)
EPF Total	Million manat	14,580	59,854	89,768
Replace Investment Cost Total	Million manat	0	332	8,322
Share	%*	0.00	0.55	9.27

The priority projects proposed need replacement investment for equipment in Phase III. It may be a heavy burden for the EPF if the tariff is not adequately revised. This implies that the team's proposal of the EPF charge revision two times in 2003 and 2006 is sensible.

#### d.4 Sensitivity Analysis

The sensitivity analyses were attempted assuming that the initial investment is financed by the soft loan and Alternative 2 for the salary table is applied.

##### d.4.1 Off-budget Revenue

Table 10-34: Sensitivity Analysis of Off Budget Revenue

	+20%	Base	-20%
FIRR (%)	-2.3	-2.6	-3.0

Unit: %

The change in FIRR is less than the change in "off budget" revenue.

##### d.4.2 Other O&M costs except personnel costs

Table 10-35: Sensitivity Analysis of Other O&M Costs

	+20%	Base	-20%
FIRR (%)	-3.4	-2.6	-1.9

Unit: %

The change in FIRR is larger than the change in O&M costs except personnel costs.

##### d.4.3 Revision of the EPF charges in 2003

When the extent to which the EPF is raised in 2003 is changed, the share of the investment cost for replacement in EPF is changed as below.

Table 10-36: Sensitivity Analysis of Revision of EPF charges in 2003

		+20%	Base	-20%
		60 times	50 times	40 times
Share of Investment Costs for Replacement in EPF	Phase II	0.46	0.55	0.69
	Phase III	7.73	9.27	11.59

Unit: %

If the raise in the EPF charge is 20% less than proposed, the share increases by 25%. When the raise in the EPF charge is 20% more than proposed, the share decreases only by 17%.

**e. Conclusion**

The FIRR calculations make it clear that the implementation of the priority projects is difficult when the initial investment is financed by loan and grants are necessary to initiate the priority projects. The examinations above also revealed the importance of revenue control of “off budget”, control of O&M costs other than personnel cost, and the necessity of revision of EPF charges. If these premises are satisfied, it is judged that the implementation of the priority projects can start to make the first step toward the realisation of the environmental management M/P.

### 10.7.5 Economic Evaluation

**a. Methodology of Economic Evaluation**

Environmental improvement can have many kinds of indirect but positive impacts such as health conditions, beautification of the city, establishment of new environmental industries which raise profit by contributing to the environment, development of tourism, etc. The quantification of such environmental benefits, however, is difficult and is often attempted only arbitrarily.

In this section, the Economic Internal Rate of Return (EIRR) is calculated for reference taking account of only two types of benefit:

- prevention of infectious diseases and respiratory diseases through strengthened environmental monitoring and inspection by the BCE;
- contribution to the tourism development by improved city beauty.

As for other impacts, a qualitative evaluation method is adopted.

The evaluation term is from 2003, when the major investment for the priority projects are to be completed, to 2010, the target year of the environmental management M/P. The salvaged value at the end of 2010 are considered as minus expenditure in 2011 as in the financial evaluation.

**b. Benefits**

**b.1 Prevention of infectious diseases and those of respiratory organs**

There were 18 patients of infectious disease in 1,000 people in 1998 in Azerbaijan, that is less than that in 1990, 30 patients in 1,000 people. 80 patients suffered the disease of respiratory organs in 1,000 people in 1998, that is also less than that in 1990, 112 patients in 1,000.

If the environmental monitoring and inspections would be poor in the process of economic recovery in Azerbaijan, the rate of occurrence could be more than the 1998 figure. The priority projects are assumed to bring a benefit to keep the morbidity rate of infectious and/or respiratory diseases of 1998 level until 2010. Although such effects will first appear in 2004, the morbidity rate in 2004 is assumed same as that in 1998. If the priority projects would not be carried out, the morbidity rate would

increase in proportion to GRDP/capita after 2004 (infectious disease: 31 patients in 1,000 people and those of respiratory organs: 139 patients in 1,000 people in 2010).

The medical consultation fee is expensive in Azerbaijan. In this study, the fee for infectious diseases is assumed to be US\$ 3 per patient, and that for diseases of respiratory organs is assumed to be US\$ 10 per patient.

