

STATE COMMITTEE ON ECOLOGY AND NATURE UTILISATION CONTROL
BAKU COMMITTEE ON ECOLOGY AND NATURE UTILISATION CONTROL
AZERBAIJAN REPUBLIC

**THE MASTER PLAN STUDY
ON
INTEGRATED ENVIRONMENTAL
MANAGEMENT
IN
BAKU CITY
IN
AZERBAIJAN REPUBLIC**

**FINAL REPORT
VOLUME II**

MAIN REPORT

MARCH 2001

KOKUSAI KOGYO CO., LTD.

S S S

J R

01-42

PREFACE

In response to a request from the Government of Azerbaijan Republic, the Government of Japan decided to conduct The Master Plan Study on Integrated Environmental Management in Baku City in Azerbaijan Republic and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Susumu Shimura, Kokusai Kogyo Co., Ltd. to Azerbaijan, three times between January 2000 to March 2001. In addition, JICA set up an advisory committee headed by Mr. Masahiro Ohta, a senior adviser on environmental policy development of the Institute for International Cooperation of JICA, which examined the study from specialist and technical points of view.

The team held discussions with the officials concerned of the Government of Azerbaijan, and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Azerbaijan Republic for their close cooperation extended to the study.

March, 2001



Kunihiko Saito

President

Japan International Cooperation Agency

March 2001

Mr. Kunihiko Saito
President
Japan International Co-operation Agency

Letter of Transmittal

Dear Mr. Saito,

It is our pleasure to submit to you the report on the Master Plan Study on Integrated Environmental Management in Baku City in Azerbaijan Republic.

The report consists of three components: the study on the current Environmental Management (EM); the formulation of the EM Master Plan (M/P) until the year 2010; and the formulation of the implementation programme for priority projects.

During the study on the current EM, seven field investigations were conducted, and existing data and information of various sources were collected and examined. By doing so, the current status of EM in Baku City was thoroughly understood, and the key environmental issues were identified.

The M/P was formulated with the principal goal of "contributing 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 aiming for the development of an EM policy framework and the enhancement of capacity to enforce the EM policy framework in Baku City.

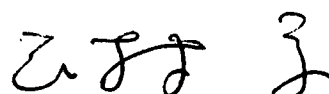
The implementation programme was formulated on six priority projects that should be implemented from 2001 to 2003: development of environmental data management; institutional capacity building for the BCE; development of environmental monitoring system; development of nature conservation system; development of illegal dumping control system; and development of supervision and support system for M/P formulation of municipal solid waste and waste recycling. From the technical, the social, the financial, and the economical assessments of these projects, we concluded that they would be viable and sound in every aspect.

During the study we conducted two pilot projects with the close co-operation of the Azeri counterparts in order to identify and to overcome the difficulties that may arise in the realisation of the M/P: experiment on enhancement of the BCE laboratory; and experiment on development of illegal dump control system. We also held seminars on technology transfer to publicise the results of the study. These activities were reported in the local media, and attracted much attention from the general public.

We would like to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, and the Ministry of Environment of Japan. We would also like to extend our deep appreciation to the Cabinet of Ministers and Ministry of Foreign Affairs of Azerbaijan, SCE and BCE, and the Embassy of Japan for their vital co-operation during the implementation of our study in the Republic of Azerbaijan.

Last but not least, we hope that the output of our study presented here will contribute to the improvement of EM and the sustainable growth of Baku City.

Respectfully,



Susumu Shimura
Team Leader
Master Plan Study on Integrated
Environmental Management in Baku
City in Azerbaijan Republic

The Study on Integrated Environmental Management in Baku City in Azerbaijan Republic

List of Volumes

Volume I	Executive Summary
Volume II	Main Report
Volume III	Supporting Report
Volume IV	Data Book

All the volumes are also available in Russian.

This is the Main Report.

In this report, the project cost is estimated by using the price as of the end of October 2000 and the exchange rate of US\$ 1.00 = 108.30 Japanese Yen = 4550 Manat.



