JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

BUDAPEST CAPITAL CITY GOVERNMENT

THE REPUBLIC OF HUNGARY

THE STUDY
ON
THE MUNICIPAL SOLID WASTE MANAGEMENT
IN
BUDAPEST

FINAL REPORT
MAIN REPORT

SEPTEMBER 1993

ENVIRONMENTAL TECHNOLOGIC CONSULTANT CO., LTD.
(ETC)

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In this report, project cost is estimated at March 1993 price and at an exchange rate of 1US$=84Ft=¥120

PREFACE

In response to a request from the Government of the Republic of Hungary, the Government of Japan decided to conduct a master plan and feasibility study on the Municipal Solid Waste Management in Budapest and entrusted the study to the Japan International Cooperation Agency (JICA).

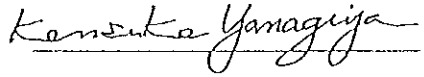
JICA sent to Hungary a study team headed by Mr.Katsuhiro Kawamura, Environmental Technologic Consultant Co., Ltd, four times between April 1992 and July 1993.

The team held discussions with the officials concerned of the Government of Hungary, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Hungary for their close cooperation extended to the team.

September 1993



Kensuke Yanagiya
President
Japan International Cooperation Agency

September 1993

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Yanagiya,

Letter of Transmittal

We are pleased to submit to you the study report on the Municipal Solid Waste Management in Budapest in the Republic of Hungary. This study contains the master plan until 2005 and the feasibility study on the first priority project.

The master plan proposes the construction of the transfer station, operation of the existing incineration plant, construction of the new incineration plant, operation of final disposal sites and purchasing of collection vehicles, and the feasibility study was conducted for the first priority project which consists of the construction of the new incineration plant.

Throughout the study, we have taken into full consideration the present situation in Budapest, and have concluded that the proposed first priority project is feasible. We recommended to the Municipality of Budapest Capital City that the first priority project should be implemented provided economic and financial status would exceed the assumption made in this study.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, the Ministry of Health and Welfare and Members of the Advisory Committee. We also wish to express our deep gratitude to the Ministry for Environment and Regional Policy, the Municipality of Budapest Capital City, and the Embassy of Japan in the Republic of Hungary.

At last, we hope that this report will be effectively used for the implementation of the project.

Respectfully,

川村勝弘

Katsuhiro Kawamura
Team Leader
The Study on the Municipal Solid Waste Management in Budapest
in the Republic of Hungary

Plate 1 : Image of New Incineration Plant (HHM2)