### b.2 Contribution to Tourism Development

Tourism industry in Azerbaijan has grown drastically in recent years. The revenue from tourism touched US\$ 650 million in 1999 (16% of GDP). It is assumed that the impacts of the priority projects induce its increase by 0.01%. The basic revenue of tourism is assumed to increase in proportion to GRDP in Baku.

### b.3 Quantified Benefit

Under the above assumptions, benefits caused by the priority projects are as in Table 10-37.

Table 10-37: Assumed Benefit

Unit: million manat			
	2004	2006	Total (2004 – 2010)
Prevention of disease	136	1,483	5,246
Contribution to Tourism	445	788	4,219
<b>Total</b>	<b>581</b>	<b>2,271</b>	<b>9,465</b>

### c. Conversion to Economic Prices

The VAT (20%), custom tariff (15% for normal products) and unemployment rate are considered to convert market prices to economic prices.

Table 10-38: Conversion Factors for Economic Evaluation

Items		Conversion rate	
Investment	Civil & Construction	0.77* <sup>1)</sup>	
	Equipment	Foreign	0.65* <sup>2)</sup>
		Domestic	0.8* <sup>3)</sup>
O&M	Personnel Cost	Skilled	1.0
		Un-skilled	0.54* <sup>4)</sup>
	Other O&M costs		0.8* <sup>5)</sup>

Notes: 1) 30% for personnel x 0.8 + 50% for material x 0.8 + 20% for equipment x 0.65

2) 1 – VAT(20%) – Custom Tariff(15%)

3) 1 – VAT(20%)

4) Wage of Agriculture Sector(65,000manat/month) divided by Salary of C-2 in BCE(120,000manat/month)

5) 1 – VAT(20%)

As for the investment costs, the initial investment in 2003 and the investment into replacement from 2004 to 2010 are calculated.

Table 10-39: Assumed Costs for Investment

Unit: million manat

	2003	Replacement	Salvaged value	Total
Investment costs	11,940	5,291	13,419	3,812

As for the O&M costs, those after 2004 are counted. Those after 2007 is assumed to be equal to that in 2006 as in the financial evaluation.

Table 10-40 Assumed O&M Costs

Unit: million manat

	2004	2006	Total (2004 – 2010)
O&M costs	787	1,176	7,501

**d. Result of EIRR Calculation**

On the assumptions above, the EIRR is calculated at –1.8%. It is not high enough to judge the priority projects economically reasonable. If the contribution for tourism is assumed to induce 0.05%, however, EIRR leaps up to 15.2%. If the medical consultation fee is assumed to be US\$ 10 for infectious diseases and 30 US\$ for diseases of respiratory organs the EIRR becomes 8.1%.

**e. Qualitative Analysis**

The improvement of air protection and water resources protection will improve the quality of lifestyles of Baku citizens. The encouragement of the BCE for factories to introduce CPT will turn to be their financial benefit. Land protection and waste control will result in the increased land value and opportunities of other land use.

Fauna and flora protection and conservation areas management will provide improved amenity and comfort to the Baku citizen.

The laboratory and the GIS are the strong instruments for the BCE to satisfactorily conduct its responsibility.

Data management using the GIS will increase the work efficiency of the BCE and allow timely and practical decision-making.

Although it is difficult to quantify such benefits, they are presumed to be larger than the impacts, which were quantified above.

**f. Conclusion**

The GRDP of Baku, the study area, in 2003 is estimated at 10,123 billion manat. Investment cost for the proposed priority projects is 11.94 billion manat in economic price and 17.41 billion manat in market price. These figures are equivalent to only 0.12 % and 0.17 % of GRDP respectively. Therefore we conclude the investment cost for the proposed priority projects is in an affordable range of the Baku economy.

Furthermore, there are many benefits, which could not be quantified, in addition to the calculated EIRR. Therefore the proposed M/P is judged to be reasonable and recommendable.

### **10.7.6 Overall Evaluation**

Based on the above evaluation in terms of technical, social, financial and economic aspects the team concluded that all the priority projects are reasonable and recommendable in technical, social, financial and economic terms.