Location of the Study Area

CONTENTS

Preface

Letter of Transmittal

List of Volumes

Location of the Study Area

Plates

	Page:
1 Introduction.....	1-1
1.1 Background	1-1
1.2 Scope of the Study.....	1-2
1.2.1 Environmental Management.....	1-2
1.2.2 Components of Environmental Management	1-2
1.2.3 Objectives of the Study	1-3
1.3 Policies of the Study	1-3
1.4 Study Area.....	1-4
1.5 Work Schedule	1-4
1.6 Study Organisation and Persons Involved	1-7
1.6.1 Study Organisation.....	1-7
1.6.2 Persons Involved.....	1-7
1.7 Reports.....	1-8
1.8 Technology Transfer.....	1-9
2 Profile of the Study Area	2-1
2.1 Country Profile and the Environment.....	2-1
2.1.1 Socioeconomic Conditions	2-1
2.1.2 Industry.....	2-7
2.1.3 Administration and Organisation.....	2-9
2.1.4 Natural Settings.....	2-14
2.2 Profile of the Study Area	2-15
2.2.1 Definition of Study Area	2-15
2.2.2 Natural Environment	2-16
2.2.3 Land Use.....	2-22
2.2.4 Socio-economic Conditions in Baku.....	2-30
2.2.5 Urban Services.....	2-34
3 Findings in Field Investigations.....	3-1
3.1 Mobile Pollution Source Survey	3-1
3.1.1 Traffic Volume Survey.....	3-1
3.1.2 Type of Fuel used by Large Vehicle	3-2

3.1.3	Measurement of Vehicle Emissions	3-5
3.2	Factories (Point Pollution Sources) Survey	3-5
3.2.1	Objectives	3-5
3.2.2	Review of Environmental Passport.....	3-6
3.2.3	Opinion Survey for Factories.....	3-9
3.3	Environmental Quality Survey.....	3-11
3.3.1	Assessment of Reliability and Accuracy of Data	3-11
3.3.2	Data Verification.....	3-12
3.3.3	Environmental Quality Survey	3-14
3.4	Opinion Survey for Medical Institutions	3-15
3.4.1	Objectives	3-15
3.4.2	Medical and General Waste Generation from Medical Institutions	3-16
3.4.3	Current Medical Waste Management.....	3-17
3.4.4	Financial Matters.....	3-19
3.5	Public Opinion Survey.....	3-19
3.5.1	Objectives	3-19
3.5.2	Survey Method.....	3-19
3.5.3	Findings	3-19
3.6	Waste Amount and Composition Survey (WACS).....	3-22
3.6.1	Objectives	3-22
3.6.2	Results of the Survey.....	3-22
3.6.3	Waste Composition Analysis.....	3-23
3.6.4	Waste Stream	3-26
3.6.5	Waste Discharge Amount Forecast.....	3-28
3.6.6	Waste Composition Forecast	3-31
3.6.7	Forecast of Waste Stream.....	3-31
3.7	Survey of Recycling Activities	3-34
3.7.1	Survey of Recycling System.....	3-34
3.7.2	Survey of Waste Pickers.....	3-38
3.7.3	Survey of Recycling Companies/Unions	3-42
4	Environmental Management of Study Area.....	4-1
4.1	Environmental Status.....	4-1
4.1.1	Air	4-1
4.1.2	Water	4-5
4.1.3	Soil	4-7
4.1.4	Others	4-10
4.2	Environmental Policy	4-10
4.2.1	Environmental Policy.....	4-10
4.2.2	National Environmental Action Plan	4-11
4.3	Institution	4-17
4.3.1	Organisation.....	4-17
4.3.2	Legislation	4-23
4.3.3	Financial System.....	4-26
4.3.4	Land Use.....	4-38

4.4	Technical Management.....	4-38
4.4.1	Monitoring System and Laboratories.....	4-38
4.4.2	Pollution Source Control.....	4-41
4.4.3	Nature Conservation.....	4-45
4.4.4	Geographical Information System.....	4-49
4.4.5	Food Control.....	4-53
4.4.6	EIA.....	4-54
4.4.7	Protection of Mineral Resources.....	4-54
5	Identification of Key Environmental Issues.....	5-1
5.1	Environmental Status.....	5-1
5.2	Environmental Policy.....	5-1
5.3	Environmental Institution.....	5-2
5.3.1	Organisation.....	5-2
5.3.2	Legislation.....	5-3
5.3.3	Financial System.....	5-4
5.3.4	Land Use.....	5-5
5.4	Technical Management.....	5-7
5.4.1	Monitoring System.....	5-7
5.4.2	Pollution Source Control.....	5-12
5.4.3	Nature Environment Conservation.....	5-21
5.4.4	GIS.....	5-26
5.4.5	Food Control.....	5-29
5.4.6	EIA.....	5-30
5.4.7	Protection of Mineral Resources.....	5-30
6	Master Plan Framework.....	6-1
6.1	Socio-economic Framework.....	6-1
6.1.1	National Development Plan.....	6-1
6.1.2	Baku City Development Master Plan.....	6-2
6.1.3	Completed/On-Going/Planned Environmental Projects.....	6-3
6.1.4	Population Forecast.....	6-6
6.1.5	Economic and Industrial Development.....	6-7
6.1.6	Implication of Population Forecast and Economic Development to the Environment.....	6-8
6.2	Master Plan Framework.....	6-10
6.2.1	Definition of Environmental Management Master Plan.....	6-10
6.2.2	Goals.....	6-10
6.2.3	Targets.....	6-11
6.2.4	Environmental Zoning.....	6-14
6.2.5	Institutional Framework.....	6-19
7	Environmental Management Master Plan.....	7-1
7.1	Air Protection.....	7-1
7.1.1	Directions.....	7-1
7.1.2	Strategies.....	7-1
7.1.3	Monitoring.....	7-4