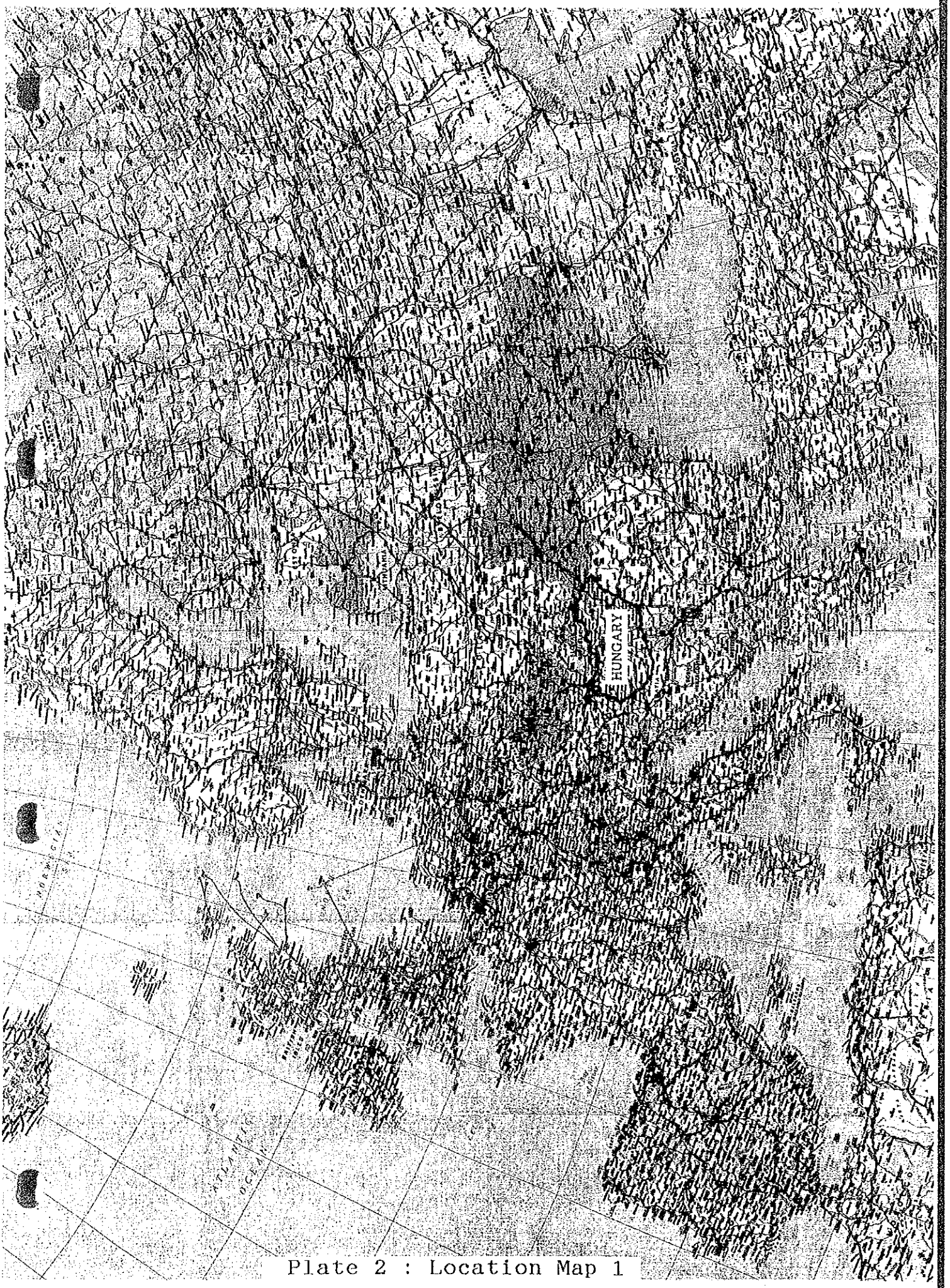


Plate 2 : Location Map 1

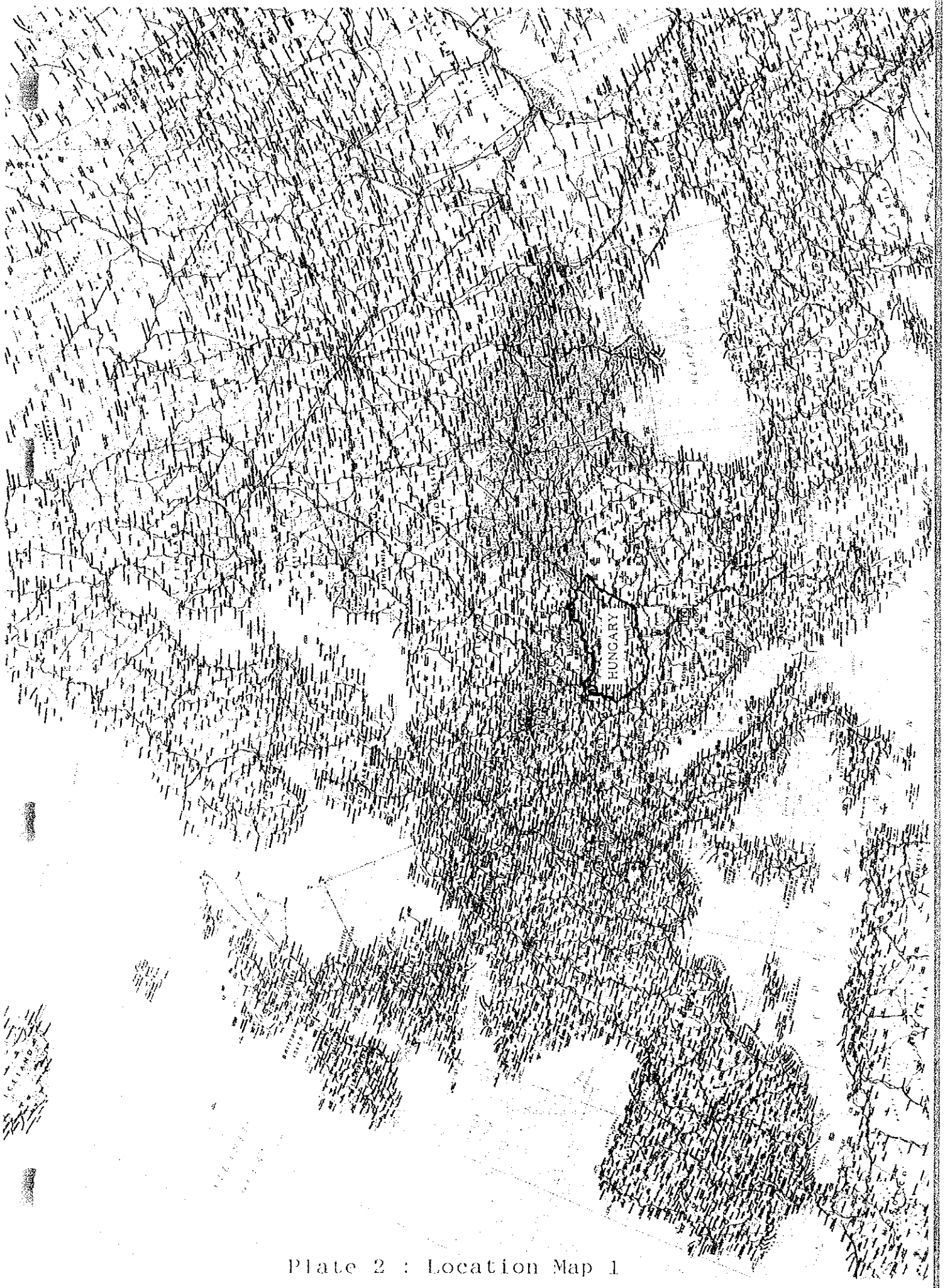


Plate 2 : Location Map 1

THE REPUBLIC OF HUNGARY

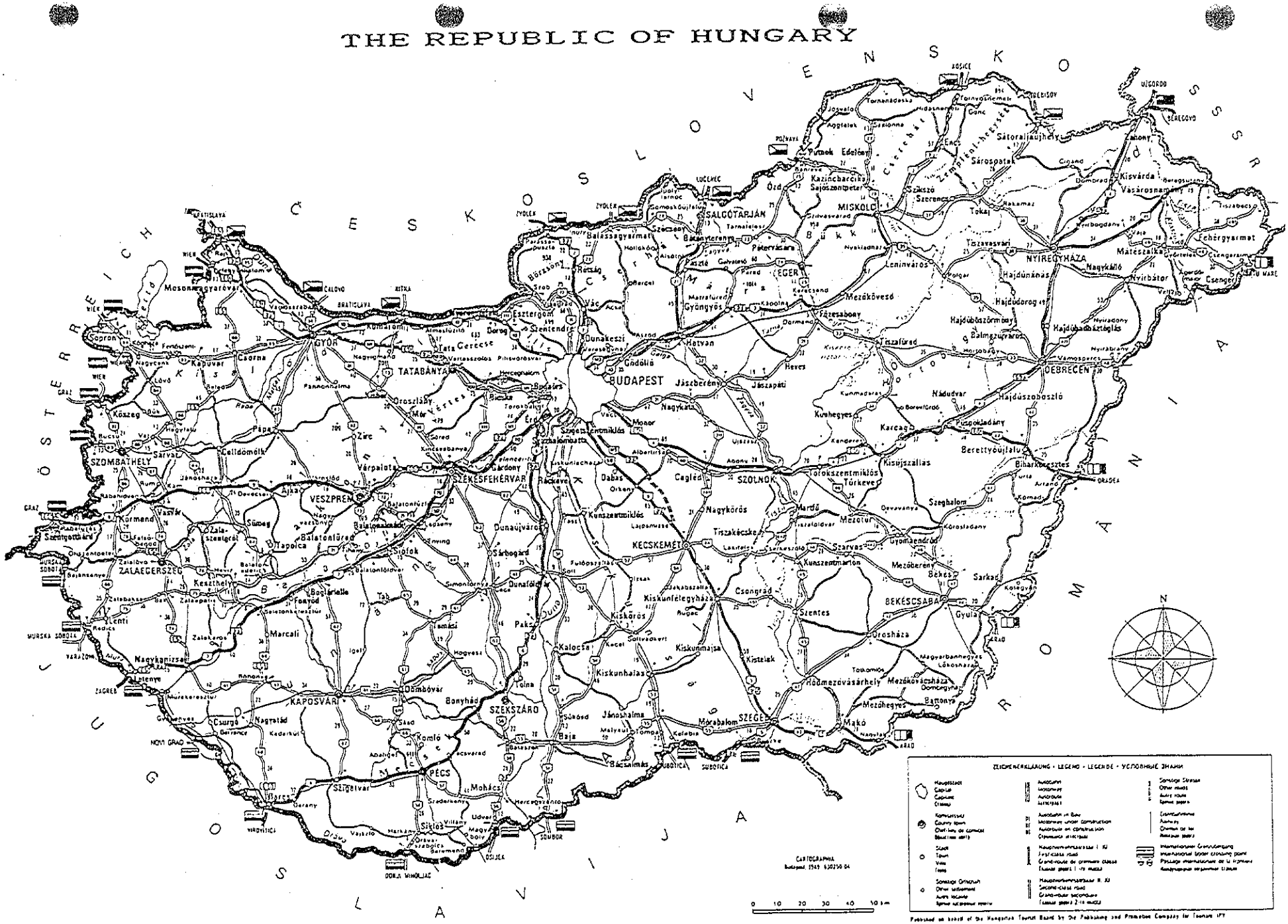


Plate 3 : Location Map 2

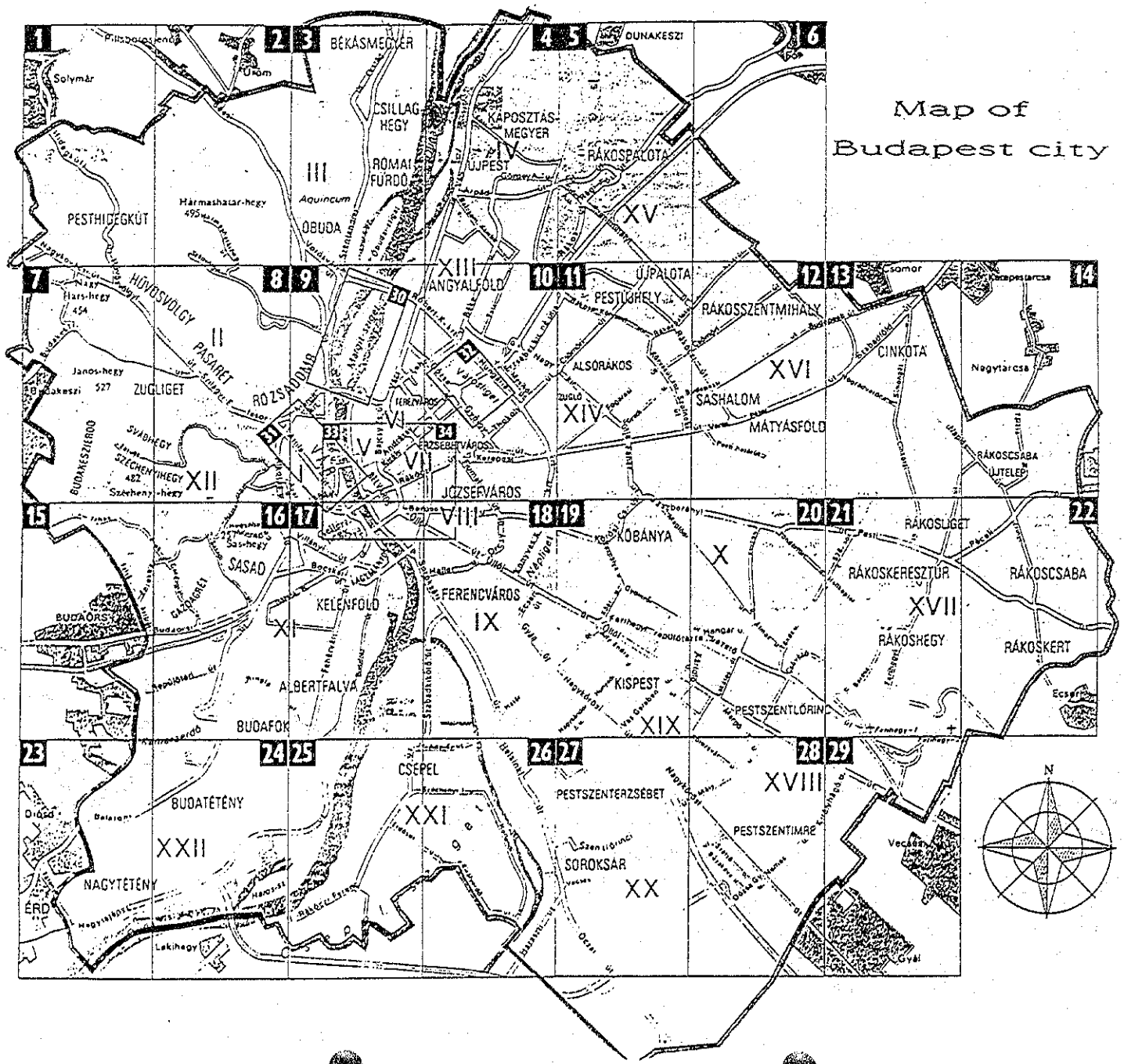


Plate 4 : Map of Budapest City

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Abbreviations

Organizations

COMECON	Council for Mutual Economic Assistance Countries
DOSZEN	Dorogi Coalmining Co.
EBRD	European Bank for Reconstruction and Development
EC	European Community
EFTA	European Free Trade Association
FKFV	Public Service Enterprise
FOKERT	Public Park and Gardens Maintenances Co.
FOTAV	Heat Distributing Co.
FSZDV	Service Charge Collecting Co.
IBRD	International Bank for Reconstruction and Development
IKV	City Dwelling Service Co.
JICA	Japan International Cooperation Agency
MEH	Hungarian Recycling Co.
MVMT	Hungarian Power Companies Ltd.
SPA	State Property Agency

Report and Study

ACR	Additional Capital Requirement
B.L	Battery Limit
C/B	Cost-Benefit
CEPF	Central Environment Protection Fund
C/P	Counter Part
CPI	Consumer Price Indexes
DM	Deutsche Mark
EE	Environmental Evaluation
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EP	Electrostatic Precipitator
FB	Fluidized Bed
FGTS	Flue Gas Treatment System

F/S	Feasibility Study
Ft	Hungarian Forint
GDP	Gross Domestic Product
GNP	Gross National Product
HHM1	The Existing Incineration Plant (Hulladek Hasznosito Muvek 1)
HHM2	The New Planned Incineration Plant (Hulladek Hasznosito Muvek 2)
H.P	Horsepower
ICR	Initial Capital Requirement
IDC	Interest During Construction
M/P	Master Plan
MSW	Municipal Solid Waste
NPV	Net Present Value
PCDD	Polychlorinated Dibenzo-p-Dioxins
QR	Quenching Reactor
RDF	Refuse Derived Fuel
TCDD	Tetra Chloro-dibenzo-p-Dioxin
T/S	The Transfer Station
US$	United States Dollar
VAT	Value Added Tax

PART I

MASTER PLAN

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

Presently in Hungary, along with the reformation of the political structure, a large socioeconomic transformation is being promoted. Although relatively systematic Municipal Solid Waste (MSW) management has been carried out until now by the Budapest Capital City Government, the city presently faces the need to accommodate increasing volumes and changes in the quality of the MSW due to changes in the lifestyle.