# Chapter 11

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*Conclusions and  
Recommendations*

## 11 Conclusions and Recommendations

### 1. Promotion of City Development with Due Attention to the Environment

At present, the city development plan of Baku City is under preparation and there is no clear development policy of city planning yet. Drive for economic development and control of excessive urbanisation must be balanced, but no criteria are given for rational decision making. For the promotion of city development with due attention to the environment, the city development plan has to be formulated as soon as possible.

Under the limitation of no city plan, the team elaborated an environmental zoning plan as shown in Plate 10 which aims at environmental land use. The team strongly urges the relevant authority to develop a city land use plan incorporating the proposed environmental zoning and officially approve the plan for practical enforcement. Environmental zoning is a powerful means of guiding sound development and protecting the natural environment provided only if it is properly enforced.

### 2. M/P Formulation for the Management of Municipal Solid Waste and Medical Waste

Water supply, wastewater treatment and waste management are the major common concerns for cities of the world. Among those issues, the M/P for water supply and wastewater treatment was made for Baku with an assistance of the WB and is being brought into effect. A study on hazardous waste management is also on-going under the WB. Municipal solid waste management is, however, laid aside without a M/P or any other forms of improvement strategies, although the problems associated with municipal solid waste are diverse including insufficient waste collection services, non-sanitary final disposal and innumerable illegal dumps. Moreover, the collapse of the FSU heavily damaged the waste recycling system well established in the Soviet time. Principal recycling items such as scrap iron and paper are not currently recycled since recipients of those items disappeared from the country.

A M/P for the management of municipal solid waste including non-hazardous industrial waste must be therefore immediately worked out in order to resolve such problems. The M/P formulation should be lead by the BEP with the district EPs and the BCE should give advises and assistance to them. In this study, the team carried out a waste amount and composition survey, and suggested issues to be covered in the M/P using its result.

There are no plans or policies either for the proper management of medical waste, some of which is at present disposed of together with municipal solid waste. A M/P for medical waste management is also urgently needed. The Ministry of Health should take an initiative for M/P formulation with a support from the BEP and the district EPs, and the BCE should assist them. The result of the survey at 40 medical institutions in this study and generation analysis and forecast of medical waste by the team will be useful for the BCE.

The team recommends the BCE to refer to the study output and to urge the relevant authorities to take necessary actions for the formulation of the M/Ps for MSWM and medical waste management.

### **3. Enhancement of the Monitoring System**

The rate of operation of manufacturing industry in Baku is one-third of that in the Soviet era. Consequently environmental degradation due to industrial pollution seems to be still in a lull. The surveys by the team revealed, however, that the quality of lake water and sediment is partly poor and air quality is threatened by vehicles, 70% of which were found to emit CO exceeding the standard. The data obtained from State Committee for Land proved the soil contamination of some areas.

Therefore, the BCE, with assistance of the SCE, has to enhance its monitoring system as in the M/P and the priority project proposed by the team. Further, data collected in the monitoring system should be entered into the GIS database, distributed to organisations that need them, and be reflected in a process to formulate concrete action plans.

### **4. Institutional Building of the BCE**

The BCE is a governmental body to watch the Baku environment and promote environmental improvement. Its institutional system is, however, seriously weak. For example, it does not possess the environmental passports or even a list of factories under its control, which should be an inevitable material for inspection. It does not own its transport means and the cost for a factory visit for inspection has to be borne by the inspectors. Furthermore, its salary level is below the standard, discouraging the staff from working for environmental improvement.

Improvement is required in every aspect for institutional building of the BCE. Particularly, the team stresses the following that are also proposed in the M/P and the priority projects.

- The BCE has to obtain tools for law enforcement such as the environmental passports, EIA reports, laboratory, and transport means.
- The BCE has to develop a data management system including data acquisition and data diffusion.
- All the BCE personnel has to develop its capability and work efficiency and be allocated to appropriate positions so that the BCE can cope with diversified and complex work requirement.
- To motivate the BCE personnel, its salary level has to be raised. It will not easy at all to raise it to the level of the private sector, but it is proposed to be equal to overall average salary in 2000 multiplied by the growth rate of GRDP/capita by 2010.