7.1.4	Law Enforcement.....	7-5
7.1.5	Data and Information Management	7-6
7.1.6	Investment Plan.....	7-6
7.1.7	Personnel Plan.....	7-6
7.2	Water Resources Protection.....	7-6
7.2.1	Directions.....	7-6
7.2.2	Strategies	7-7
7.2.3	Monitoring	7-10
7.2.4	Law Enforcement.....	7-11
7.2.5	Data and Information Management	7-11
7.2.6	Investment Plan.....	7-11
7.2.7	Operation and Maintenance (Personnel) Plan	7-12
7.3	Land Protection and Waste Control	7-12
7.3.1	Directions.....	7-12
7.3.2	Strategies	7-15
7.3.3	Monitoring and Inspections	7-20
7.3.4	Law Enforcement and Incentives.....	7-21
7.3.5	Data and Information Management	7-23
7.3.6	Investment Plans	7-23
7.3.7	Personnel Plan.....	7-23
7.4	Fauna and Flora Protection and Conservation Areas Management	7-23
7.4.1	Fauna Protection	7-23
7.4.2	Flora Protection.....	7-27
7.4.3	Conservation Areas Management	7-30
7.4.4	Data and Information Management for Fauna and Flora Protection and Conservation Areas Management.....	7-34
7.4.5	Investment Plans for Fauna and Flora Protection and Conservation Areas Management.....	7-34
7.4.6	Personnel Plan.....	7-34
7.5	Laboratory (Chemical Analysis)	7-35
7.5.1	Directions.....	7-35
7.5.2	Strategies	7-36
7.5.3	Monitoring	7-38
7.5.4	Law Enforcement.....	7-38
7.5.5	Data and Information Management	7-39
7.5.6	Investment Plan.....	7-39
7.5.7	Personnel Plan.....	7-39
7.6	Food Environment Control	7-40
7.6.1	Directions.....	7-40
7.6.2	Monitoring	7-43
7.6.3	Law Enforcement.....	7-44
7.6.4	Data and Information Management	7-44
7.6.5	Investment Plan.....	7-44
7.6.6	Personnel Plan.....	7-44
7.7	EIA	7-45
7.7.1	Direction.....	7-45
7.7.2	Strategies	7-45
7.7.3	Monitoring	7-48

7.7.4	Law Enforcement.....	7-48
7.7.5	Data and Information Management	7-49
7.7.6	Investment Plan.....	7-49
7.7.7	Operation and Maintenance (Personnel) Plan	7-49
7.8	Information.....	7-50
7.8.1	Directions.....	7-50
7.8.2	Strategies	7-52
7.8.3	Monitoring	7-54
7.8.4	Law Enforcement.....	7-54
7.8.5	Data and Information Management	7-54
7.8.6	Investment Plan.....	7-55
7.8.7	Personnel Plan.....	7-55
7.9	Administration Department.....	7-55
7.9.1	Direction.....	7-55
7.9.2	Strategies	7-56
7.9.3	Monitoring	7-59
7.9.4	Law Enforcement.....	7-59
7.9.5	Data and Information Management	7-60
7.9.6	Investment plan.....	7-60
7.9.7	Personnel plan.....	7-60
7.10	Financial Management.....	7-60
7.10.1	SCE	7-60
7.10.2	BCE.....	7-63
8	Implementation Plan and Evaluation of the Master Plan .	8-1
8.1	Implementation Plan.....	8-1
8.2	Investment Plan.....	8-1
8.3	Cost Estimation	8-1
8.4	Financial Planning and Evaluation.....	8-10
8.4.1	Financial Planning for Master Plan.....	8-10
8.4.2	Financial Evaluation.....	8-15
8.5	Economic Evaluation.....	8-17
8.6	Selection of Priority Project.....	8-17
9	Pilot Projects	9-1
9.1	Plan of Pilot Projects	9-1
9.1.1	Objectives	9-1
9.1.2	Selection of Pilot Projects	9-1
9.1.3	Implementation Schedule	9-2
9.2	Experiment on Enhancement of the BCE Laboratory.....	9-2
9.2.1	Objectives	9-2
9.2.2	Plan of the Experiment	9-2
9.2.3	Implementation of the Experiment	9-4
9.2.4	Findings	9-6
9.3	Experiment on Development of Illegal Dump Control System.....	9-9