The volume of the MSW generated in Budapest in 1980 was 4,330,000 m^3, it is anticipated to reach about 5,375,000 m^3 in 2005. On the other hand, the capacities of the existing final disposal sites are anticipated to be filled in 1994. However, the new final disposal sites are hard to obtain due to increasing public awareness about environmental protection. In this respect, environmental assessment and related public relations shall be strongly taken into account.

Accordingly, a comprehensive study of the MSW management system in Budapest city is very important and urgent.

In response to the request of the Government of the Republic of Hungary to the Government of Japan for cooperation in the study of this matter, the Government of Japan decided to conduct the Study of the MSW Management in Budapest in the Republic of Hungary.

Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, undertook the Study in close cooperation with the concerned authorities of the Government of the Republic of Hungary.

Environmental Technologic Consultant Co., Ltd. was the consultant selected by JICA to carry out the Study.

1.2 Objectives of the Study

The objectives of the Study are:

(1) To formulate a Master Plan (M/P) for the improvement of the MSW management in Budapest, and

(2) To conduct the Feasibility Study (F/S) on the first priority project to be identified in the said M/P.

1.3 Scope of the Study

(1) Basic Study

1) Data collection, review of previous studies
2) Field surveys

(2) Analysis of existing conditions and identification of issues

(3) Formulation of the M/P (the target year 2005)

(4) The F/S on the first priority project (the target year 1999)

1) Confirmation of the planning framework
2) Supplementary study
3) Preliminary design of operational systems and main facilities
4) Planning of major equipment
5) Institutional planning
6) Preliminary cost estimation
7) Project evaluation
8) Planning of the project implementation

1.4 Subject of the Study

The subject of the Study was the MSW, which included household waste, market waste, commercial waste and street sweeping waste. Hospital waste and industrial waste were not included. However, a short diagnostic study of the industrial waste such as tires, oils and solvents that get mixed into the MSW was carried out in order to prepare general recommendations for collection and treatment.