### **5. Integration and Sharing of Environmental Data**

Under the Soviet system, all information was sent to Moscow, where it was strictly controlled, and little was accessible for the general public. The influence of such social system still firmly remains, even after the collapse of the FSU and the independence of Azerbaijan. Data of the environment are kept within the relevant authorities and are closed to the general public. Access to those data requires a troublesome process and costs even state organisations not a small amount.

The acquisition of reliable data is essential to understand the environmental conditions and formulate appropriate environmental improvement plans. Data, after

acquired, then have to be diffused widely to seek for the cooperation of the general public for environmental improvement for the following reasons.

- The pollution experience of Japan in the 60's and 70's proved that environment remediation behind requires huge expenditure compared with prevention or early countermeasures. If the data are integrated and shared, then small signs of environmental degradation will be easily detected and the damage can be minimised without large expense.
- The general public are the victims of the poor environment. It is also, however, often the general public who degrade the environment, either directly or indirectly. Therefore, public involvement is important to find out and cope with environmental problems early enough.

The environmental GIS database established in the present study is an instrument to integrate environmental data scattered across different organisations, and to share those among not only policy planners but also all the citizens. Due to time constraint of the team, the established database is unfortunately not complete. The BCE and the SCE have to, by closely communicating with other relevant organisations, keep the database updated, enlarge the database, and make the database more useful for their work execution.

## 6. Effective Use of the Study Products

The development of the BCE's capability, which is necessary for M/P implementation, may not be possible only with the M/P, financial arrangement, facility and equipment. In addition, the BCE has to learn practical skills of environmental management in the field. In the present study, therefore, the team carried out a number of field investigations and pilot projects, through which the BCE gained practical experiences of environmental management. The table below summarises major products of the team and their expected use for environmental management by the BCE.

Table 11-1: Study Products and Their Expected Use

Study Products	Expected Use for BCE's Works
1. GIS Database	<ol style="list-style-type: none"> <li>1. Public relations and environmental education.</li> <li>2. Environmental data input to other studies and plans.</li> <li>3. Evaluation of other studies and plans (e.g. EIA reports).</li> <li>4. Monitoring, inspection, control and supervision of polluters.</li> <li>5. Collection of the EPF charges.</li> <li>6. Understanding of the environmental status and documentation of its assessment.</li> </ol>
2. Factories Survey	<ol style="list-style-type: none"> <li>1. Factory control based on the factory list and the summary of environmental passports.</li> <li>2. Monitoring, inspection, control and supervision of polluters.</li> <li>3. Development of environmental improvement policy taking account of opinions from the industry.</li> </ol>
3. Environmental Quality Survey	<ol style="list-style-type: none"> <li>1. Sampling and monitoring.</li> <li>2. Improved laboratory skills for environmental</li> </ol>

	measurement. 3. Understanding of the environmental status.
4. Opinion Survey for Medical Institution	1. Promotion of the formulation of medical waste management M/P. 2. Control, inspection and supervision of medical waste management.
5. Public Opinion Survey	1. Public relations and environmental education. 2. Development of environmental management policy taking account of public opinions.
6. Waste Amount and Composition Survey and Survey on Recycling Activities	1. Promotion of the formulation of municipal solid waste management M/P. 2. Promotion of the formulation of municipal solid waste recycling M/P. 3. Control, inspection and supervision of municipal solid waste management.
7. Experiment on Enhancement of the BCE Laboratory	1. Improved laboratory skills for environmental measurement. 2. Detection and supervision of polluters.
8. Development of Illegal Dump Control System	1. Control of illegal dumps. 2. Prevention of new illegal dumps. 3. Public relations and environmental education

Experience learnt by the BCE from the study should be valuable and the BCE is expected to fully utilise it for the realisation of the M/P.

## 7. Financial Arrangement for M/P Implementation

The ultimate goal of the integrated environmental management master plan is “to contribute to the sustainable growth of Baku City with due attention to the environment, by the target year 2010.” To achieve this, the M/P was formulated by placing the main focus on the improvement of environmental management capability of the BCE, the executive body of the M/P.