9.3.1	Background.....	9-9
9.3.2	Plan of Experiment.....	9-9
9.3.3	Implementation of the Experiments.....	9-11
9.3.4	Results and Findings	9-12
10	Priority Projects	10-1
10.1	Development of Environmental Data Management	10-1
10.1.1	Targets.....	10-1
10.1.2	Improvement Plan.....	10-1
10.1.3	Facilities and Equipment Plan	10-4
10.2	Institutional Capacity Building for the BCE.....	10-4
10.2.1	Background.....	10-4
10.2.2	Targets.....	10-6
10.2.3	Improvement Plan Methodology	10-7
10.2.4	Facilities and Equipment Plan	10-9
10.3	Development of Environmental Monitoring System	10-10
10.3.1	Targets.....	10-10
10.3.2	Improvement Plan and Facilities and Equipment Plan for the Priority Project.....	10-16
10.4	Development of Nature Conservation System.....	10-21
10.4.1	Background.....	10-21
10.4.2	Absheron Sanctuary Development Plan.....	10-21
10.4.3	Operation	10-29
10.4.4	Maintenance.....	10-30
10.5	Development of Illegal Dump Control System.....	10-31
10.5.1	Background.....	10-31
10.5.2	Target.....	10-31
10.5.3	Improvement Plan	10-31
10.5.4	Facilities and Equipment Plan	10-34
10.6	Development of Supervision and Support System for M/P Formulation of MSWM and Waste Recycling	10-35
10.6.1	Important Issues for MSWM M/P and Waste Recycling.....	10-35
10.6.2	Outlines of Recommended MSWM M/P	10-35
10.6.3	Action Plan for BCE	10-52
10.7	Project Evaluation	10-53
10.7.1	Project Cost.....	10-53
10.7.2	Technical Evaluation.....	10-53
10.7.3	Social Evaluation	10-55
10.7.4	Financial Evaluation.....	10-56
10.7.5	Economic Evaluation	10-64
10.7.6	Overall Evaluation	10-66
11	Conclusions and Recommendations	11-1

List of Tables

	Page:
Table 2-1: Population.....	2-1
Table 2-2: Azerbaijan Economic Recovery	2-1
Table 2-3: GDP Distribution & Real Growth Rates by Sector	2-2
Table 2-4: Principal Economic Indicators in 1999	2-3
Table 2-5: Ratio of Non-Governmental Sector	2-4
Table 2-6: Central Government Budget (Breakdown of Revenue & Expenditure)	2-5
Table 2-7: Changes in the Employed Population by Industry Type.....	2-6
Table 2-8: Inflation and Exchange Rates	2-6
Table 2-9: Distribution of Average per Capita Income in 1998	2-7
Table 2-10: Changes in Industrial Structure	2-7
Table 2-11: Activities under the Market Economy (1999).....	2-8
Table 2-12: Physical Volume Indices of Industrial Production by Sector.....	2-8
Table 2-13: Structure of Industrial Production(1999)	2-9
Table 2-14: Land Use of the Country	2-14
Table 2-15: Meteorological Data (1990-1999)	2-16
Table 2-16: Wind Direction Data (1990-1999, unit: %)... ..	2-17
Table 2-17: Fish, Amphibian, Reptile, and Mammal Species of the Absheron Peninsula Listed in the Azerbaijan Red Data Book.....	2-19
Table 2-18: Bird Species Found in the Absheron Peninsula and the Azerbaijan Red Data Book.....	2-21
Table 2-19: Land Use of Baku city	2-26
Table 2-20: Population of Baku, 1989, 1999	2-30
Table 2-21: Number of Refugees and Internally Displaced Population by District, 1999	2-31
Table 2-22: Population of Azerbaijan from 1989 to 1999.....	2-32
Table 2-23: Concentration by Industry & Data Source	2-32
Table 2-24: Baku GRDP.....	2-33
Table 2-25: Industrial Economic Activities in Baku.....	2-34
Table 2-26: Present and Future Population Served City Water in Greater Baku.....	2-35
Table 2-27: Existing Water Resources in Greater Baku.....	2-36
Table 2-28: Wastewater Treatment of BSD Service Area.....	2-39
Table 2-29: Comparison of MSW Generation	2-42
Table 2-30: Solid Waste Disposal Sites in Baku City.....	2-45
Table 3-1: Distribution of Traffic Volume in the Centre of Baku	3-1
Table 3-2: Traffic Volume To and From the Suburban Area of Baku	3-2
Table 3-3: Ratio of Large Vehicles to Traffic Volume	3-2
Table 3-4: Details of Large Vehicles.....	3-3
Table 3-5: Mileage of Large Vehicles (km/month).....	3-4
Table 3-6: Mileage of Large Vehicles by Fuel	3-4
Table 3-7: Fuel Consumption by Large Vehicle	3-4
Table 3-8: Result of Vehicle Emission (CO)	3-5
Table 3-9: Rate of Surveyed Factories	3-6
Table 3-10: Comparison of the Results by Hydromet and by JICA Team.....	3-11
Table 3-11: Evaluation of Water Quality Analysis at Lake Beyuk-Shor (mg/l).....	3-12
Table 3-12: Evaluation of sediment analysis at Baku bay area (mg/kg)	3-12
Table 3-13: Comparison of Gas Emitted from Factories.....	3-13
Table 3-14: Comparison of Wastewater from Factories.....	3-14