1.5 Study Procedure

The findings of the JICA Study Team executed in collaboration with the Hungarian Counterpart on the basis of the result of the first field survey in Hungary were presented in the Progress Report (I) edited in Budapest in July 1992. Data and information included in the Progress Report (I) were used for elaboration of the M/P for the MSW management by the JICA Study Team during the desk study in Japan, a description of which is given in the Interim Report of October, 1992.

The Progress Report (II) reflects the findings by the next field mission in Hungary in January - March, 1993 with special attention paid to conduct of the Feasibility Study of the First Priority Project, i.e. the construction of HHM2.

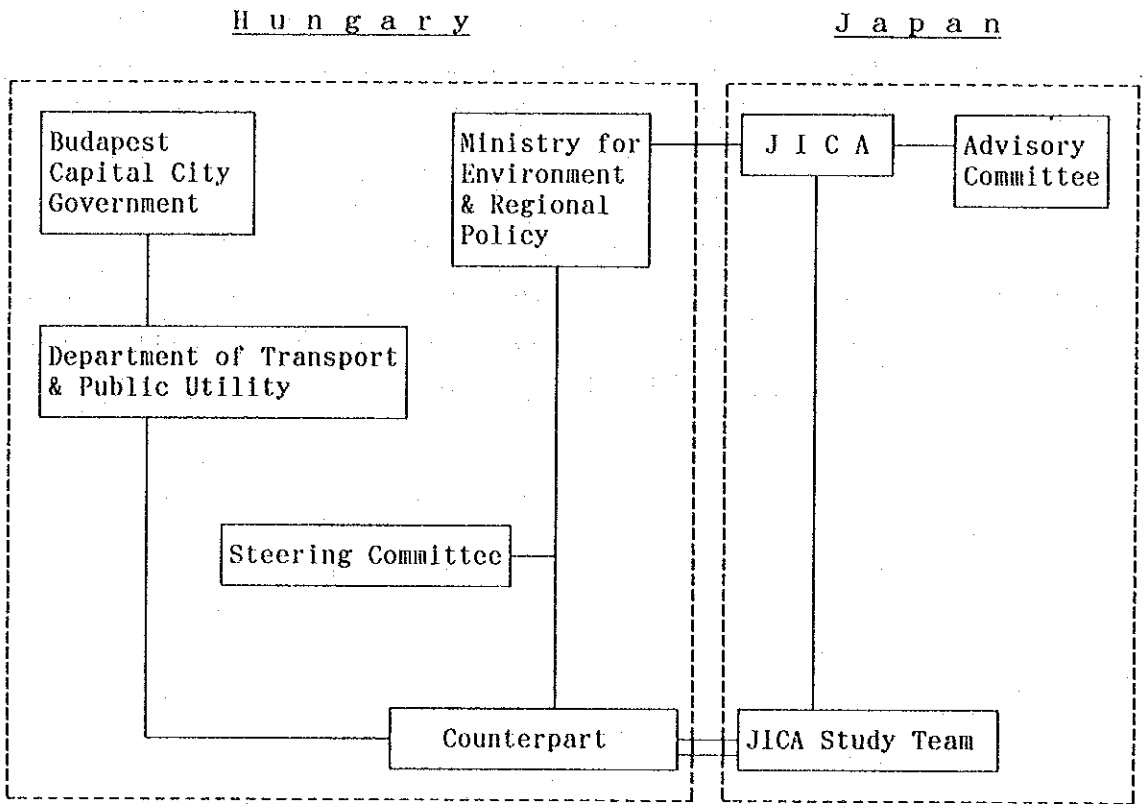
The Draft Final Report formulated by the JICA Study Team during the second desk study in Japan in March - June 1993 has two main objectives:

- To summarize the results and findings of various steps of the Study, and
- To give the detailed information on the main objectives of the Study, i.e. the M/P and the First Priority Project (feasibility study for HHM2).

1.6 Organization of Executing Bodies

The Study was carried out by the organization presented in the Figure 1-1.

Figure 1-1 Project Organization



1.7 Key Assumptions

In the Study the following essential conditions were assumed as key assumptions to formulate the M/P and carry out the F/S on the First Priority Project. If the key assumptions were changed, depending on the degree of the change the results of the Study itself would be changed either partially or completely.

- Increasing ratio of the MSW, 2.0% per year for the foreseeable future
- Characteristics of the MSW due to a change of social mechanism and life style
- National regulation for disposing of the residue and fly ash from the MSW incineration; today there is no regulation in force.
- Increasing ratio of GDP in the future of Hungary, it is assumed to be 3.0%.
- Utility costs given by the Hungarian side, which are used in the Chapter 10
- Location of T/S in district-X
- Own financing portion is assumed to be 40%.
- Revenue estimate is on the basis of 1993 tariffs including 6% VAT.
- Budapest Capital City Government will be the owner of HHM2.
- Exchange rate used for estimation at March 1993

  1 US$ = 84 Ft = 1.65 DM = ¥120

CHAPTER 2 PRESENT STATE OF THE STUDY AREA

2.1 Location and Area

Budapest, the capital of Hungary, is situated on the two banks of the Danube and covers an areas of 525.6 Km^2. Buda, on the west bank, composes almost one third (173.2 Km^2) of the area, while Pest, on the east bank, occupies two thirds (352.4 Km^2). Administratively, Budapest is divided into 22 districts. Districts I-III, XI, XII and XXII are situated on the Buda side, districts IV-X and XII-XX, on the Pest side, and district XXI on the northern tip of Csepel Island.

2.2 Population

The population of Budapest in 1992 is estimated at 2,018,000. The distribution of population according to sex and age groups in January 1991 is given in the Table 2-1, indicators of vital statistics for the period 1975-1990 are shown in the Table 2-2.

Table 2-1 Population by Age-Group, January 1, 1991

Unit: Person

	0 - 14	15 - 29	30 - 39	40 - 59	> 60	Total
Males	174,824	206,919	145,460	245,935	163,811	936,949
Females	166,657	205,453	153,243	282,761	272,981	1,081,086
Total	341,481	412,372	298,694	528,696	436,792	2,018,035

Source: Hungarian Statistical Yearbook

Table 2-2 Indicators of Vital Statistics

Data of Budapest /per 1,000 population/

Live-birth			Deaths			Natural increase decrease/-/, resp.			Infant mortality a/
1975	1980	1990	1975	1980	1990	1975	1980	1990	1990
16.3	11.5	9.6	13.6	15.8	14.7	2.7	-3.6	-5.1	13.2

Note: a/ Death under 1 year per 1,000 live births

Source: Hungarian Statistical Yearbook

2.3 Natural Conditions

Budapest is situated at the point where the mountainous Transdanubia (Dunantul) and the Great Plain (Alfold) meet. The main part of Buda is built on hills and surrounded on the north, west and south by the forest covering the Buda Mountain Range. Pest lies on a gently sloping plain. The length of the Danube passing through the capital is 28 km. Its average depth is between 3 and 3.5 m. The two banks are connected by the six roads and two railway bridges. Meteorological data for Budapest in 1990 are given in the Tables 2-3 and 2-4.