The team estimated that for the implementation of the M/P, US\$ 7.24 million must be invested by 2010 and O&M cost has to be raised up to US\$ 366.7 thousand from the current level of US\$ 175.7 thousand.

At present, the budget of the SCE and the BCE is significantly small. M/P implementation is far beyond of their affordability. Hence securing additional financial sources is a prerequisite. Financial arrangement proposed by the team is based on the following preconditions.

Table 11-2: Preconditions of Financial Arrangement for M/P Implementation

Phase		Phase I (2001 – 2003)	Phase II (2004 – 2006)	Phase III (2007 – 2010)
Financial Items				
Investment		Foreign finance	EPF	EPF Oil fund
O & M	Personnel Expenses	General budget Off budget	General budget	General budget
	Others	General budget Off budget	General budget Off budget	General budget

The current financial sources of the BCE are the general budget from the central government through the SCE and the “off-budget” which the BCE earns by itself.

O&M cost should be covered by the general budget because the BCE is the state body overseeing the local environment. This is set as a final target of the financial M/P. The team, however, understands that because of the financial restriction currently the country faces, the BCE can not help counting on the “off-budget” by Phase II. Therefore, the team proposes that in Phase II, the flow and usage of the “off-budget” should be transparent, it should be handed over to the central budget, and the same amount should be paid back to the BCE. The “off-budget” must be phased out in Phase III and totally abolished by 2010.

For investment, the EPF and/or the Oil fund are the possible sources. However, they are at present still small and there is no mechanism to use them for the enhancement of the BCE or any other environmental purposes. Accordingly in Phase I, finance must be sought from international or bilateral aid agencies. Meanwhile, the EPF should be expanded by drastically revising the EPF charges (namely pollution fee, fine and claim) to follow inflation (50-fold by 2003 and further fivefold by 2006) and a system to use the EPF for environmental projects must be developed. Accordingly, a portion of the EPF should be allocated for investment required in Phase II. In Phase III, the Oil Fund, which should be large enough then, should be also partly allocated as investment fund for the M/P.

## 8. Implementation of Priority Projects

Through the discussion with the BCE based on the M/P, the team selected six priority projects that are to be implemented by 2003, and examined their implications. The table below is the summary of initial investment necessary for them.

(Unit: 1,000 US\$)

	Phase I (2001 – 2003)
1. Procurement of Office Equipment	80
2. Procurement of Equipment for Inspection	1,118
3. Procurement of an Air Quality Monitoring Station	1,254
4. Procurement of Equipment for Chemical Analysis	867
5. Procurement of Equipment for Information	22
6. Development of Absheron Sanctuary	553
Total	3,894

The priority projects were evaluated from technical, social, financial and economical points of view.

The financial evaluation was on the following assumptions.

- The practically softest loan conditions are adopted (repayment term: 25 years (including 7-year grace period); interest: 1.7% per year).
- The general budget covers all the cost for personnel and office by 2004 and all the O&M cost by 2010.

- The EPF charge is raised 50 times higher than the current level by 2003 to follow inflation.
- The “off-budget” raised from the services rendered by the BCE (e.g. EIA evaluation, laboratory analysis, etc.) increases 1.5 times by 2003, and 2.2 times by 2006 compared with the 1999 level.
- To narrow the gap of salary between the public and private sectors, the salary of the public sector increases 1.64 times by 2006, where  $1.64 = 1.55 \times 1.06$ , the growth rate of GRDP/capita is 1.55, and the ratio of the present salary of the public sector to the overall average is 1.06.

On those assumptions, FIRR was calculated at  $-2.6\%$ . The team therefore concludes that investment into the priority projects using a loan will result in financial difficulties.

The quantification of environmental benefits is in general difficult and is often attempted only arbitrarily. The team attempted EIRR calculation only taking account of benefits from (i) prevention of infectious and respiratory diseases and (ii) contribution of improved city beauty to tourism industry development. On the assumptions that the doctor consultation fee for infectious diseases is US\$ 3.00, that for respiratory diseases is US\$ 10.00, and improved city beauty increases the revenue from tourism by 0.05%, EIRR is calculated at 13.2%. It is well above the threshold value of 8.0% used by the WB and EBRD (European bank for reconstruction and development) in decision making of financing. Furthermore, there should be other large benefits such as timely decision making using the GIS database and increased opportunity to have contact with nature in Absheron Sanctuary, although they are not quantified.