Table 3-15: Air Quality polluted by Vehicle Exhaust Gas	3-14
Table 3-16: Medical Waste Generation Amount	3-16
Table 3-17: Medical Waste Generation in Other Countries	3-16
Table 3-18: General Waste Generation Amount	3-17
Table 3-19: Forecast Generation Amount.....	3-17
Table 3-20: Fee for Public Services.....	3-21
Table 3-21: Household Waste Discharge rate in the Target Area.....	3-23
Table 3-22: Discharge Rate of Other Types of Waste.....	3-23
Table 3-23: Results of Waste Composition Survey and MSW.....	3-25
Table 3-24: Results of Chemical Analysis.....	3-26
Table 3-25: Population by Income Level & Household Waste Discharge Rate.....	3-26
Table 3-26: Amount of Bottles Recycled at Households.....	3-27
Table 3-27: Daily Waste Discharge Amount (2000).....	3-27
Table 3-28: Daily Recycled Waste Amount* ¹	3-28
Table 3-29: Waste Stream.....	3-28
Table 3-30: Baku Population Projection.....	3-29
Table 3-31: Forecast of Waste Discharge Rate.....	3-30
Table 3-32: Forecast of Number of Waste Discharge Sources	3-30
Table 3-33: Forecast of Waste Discharge Amount	3-30
Table 3-34: Future Waste Composition Forecast	3-31
Table 3-35: Targets of MSWM M/P	3-32
Table 3-36: Forecast Waste Stream.....	3-32
Table 3-37: Questionnaire Survey Results (Recycle Activity)	3-34
Table 3-38: Amount of Recycled Materials by Income Level.....	3-35
Table 3-39: Monthly Quantity of Recyclable Materials Purchased by Middlemen....	3-36
Table 3-40: Categories and Main Products of End Users.....	3-36
Table 3-41: Monthly Quantity of Recyclable Materials Purchased by End Users	3-36
Table 3-42: Total Amount of Recycling.....	3-37
Table 3-43: Monthly Income.....	3-39
Table 3-44: Working Years.....	3-40
Table 3-45: List of Main Collected Materials	3-40
Table 3-46: Main Buyers	3-40
Table 3-47: Annual Sales of the Recycled Materials	3-41
Table 3-48: Price of Recycled Materials	3-41
Table 3-49: Usage of Recycled Materials – Known or Unknown	3-41
Table 3-50: Concerns of Waste Pickers.....	3-42
Table 3-51: Future Collection Amount.....	3-42
Table 3-52: Types of Business and Property of Surveyed Companies	3-43
Table 3-53: Location of Companies	3-43
Table 3-54: Number of Workers and Working Years	3-44
Table 3-55: Categories and Main Products of Companies	3-44
Table 3-56: Type of Glass Deal with by Middlemen	3-45
Table 3-57: Products of End User Companies	3-45
Table 3-58: Main Types of Supplies and Clients	3-46
Table 3-59: Volumes of Transportations by Categories of Companies (1999)	3-46
Table 3-60: Main Suppliers to Companies	3-47
Table 3-61: Annual Sales Volumes (in the manat)	3-47
Table 3-62: Cost of transportation.....	3-48
Table 3-63: Annual Supply Volumes by Sources	3-48
Table 3-64: Material Prices.....	3-48