Table 2-3 Meteorological Data for Budapest in 1990
(Humidity, Precipitation, Sunshine, Wind velocity)

Month	Relative humidity (%)	Number of days with precipi-tation	Intensity of pre-cipitation (mm)	Sunshine duration (hours)	Average wind velocity (m/s)
January	78	3	12	40	2.1
February	68	8	19	145	2.5
March	57	3	4	173	2.9
April	67	9	58	163	3.0
May	60	4	33	263	2.1
June	65	8	53	206	2.3
July	50	5	19	283	2.7
August	48	3	13	110	2.2
September	67	5	60	107	2.9
October	75	7	57	100	1.6
November	81	7	45	98	2.1
December	82	8	43	90	2.1

Source: Hungarian Statistical Yearbook

Table 2-4 Meteorological Data for the Budapest City in 1990 (Temperature)

Month	Temperature (°C)		
	Mean	Max.	Min.
January	1.0	11.0	-9.7
February	6.4	19.1	-0.6
March	10.5	22.5	0.2
April	11.2	21.6	2.2
May	19.2	33.5	7.6
June	19.2	33.5	8.8
July	21.2	34.6	12.0
August	22.6	34.2	13.5
September	15.2	29.8	7.0
October	11.4	23.8	-0.4
November	6.6	13.7	-0.5
December	1.1	6.6	-5.6

Source: Hungarian Statistical Yearbook

2.4 Social Conditions

The present social conditions are first of all marked by the process of privatization which influences, to the highest degree, the changes occurring in Budapest as well as in all of Hungary. Mostly small and medium-sized enterprises were formed in 1992; this trend is likely to continue in 1993. Leasing or ownership rights of 5,533 units were privatized in the privatization scheme of retail and newly formed businesses from the beginning of the privatization process until the end of 1992. 1992 revenues from selling state property exceeded HUF 60 billion. The goal of the State Property Agency (SPA), responsible for the process of privatization, i.e., transformation of state-owned enterprises into economic associations, is to have 65 - 70% of the former state properties in private hands. Many privatized (or privatizing) enterprises are being transformed into joint venture companies with the participation of foreign capital. Privatization causes polarization of the population leading to the formation of a class of owners or co-owners of private enterprises with high income, and another class of jobless workers living in very low social conditions.

This polarization of population may influence policy in the field of the MSW management.

2.5 Urban Structure

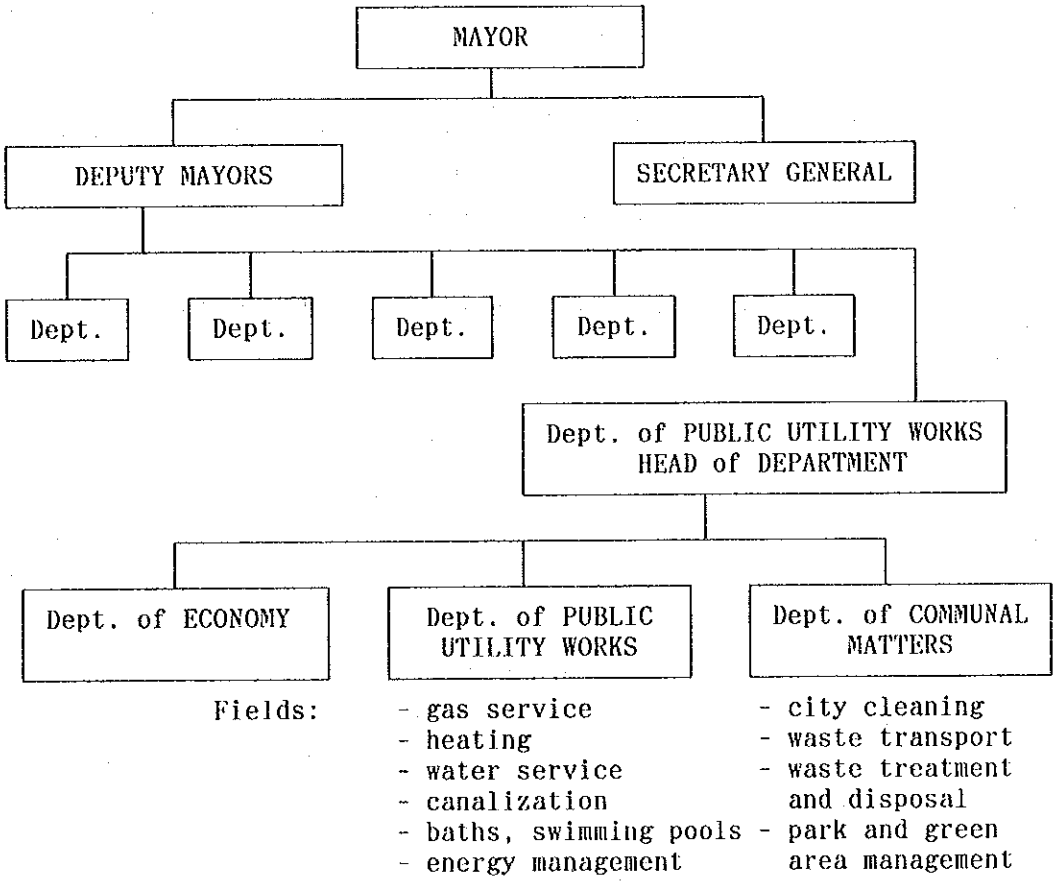
According to statistical data from 1990, Budapest has 4,371 km of water distribution lines, and a 3,703 km canal network. Two main sewage treatment plants are located in the southern and northern parts of the city. In addition a part of Budapest's sewage is treated in a plant located in Budakeszi. The South Plant has a capacity of 72,000 m^3/day and uses a biological anaerobic/aerobic system. The sludge after dewatering (about 70% of water content) in amount of about 12t/day is mixed with humus and used for agricultural purposes. The North Plant has a nominal capacity of 140,000 m^3/day, but the present used capacity is about 80,000 - 85,000 m^3/day. The sludge (about 20t/day) is transported on the deposit site. The Budakeszi Plant has a capacity of 1,860 m^3/day. The sludge is incinerated in a small incinerator located at the plant and 300 - 350 m^3 of ash/year is generated. The length of the heating network is 446 km. The number of accommodations heated by this system is 241,695 and the number of accommodations supplied with hot water is 225,820. The total amount of supplied heat is 20,026 GJ/month of which 13,521 GJ/month is for public institutions.

A 3,049 km long gas distribution network supplies gas to 654,956 apartments. Gas consumption is about 1,000 m^3/year/person. The lighting system has a 8,673 km long network. The city is equipped with a subway system consisting of three different lines.

2.6 Administration

The administrative organization of the Budapest Capital City Government related to the MSW management is shown in the Figure 2-1.

Figure 2-1 Administrative Organization of the Budapest Capital City Government related to the Municipal Solid Waste Management



2.7 Policy and Development Plans Related to the Municipal Solid Waste Management

The MSW management policy in the Budapest city is based on the "Concept on separate collection of the MSW" and "Waste management concept" elaborated by the Ministry for Environmental and Regional Policy.

This concept, in addition to the general regulations concerning the MSW management, takes into account some specific issues for the MSW.

The concept considers also the changes of quality and quantity of the MSW due to the change of lifestyle and customs as well as environmental and public health issues.

The most significant elements of the new policy are summarized as follows.

- Within the scope of the MSW management, priority should be given to recycling in the future. For wider waste reuse, an economic incentive system, and appropriate technical, legal and taxation conditions should be established.

- In the field of resource recovery and recycling, the following methods might be considered:
  a) Resource recovery with a separate collection system
  b) Incineration with a heat recovery system

- In case of incineration, a flue gas treatment system that meets environmental standards is required.

- To reduce the quantity of the MSW, the separate collection of recyclable materials should be developed.

- Separate collection and treatment of wastes such as batteries, dry cells, oil, solvents, tires that get mixed into the MSW is of primary importance both from the economic and environmental points of view.