The team concluded that all the priority projects are reasonable and recommendable in technical, social, financial and economic terms.

The BCE is strongly recommended to implement the priority projects immediately as a first step toward the M/P. Securing investment fund from overseas is the first inevitable question to be solved and its financial source should be on a grant base as much as possible.

## 9. Efficient Use of Water Resources

Baku City stands on arid land with yearly precipitation of some 200 mm and import almost all water required in the city from a distance of hundreds kilometres. This means that social and economic activities in the city heavily depend on considerably expensive water supply. Nevertheless, ARWC (Absheron Regional Water Company) consumption data indicates domestic consumption levels of 580 litre/person/day (for comparison, 391 litre/person/day<sup>1</sup> in 1996 in Japan) and unaccounted-for-water (UFW) at 50 % of water produced.

Inefficient water use brings economic loss by wasting expensive water and also environmental burden by increasing wastewater volume to be treated. To solve this problem, the citizens should recognise that they are exhausting valuable water resources and they have to be stimulated to cooperate for water resources

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<sup>1</sup> Annual Report on Health and Welfare 1998 – 1999, Ministry of Health and Welfare of Japan, March 2000

conservation. The BCE is urged to promote publicity and educational activities in cooperation with ARWC, BEP and other organisations.

## 10. Public Awareness Raising

When an environmental issue is addressed, attention tends to be paid to sensational problems such as land contamination of oil and high SO<sub>x</sub> emission. Those are usually caused by limited part of population mainly engaged in industrial activities, and the rest most people are indifferent, considering that they are out of the picture, unless they are not affected by the problem.

However, there are environmental problems of another type, such as littering an empty cigarette box on a street and blowing the car horns constantly, which are attributed to daily habits of the general public. In Baku, although they may appear small at a first glance, such problems are so widespread that they are major non-negligible problems. However, because these arise from people's behaviour, it is difficult for themselves to actually recognise that they *are* the problems.

An environmental issue is, in plain words, a question as to how the condition of surroundings of our daily lives is. Everybody should be eager to live in a favourable surrounding and this is possible only if all the members of the society care about and make efforts to better the surroundings. If the society changes in that way, the industry will also change because the society starts to impose sanctions on polluters. There are state bodies that bear responsibilities to protect the environment, but their performance eventually depends on the support of the general public (i.e. tax payers).

Therefore the BCE has to seriously work on public awareness raising. It requires laborious, time-consuming and difficult works that must be attempted continuously even though their effect will not be easily visible. The campaign carried out in the study is one of the public awareness raising activities, but it should not be a one shot event. The BCE is strongly recommended to make the best use of the experiences obtained during the campaign, the GIS database, Absheron Sanctuary that is proposed to have recreational facility, and other outputs of the present study to tackle this challenging task.

## 11 . Monitoring of M/P Implementation

The BCE should not leave the M/P as a plan drawn in paper but bring it into effect steadily. The team recommends the BCE to develop a system to monitor the progress of the M/P as below:

- a monitoring team should be formulated within the BCE headed by the BCE chairman;
- the BCE chairman should submit a M/P monitoring report to the SCE chairman (or the Minister of Environmental Protection, if the SCE is transformed to a Ministry) every year. After reviewed and approved by the SCE chairman (or the Minister), Cabinet of Ministers and the Parliament, the report should be publicised;
- the report should describe the progress of the environmental projects to be undertaken by other organisations as well as the progress of the M/P itself (i.e. improvement of the BCE/SCE). It should also state accomplished environmental improvements as quantitatively as possible;



- in 2003 and 2006, i.e. at the end of Phase I and Phase II of the M/P, the report should include the overall evaluation of each phase, and review and revision of the M/P for the next phase if necessary, in addition to the progress in that year;
- the report of the year 2010 should contain the overall evaluation of the M/P and proposals for further actions to be taken in the following decade.