Table 3-65: Number of companies with various types of treatment process.....	3-49
Table 3-66: End Product – Known or Unknown.....	3-49
Table 3-67: Governmental Support – For or Against.....	3-49
Table 3-68: Volume Tendency of Products.....	3-50
Table 4-1: Number of Monitoring Points Exceeding MPE (1999).....	4-1
Table 4-2: Air Quality at the Monitoring Station No.5.....	4-1
Table 4-3: Air Quality at the Monitoring Station No.15.....	4-1
Table 4-4: Air Quality at the Monitoring Station No.17.....	4-2
Table 4-5: Air Quality at the Monitoring Station No.19.....	4-2
Table 4-6: Air Quality at the Monitoring Station No.37.....	4-2
Table 4-7: Air Quality at the Monitoring Station No.38.....	4-2
Table 4-8: Air Quality at the Monitoring Station No.39.....	4-3
Table 4-9: Air Quality at the Monitoring Station No.40.....	4-3
Table 4-10: Air Quality at the Monitoring Station No.48.....	4-3
Table 4-11: Water Quality in Lake Yasamal 1.....	4-5
Table 4-12: Water Quality in Lake Yasamal 2.....	4-5
Table 4-13: Water Quality in Lake Ganli-Gol.....	4-6
Table 4-14: Water Quality in Lake Beyuk-Shor.....	4-6
Table 4-15: Water Quality in Lake Bul-Bul.....	4-6
Table 4-16: Information of Soil Contamination.....	4-8
Table 4-17: The 1999 Law on Environment.....	4-24
Table 4-18: SCE Budget.....	4-27
Table 4-19: Breakdown of Expenditure in SCE.....	4-28
Table 4-20: BCE Budget.....	4-29
Table 4-21: Breakdown of Off-budget Revenue in 1999.....	4-29
Table 4-22: Breakdown of BCE Expenses (1999).....	4-30
Table 4-23: Breakdown of Budget Revenue (Expenditure)* in BCE.....	4-30
Table 4-24: Breakdown of Off-budget Revenue in BCE.....	4-31
Table 4-25: Breakdown of Off-budget Expenditure in BCE.....	4-31
Table 4-26: Breakdown of Environmental Protection Fund in BCE.....	4-32
Table 4-27: Environmental Protection Fund by Department in BCE.....	4-32
Table 4-28: Communal and Housing Service Department Budget (2000).....	4-33
Table 4-29: District Population & Population Targeted by the Communal and Housing Services (1998).....	4-33
Table 4-30: Division of General Waste Collection, Street Sweeping and Waste Disposal Services by District.....	4-34
Table 4-31: Data on District Street Sweeping and Waste Collection by the Housing and Communal Services (1998).....	4-35
Table 4-32: 1988 Revenue & Expenditure and 1999 Revenue from Fee Collection..	4-36
Table 4-33: Water Supply Tariff.....	4-36
Table 4-34: Sewerage Tariff.....	4-37
Table 4-35: Outline of Documents required for Controlling Factories (Point Pollution Sources).....	4-43
Table 4-36: Natural Monuments in Greater Baku.....	4-47
Table 4-37: List of Hardware and Software Employed in Environmental Rehabilitation Project of Sumgait.....	4-49
Table 4-38: Database Structure in GIS Established in Environmental Rehabilitation Project of Sumgait.....	4-50
Table 4-39: List of Hardware and Software Employed for the Baku Bay Gulf Oil Pollution Project.....	4-50