2.8 Economic and Financial Conditions

2.8.1 National Economic and Budget Structure

(1) National Economy

Hungary undertook economic reforms beginning in 1968 that attempted to incorporate the market mechanism within its central planning system. Significant reforms occurred in 1988 and 1989 including the Corporate Act, the Foreign Investment Act that allowed 100 percent foreign ownership of Hungarian businesses, and the Securities Stock Exchange Act. These laws were aimed at promoting the transformation of state-owned enterprises into private companies, by privatization. Following election of the new non-communist coalition government, in April, 1990, the government plans to accelerate the pace of economic reform.

In the past 40 years, roughly two thirds of Hungarian foreign trade was with the Council for Mutual Economic Assistance (COMECON) countries. Now, Hungary has been gradually switching trade partners, from COMECON to mainly EC and EFTA countries; that means the Hungarian economy is becoming an economy not based on the ruble but hard currencies and market prices. The country joined the IMF and the World Bank in 1992 and became an associate member of the European Community in 1992.

The Table 2-5 shows the principal economic indicators of Hungary in 1988-1992. The Gross Domestic Product has stagnated for the last couple of years, despite the government's reform effort. Hungarian economic decline and stagnation in this period were caused by not only restructuring of the domestic economy but also economic recession in European countries.

Table 2-5 Hungary: Principal Economic Indicators

	1988	1989	1990	1991	1992 *P
Population (million)	10.46	10.42	10.37	10.35	10.33
at the beginning of the year					
Gross Domestic Product, GDP *1	1,435.2	1,710.8	2,079.5	2,308.0	2,800.0
Real Change of GDP y/y (%)	-0.1	0.4	-3.3	-11.9	-5.0
GDP Per Capita (US$)	2,726	2,784	3,175	2,974	3,428
Industrial Production Index, y/y (%)	2.8	-1.0	-5.0	-19.1	-10.0
Agriculture Production Index, y/y (%)	1.0	-6.2	-9.2	-17.9	-23.0
Gross Capital Formation *1	358.1	444.9	478.8	425.0	482.0
External Trade: Exports *1	492.3	571.3	603.6	851.4	967.3
Change in Exports, y/y (%)	6.3	0.3	-4.1	-5.0 *P	6.0
Imports *1	460.9	523.5	544.9	893.8	939.9
Change in Imports, y/y (%)	-0.3	1.1	-5.2	2.0 *P	-5.0
Terms of Trade *2 (%)	2.4	2.8	0.4	-10.4	
(CPI) Inflation, y/y (%)	15.5	17.0	28.9	35.0	23.0
Change in real income of households, y/y (%)	-0.9	2.7	2.1	-3.6	
External Debt in US$					
Gross External Debt (million US$)	19,602	20,390	21,270	22,658	21,437
Net External Debt (million US$)	13,966	14,900	15,933	14,554	13,000
Debt Service (million US$)	3,381	3,408	3,982	3,822	3,740
Foreign Convertible Currency Reserves					
(million US$)	1,967	1,725	1,166	4,017	4,380
Direct Foreign Investment (million US$)	23	215	569	2,107	3,192
Unemployment rate (%)	0.3	0.4	1.9	7.5	12.3
Government Budget Deficit (million Ft.)	-19,736	-54,008	-1,369	-197,140	-185,367

Notes : *1 At current prices, thousand million forints
*2 Rate of change, previous year = 100.0
*P Preliminary

Sources: Hungarian Statistical Yearbook 1990
National Bank Annual Report 1991
National Bank Monthly Report, Dec 1992

In 1992, however, some economic indicators showed that the Hungarian economy was gradually improving. Especially in external economic relations, there are signs of recovery, such as the improvement of the trade balance, the increase of convertible currency reserves, the decrease of the external debt and the improvement of the debt service ratio.

While the domestic economy in 1992 still faced severe conditions, they were more moderate than in the previous year. For example, the GDP of 1992 amounted to 2,800 billion Ft in nominal terms; this has fallen by 5% from the previous year, but follows a drop of 11.9% in 1991. Declines in industrial production, experienced for several years, stopped in 1992 while agriculture production continues to show great decrease. The unemployment rate increased to 12.3%, that is the highest recorded so far (unemployment had been unknown in the "socialist planned economy").

Inflation, meanwhile, remained within the projected limits, which means that it slowed down significantly. In terms of the Consumer Price Indexes (CPI), the price level rose by an average 35% from 1990 to 1991 and by 23% from 1991 to 1992. In January 1993 CPI rose by 6.8% over December 1992, but this considerable rise was mainly the result of the introduction of a new two-rate VAT system (Table 2-6).

Table 2-6 Consumer Price Index

	1980 = 100		y/y change, %	
	Foodstuffs	Total	Foodstuffs	Total
1987	151.1	159.1	9.2	8.6
1988	175.0	183.8	15.8	15.5
1989	206.0	215.0	17.7	17.0
1990	278.5	277.1	35.2	28.9
1991	339.5	374.1	21.9	35.0
1992	405.4	460.1	19.4	23.0

Source: National Bank of Hungary

The Table 2-7 exhibits the percentage contribution of GDP in 1988 - 1991. During the same period, the agriculture and forestry (or the primary sector) and manufacturing sectors experienced the decreases of their shares slightly from 13.9% in 1988 to 9.7% in 1991 and from 30.0% in 1988 to 27.6% in 1991 respectively. The main reason for the decrease for the manufacturing sector is the government's privatization policy and effects of cutbacks in government subsidies for the sector, in addition to the collapse of eastern bloc trade and the contraction of domestic demand. In contrast with the above two sectors, the share of the merchandise trade and services sectors are gradually increasing due to the Pre-Privatization Act (1990) regulating the privatization of smaller formerly state-owned shops and restaurants. It does not appear in the Table 2-6 but the tourism sector achieved a surplus and has made a high contribution to the national economy recently.

(2) Budget Structure

The Ministry of Finance submitted an interim report on the Kupa Program (Hungarian economic development program for 1991-1994) to the government in September 1992. The biggest miscalculation in the first two

years of the program period is a huge central budget deficit. The Tables 2-8 to 2-10 show the last five years budget deficit and budget structure. For 1992 alone, the central budget deficit was 197.1 billion Ft, which was nearly 2.5 times as much as originally planned. This was because revenues were much smaller dthan planned, due to unexpected lower economic performance and income growth than expected, while expenditures were near the original projections.

The reduction of the huge current budget deficit to a sustainable level can be achieved only gradually, through the fundamental restructuring of the expenditure side (including the streamlining of main income distribution systems in accordance with burden bearing capacities and the reduction of the role of public finance) on the one hand, and the stabilization of the impact of growth on the revenue side, on the other. This is also pointed out by the IMF, namely that the Hungarian government should take steps to reduce the fiscal deficit in 1994 - 1996. By reforming the expenditure structure to assure better targeted social expenses, it would be possible to insure that the expenditures go to the most needy.

As a whole, the present economic issues in Hungary are summarized in the following three items: 1) high inflation ratio, 2) huge budget deficit in the central government, and 3) rising unemployment caused by the recession. Especially, the first two items will affect compilation of the Budapest municipality's budget in the future.

Table 2-7 Distribution of GDP Production (Based on current prices)

Unit: %

	1988	1989	1990	1991 *P
Industry	30.0	30.1	26.8	27.6
Construction	6.8	6.7	5.6	5.8
Agriculture	13.9	13.1	12.0	9.7
Forestry	0.7	0.7	0.6	0.5
Transport, posts and telecommunicatio	7.1	7.3	6.9	8.4
Trade	8.9	9.3	12.8	12.4
Water supply	1.2	1.2	1.1	1.1
Other material activities	0.9	1.1	1.1	1.4
Total of material branches	69.5	69.5	66.9	66.9
Non-material branches	18.1	18.1	19.0	21.3
Total	87.6	87.6	85.9	88.2
Net taxes on products	12.4	12.4	14.1	11.8
GDP TOTAL	100.0	100.0	100.0	100.0

Note : *P Preliminary

Source: National Bank of Hungary

Table 2-8 Central Government Budget (1988 - 1992)

Unit: Million Ft.

	1988	1989	1990	1991	1992
Revenues Total	519.257	535.084	640.897	716.489	793.284
Expenditures Total	538.993	589.092	642.266	830.645	990.424
Deficit	-19.736	54.008	-1.369	-114.156	-197.140

Source: National Bank of Hungary

Table 2-9 Central Government Budget (Revenues)

Unit: Million Ft.

Actual Revenues	1990	1991	1992	1993 *1
Revenues from Economic Entities				
Corporate profit taxes (incl. financial sector)	94.044	77.338	64.064	54.000
Surtax	747		2,398	5.500
Differential producers turnover tax	78.989	32.346	19.897	25.000
Production taxes	158		0	
Customs duties and import levies	50.514	61.622	94.190	82.000
Dividends of state property	27.139	18.446	2.299	6.600
Other payments	6.161	10.615	11.002	15.600
Total	257.752	200.367	193.850	188.700
Consumer Taxes				
VAT	146.789	149.534	175.728	259.000
Excise taxes	108.196	137.270	166.705	170.000
Total	254.985	286.804	342.433	429.000
Revenues from Households				
Personal income taxes	52.281	124.958	142.704	189.500
Other taxes	5.767	3.891	12.827	8.900
Fees	4.071	4.504	4.808	8.500
Total	62.119	133.353	160.339	206.900
Payments from central budgetary institutions	1.116	3.127	2.804	2.000
Revenues from extrabudgetary funds	2.000	1.300	1.000	
Revenues from international financial transactions	5.544	11.098	10.290	22.200
Corporate tax and dividends from the financial sector	48.585	44.479	1.690	25.000
Other revenues	8.796	4.011	6.027	5.000
Amortization and interest payments of				
Payments from local government institutions	0	0	1.505	500
Revenues related to debt service	0	0	53.347	80.750
Extraordinary (privatization) revenues	0	0	20.000	0
state loans to domestic debtors	0	31.950	0	0
Revenues total	640.897	716.489	793.285	960.050
REVENUES TOTAL	640.897	716.489	793.285	960.050
EXPENDITURES TOTAL	642.266	830.645	990.424	1.145.417
GRAND TOTAL DEFICIT	-1.369	-114.156	-197.139	-185.367

Note: *1 Planned revenue
Source: National Bank of Hungary

Table 2-10 Central Government Budget (Expenditures)

Unit: Million Ft.

Actual Expenditures	1990	1991	1992	1993 *1
Subsidies to Enterprises				
Production subsidy	16.772	23.784	21.644	16.500
Import subsidy	32	13	226	0
Other subsidy	1.707	6.017	1.713	1.500
Reorganization program	0	0	352	3.000
Total	18.511	29.814	23.935	21.000
Agricultural, food processing export subsidy	23.209	26.823	22.391	26.000
Agrarian market subsidy	0	1.003	7.301	9.000
CMEA price equalization	28.356	-1.224	0	0
Socialist interstate settlements	0	0	499	0
Total	51.565	26.602	30.191	35.000
Consumers price subsidy	36.865	42.262	19.145	20.400
Investment Expenditures				
Centrally decided investments	26.589	26.395	31.949	26.350
Enterprises investments	0	0	0	0
Housing grant	25.692	21.619	28.674	26.560
Stockpiling	1.278	62	46	0
Cover to state security purchases	1.455	0	0	0
Yamburg Gas Pipeline Building Fund	0	7.000	6.700	2.500
Total	55.014	55.076	67.369	55.410
Transfers to central budgetary institutions	188.508	285.291	333.424	401.252
Defence and arm forces	61.598	0	113.680	127.627
Ministries, national organizations	0	0	125.785	140.875
Transfers to social self-organizations	0	0	2.145	2.330
Family allowance	0	0	91.814	106.490
Allocations for wage policy	0	0	0	10.480
Other benefits and compensations	0	0	0	13.450
Transfers to social security	0	14.684	16.784	8.800
Transfers to local governments	113.327	190.672	223.993	262.228
Transfers to separate funds	67.210	67.898	0	0
Expenditure from international transactions	20.398	9.782	10.387	29.440
Debts service	70.749	107.068	190.523	203.597
Payments of credits and state loans	8.511	14.091	20.462	23.825
Expenditures related to housing	0	0	0	33.660
Other expenditures	20.119	1.496	5.322	2.500
Reserve	0	0	0	13.500
Transfers to extrabudgetary funds	0	0	55.549	75.990
Extraordinary expenditures	0	0	9.530	7.300
Undertaking of guarantees	0	0	4.272	9.000
Expenditures total	642.266	830.645	990.424	1.145.417

Note: *1 Planned expenditures
Source: National Bank of Hungary

2.8.2 Budapest's Economic and Budget Structure

(1) Budapest's Economic Structure

Budapest accounts for 0.56% of the land area, 19.4% of the population, 31.1% of industrial output, and 32.4% of employment in Hungary, as of 1990. The Table 2-11 shows the economic status of Budapest relative to the whole country. Budapest has a population density of 3,817 persons/Km^2; this is equivalent to 34.4 times the national average. Another indicator that reveals the economic structure of Budapest is the number of foreign tourists. About 1.35 million foreigners visited Budapest in 1990; the percentage of foreign tourist arrivals in Budapest is 44% of all arrivals in Hungary. Further, in domestic retail trade, 16.2% of the nation's shops and restaurants are located in Budapest; their turnover accounts for 25.6% of the national total. In this way Budapest is not only the capital of Hungary, but also a Mecca of all sorts of economic activities.

(2) Municipality's Budget Structure

Since the new accounting system for the municipality was introduced in September 1990, the budget of the Budapest Capital City Government has been prepared as separate and proportional components corresponding to the actual duties and responsibilities of the municipality and 22 district governments. The financial balance for 1980 - 1992 showed sound financial management, but the budget for 1993 estimates a deficit (Table 2-12).

The total 63,679 million Ft budget was finally approved by the General Assembly on February 25, 1993. The total amount of the municipality's budget for 1993 has increased 6.7% over the level of the

Table 2-11 Budapest as a Percentage of the Country

Unit: %

	1980	1990
Population	19.2	19.4
No. of tourist arrivals in public accommodations	46.0	44.3
No. of Manufacturing Industry Companies	41.9	38.3
No. of Employees	44.7	32.4
Total Value of Assets	35.5	27.5
Total Output of Production	37.4	31.1
Total Sales Amount	37.6	29.8
Export	45.7	32.1

Source: Budapest Statisztikai Zsebkonyve 1991

Table 2-12 Revenue and Expenditure of the Budapest Municipality

Unit: Million Ft.