Table 4-40: List of Hardware and Software Employed in GIS of ANASA	4-51
Table 4-41: Hardware and Software Employed in the CEP	4-52
Table 5-1: Priority of Environmental Conservation Countermeasures	5-13
Table 5-2: Comparison of MSW Generation.....	5-19
Table 5-3: Greenery Space by District (1).....	5-23
Table 5-4: Greenery Space by District (2).....	5-24
Table 6-1: Status of Other Environmental Projects.....	6-4
Table 6-2: Baku Population (1995 – 1999).....	6-6
Table 6-3: Baku Population Projection.....	6-7
Table 6-4: Economic Development Forecast	6-8
Table 6-5: Industrial Structure in 2010.....	6-8
Table 6-6: Predicted Pollution Loads	6-9
Table 6-7: Targets for Each Environmental Sector	6-12
Table 6-8: Environmental Zoning Proposal.....	6-17
Table 7-1: Financing Plan of Priority Projects.....	7-65
Table 8-1: Implementation Plan	8-1
Table 8-2: Investment Plan	8-8
Table 8-3: Cost Schedule of the EM M/P	8-9
Table 8-4: The Investment Costs for Master Plan.....	8-10
Table 8-5: The O&M Costs for the Master Plan	8-10
Table 8-6: Assumed Amount of National General Budget and Oil Fund	8-11
Table 8-7: EPF Charges	8-12
Table 8-8: BCE Budget from National General Budget and its Share	8-12
Table 8-9: Revenue Plan of Off Budget	8-13
Table 8-10: Assumed Salary Table	8-14
Table 8-11: Changes of Personnel Costs	8-15
Table 8-12: Calculation Results by Alternatives.....	8-15
Table 8-13: Priority Projects	8-18
Table 9-1: Implementation Schedule of the Pilot Project.....	9-2
Table 9-2: The Plan of BCE Laboratory.....	9-3
Table 9-3: Descriptions and Responsibilities of the Project	9-4
Table 9-4: Work Schedule for the Experiment on Enhancement of the BCE Laboratory.....	9-5
Table 9-5: Laboratory Facilities installed in the BCE Laboratory	9-5
Table 9-6: Analysis Methods	9-5
Table 9-7: Specification of Analysis equipment	9-6
Table 9-8: Oil Content	9-6
Table 9-9: Heavy metal (Cd, Pb, As, Cr).....	9-6
Table 9-10: Work Division of Experiment	9-11
Table 9-11: Implementation Schedule	9-11
Table 9-12: Type of Machinery Used for Cleanup.....	9-13
Table 10-1: Data Digitalisation Requirement	10-3
Table 10-2: Environmental Management and Compliance - Key Factors	10-5
Table 10-3: Achievement of Targets	10-6
Table 10-4: Targets for Environmental Monitoring	10-14
Table 10-5: Improvement Plan and Facilities and Equipment Plan for the Priority Project.....	10-18
Table 10-6: Current Land Use.....	10-23
Table 10-7: Park Maintenance - Items and Frequency	10-30
Table 10-8: MSW Discharge Rate.....	10-37
Table 10-9: Comparison of Waste Generation and Discharge.....	10-37

Table 10-10: MSW Discharge Amount	10-38
Table 10-11: Composition of Discharged Waste	10-39
Table 10-12: Comparison of Composition of Discharged Waste	10-40
Table 10-13: Assessment of Current SWM	10-41
Table 10-14: Baku Population Projection.....	10-42
Table 10-15: Forecast of Waste Discharge Amount	10-43
Table 10-16: Forecast of Waste Composition of MSWM	10-44
Table 10-17: Examination Table for Appropriate Technical System Design.....	10-45
Table 10-18: Targets of MSWM M/P.....	10-47
Table 10-19: Strategy for Realisation of the MSWM M/P.....	10-48
Table 10-20: The MSWM Master Plan for Greater Baku	10-50
Table 10-21: Action Plan for BCE	10-52
Table 10-22: Cost Schedule of the Priority Projects	10-53
Table 10-23: Major Assumptions of Financial Evaluation.....	10-57
Table 10-24: Revenue Plan of Off Budget.....	10-59
Table 10-25: Revenue of Off Budget	10-60
Table 10-26: Investment Costs for Financial Evaluation	10-60
Table 10-27: Life Span by Facilities and Equipment	10-60
Table 10-28: Assumed Salary Table.....	10-61
Table 10-29: Personnel Costs for Financial Evaluation	10-61
Table 10-30: Other O&M Costs.....	10-62
Table 10-31: Result of IRR Calculation	10-62
Table 10-32: Share of BCE Budget in Central Budget.....	10-62
Table 10-33: Share of Investment Cost for Replacement in EPF	10-63
Table 10-34: Sensitivity Analysis of Off Budget Revenue	10-63
Table 10-35: Sensitivity Analysis of Other O&M Costs.....	10-63
Table 10-36: Sensitivity Analysis of Revision of EPF charges in 2003.....	10-63
Table 10-37: Assumed Benefit.....	10-65
Table 10-38: Conversion Factors for Economic Evaluation.....	10-65
Table 10-39: Assumed Costs for Investment	10-66
Table 10-40 Assumed O&M Costs	10-66
Table 11-1: Study Products and Their Expected Use.....	11-3
Table 11-2: Preconditions of Financial Arrangement for M/P Implementation	11-4

List of Figures

	Page:
Figure 1-1: Study Area.....	1-5
Figure 1-2: Work Process	1-6
Figure 2-1: State Organisation of Azerbaijan Republic.....	2-12
Figure 2-2: Organisation of Central Government	2-13
Figure 2-3: Evolution of Baku (1)	2-23
Figure 2-4: Evolution of Baku (2)	2-24
Figure 2-5: Current Land Use of Baku	2-27
Figure 2-6: City Water Facilities	2-37
Figure 2-7: Sewage Treatment Facilities	2-40
Figure 2-8: Solid Waste Disposal Facilities.....	2-46
Figure 3-1: Present Waste Stream (2000).....	3-33
Figure 3-2: Waste Stream (2010)	3-33
Figure 3-3: Recycling Flow Diagram for Recovered Materials.....	3-37
Figure 3-4: Respondents distributed to the Districts in compliance with age.....	3-39
Figure 4-1: Location of Monitoring Stations	4-4
Figure 4-2: Oil Contamination Map	4-7
Figure 4-3: Location of Soil Contaminated by Metals	4-9
Figure 4-4: State Committee for Ecology; Organisation Structure.....	4-20
Figure 4-5: BCE: Organisational Structure March 2000	4-21
Figure 4-6: BCE: Organisational Structure May 2000	4-22
Figure 5-1: Stance of the Team for Land Use Issue	5-6
Figure 5-2: Function of the Central Laboratory and Relationship with the BCE	5-10
Figure 5-3: Tasks and Problems of the BCE Fauna Protection Works	5-22
Figure 5-4: Problem Tree of Flora Protection.....	5-25
Figure 5-5: Series of Actions Involved in the GIS	5-28
Figure 5-6: Food, Environment and BCE/SCE	5-29
Figure 6-1: BCE Transition to Ministry Branch Office.....	6-25
Figure 8-1: Yearly Expenditure.....	8-13
Figure 8-2: Cash Flow in Case L-2	8-16
Figure 9-1: Layout of BCE Laboratory	9-3
Figure 10-1: Air Quality Monitoring Network	10-12
Figure 10-2: Water Quality Monitoring Network	10-13
Figure 10-3: Satellite Image of Absheron Sanctuary	10-22
Figure 10-4: Current Land Use	10-23
Figure 10-5: Perspective View of Sanctuary Park	10-24
Figure 10-6: Example of Information Board	10-25
Figure 10-7: Proposed Design of Nature Centre	10-26
Figure 10-8: Observation House	10-27
Figure 10-9: Example of Signboards.....	10-27
Figure 10-10: Layout Plan of Absheron Sanctuary	10-28
Figure 10-11: Layout Plan of Footpath and Observation Houses	10-29
Figure 10-12: Schematic Illegal Dump Control System.....	10-33
Figure 10-13: Waste Stream in 2000	10-40
Figure 10-14: Waste Stream in 2010	10-50

LIST OF ABBREVIATIONS

ANASA	Azerbaijan National Aerospace Agency
ARWC	Absheron Regional Water Company
BCE	Baku Committee on Ecology and Nature Utilisation Control
BEP	Baku Executive Power
CAWF	Committee of Amelioration and Water Farm
COM	Cabinet of Ministers
C/P	Counter Part
CPT	Cleaner Production Technology
DF/R	Draft Final Report
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EM M/P	Environmental Management Master Plan
EP	Executive Power
EPF	Environmental Protection Fund
EU	European Union
FIRR	Financial Internal Rate of Return
F/R	Final Report
FSU	Former Soviet Union
GDP	Gross Domestic Product
GIS	Geographical Information System
GoAz	Government of Azerbaijan
GRDP	Gross Regional Domestic Product
HWM	Hazardous waste management
Hydromet	State Committee for Hydro-meteorology
IC/R	Inception Report
IDP	Internally Displaced Persons
IT/R	Interim Report
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
MOEP	Ministry of Environmental Protection
M/M	Minutes of Meetings
MOH	Ministry of Health
M/P	Master Plan
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NEAP	National Environmental Action Plan
NGO	Non-governmental Organisation
O&M	Operation and Maintenance
PIU	Project Implementation Unit
POS	Public Opinion Survey

P/R	Progress Report
PPP	Polluters Pay Principle
PVI	Physical Volume Index
SCMS	State Committee for Mining Supervision
SCE	State Committee on Ecology and Nature Utilisation Control
SOCAR	State Oil Company of Azerbaijan Republic
S/W	Scope of Work
Tacis	Technical Assistance programme for the CIS
UEIP	Urgent Environmental Investment Project
UNDP	United Nations Development Programme
UPA	UP Azerbaijan
VOC	Volatile Organic Compound
WACS	Waste Amount and Composition Survey
WB	The World Bank
WTP	Willingness to Pay