	Actual Bases				
	1989	1990	1991	1992	1993
Revenue	44.194	53.924	57.013	66.349	63.679 *2
	(71.427)*1	(84.470)*1		(59.676)*2	(58.430)*3
Expenditure	42.178	51.283	54.922	65.430	63.679 *2
	(67.303)*1	(79.589)*1			

Notes: *1 Including 22 districts' budget
*2 Planned budget
*3 Estimated revenue

Source: Budapest Municipal Government

previous year in terms of the projected revenue. However, it has substantially declined as compared with the real revenue base.

The projected revenue for 1992 was 59,676 million Ft but it was increased to 65,430 million Ft. Turning to the 1993 budget revenue, 63,679 million Ft is projected, but it is estimated that the total real revenue will be 58,430 million Ft, so that there will be a 5,249 million Ft budget deficit.

The total yearly revenues and expenditures of the municipality for 1989 - 1993 are shown in detail in the Tables 2-13 and 2-14. Some notable points of the budget structure for the last five years are summarized as follows.

1) The rate of growth of the budget in nominal terms has been increasing, but it has been kept almost at the same level with inflation taken into account.

2) The municipality's budget has to heavily depend on state subsidies, but under the government's subsidy reduction policy, the share of the state subsidies in the municipality's budget has gradually declined in spite of an increase in the total budget amount (Table 2-15).

3) The growth rate of the operating expenditure is higher than the rate of the yearly budget. That means other main expenditure items such as the subsidy to municipal companies or development and construction have been held down (Table 2-16).

Table 2-13 Annual Budget for the Budapest Municipality (Revenue)

Unit: Thousand Ft.

	Actual Bases				
	1989	1990	1991	1992	1993 *1,
1 Revenues from organization financed by state budget	337,665	382,315	457,033	-	-
2 Taxes from Residents	-	-	-	-	-
3 Stamp & Certificate Fee	1,174,721	1,961,703	3,176,086	6,781,039	5,939,590
4 Personal Income Taxes	8,690,200	12,536,029	9,403,148	12,139,737	9,338,667
5 Land Tax	1,426	-	-	-	-
6 Payments from organization financed by state budget	27,649	11,131	-	-	-
7 Regulated Revenues Total	10,231,661	14,891,178	13,036,267	18,920,776	15,278,257
8 State Subsidies	23,390,091	12,924,687	15,675,993	17,265,816	15,631,793
8a Social Security Tax			15,525,133	17,041,928	15,572,524
9 7 + 8 + 8a	33,621,752	27,815,865	44,237,393	53,228,520	46,482,574
10 Cash Reserve and Revenue from Charges	2,140,801	3,455,616	3,804,332	4,827,691	3,242,798
11 Charges from holiday resorts	-	-	-	-	-
12 Contribution for Regional Development	-	-	-	-	-
13 Contribution for Development of Roads and Public Utilities	-	-	-	-	-
14 Revenue from plot sales and from long term rent	147,042	412,458	386,528	285,920	3,002,100
15 Revenue from flat and garage transactions	437,484	768,878	409,515	588,440	240,900
16 Land-use Fees and Fees from Granting Rights to use Land	633,841	524,044	372,455	-	-
17 Miscellaneous Revenues	89,796	99,786	465,178	1,206,272	3,200,000
18 Money Given for Operation by Others	374,463	12,870,007	815,741	1,581,836	165,192
19 Money Given for Development by Others	3,282,379	2,246,789	1,254,646	606,886	1,352,500
20 Bond, Loan for Operation	24,000	116,415	564,868	-	-
21 Bond, Loan for Development	-	81,722	14,002	-	-
22 Refunds	314,584	217,647	-	-	-
23 Money Transfer Between Councils	4,580	-	-	-	-
24 Other Revenues Total	7,458,970	20,793,362	8,087,265	9,097,045	11,203,490
25 Revenue from VAT	656,904	1,104,951	1,083,377	944,028	744,421
26 Total Revenue of Year	41,737,626	49,714,178	53,408,035	63,269,593	58,430,485
27 Balance Carried from the Previous Term	2,456,792	2,236,991	2,539,237	1,504,673	333,047
28 Temporary Allocated Fund		1,973,299	1,065,761	1,575,076	(4,916,288) *
29 Revenues Grand Total	44,194,418	53,924,468	57,013,033	66,349,342	63,679,820

Note : *1 Planned budget
*2 Issuing bonds or taking out a medium-term loan

Source: Budapest Municipal Government

Table 2-14 Annual Budget for the Budapest Municipality (Expenditure)

Unit: Thousand Ft.

	Actual Bases				
	1989	1990	1991	1992	1993 *1
1 Operating Expenditure	23,210,296	30,689,897	37,487,366	43,175,613	43,211,805
thereof:					
- Wages	7,618,914	10,655,225	12,990,585	14,587,077	15,067,438
- Social Security	3,310,929	4,621,979	5,523,027	6,412,249	6,552,011
- Renovations	1,282,799	1,341,345	1,190,703	851,540	961,022
- Road, Bridge Maintenance	1,052,677	1,167,395	1,305,068	1,669,616	1,763,129
- Other Expenses	9,944,977	12,903,953	16,477,983	19,655,131	18,868,205
- Reserves for Administration	-	-	-	-	
2 Subsidy to Municipal Companies	6,520,914	9,273,185	9,797,415	11,355,457	9,089,002
- Subsidy for Budapest Public Transfer Co.	5,919,900	8,719,900	9,579,456	11,249,802	9,062,802
- Construction	275,698	239,900	217,959	-	-
- Others	325,316	313,385	-	105,655	26,200
3 Development and Construction	11,791,904	8,726,926	7,027,224	10,639,448	11,379,013
- Reserve for administration	-	-	-	-	-
4 Subsidy for districts for special purpose	-	-	-	-	-
5 Money disbursed to districts	654,775	417,102	-	-	-
6 Money Residue of this year	-	-	-	-	-
7 Total Expenditure (1+2+3+4+5+6)	42,177,889	49,107,110	54,312,005	65,170,518	63,679,820
8 State Subsidy for District Councils	(12,748,866)	-	-	-	-
9 Special Fund	-	2,176,348	610,431	260,061	-
10 Grand Total (7+8+9)	42,177,889	51,283,458	54,922,436	65,430,579	63,679,820

Note : *1 Planned budget
Source: Budapest Municipal Government

Table 2-15 State Subsidies in the Budget of the Budapest Municipality

Unit: Million Ft.

	Actual Bases				
	1989	1990	1991	1992	1993 *1
1) Total Revenues	44,194	53,924	57,013	66,349	63,680
	100.0%	100.0%	100.0%	100.0%	100.0%
2) State Subsidy	23,390	12,925	15,676	17,266	15,632
	52.9%	24.0%	27.5%	26.0%	24.5%
3) Personal Income Tax	8,690	12,536	9,403	12,140	9,339
	19.7%	23.2%	16.5%	18.3%	14.7%
4) Social Security Subsidy	0	12,001	15,525	17,041	15,573
	0.0%	22.3%	27.2%	25.7%	24.5%
Total State Subsidies	32,080	37,462	40,604	46,447	40,544
	72.6%	69.5%	71.2%	70.0%	63.7%

Note: *1 Planned budget
Source: Budapest Municipal Government

Table 2-16 Structure of the Municipality's Expenditure

Unit: Million Ft.

	Actual Bases				
	1989	1990	1991	1992	1993 *1
Operating expenditure	23,210	30,690	37,487	43,175	43,212
	55.0%	59.8%	68.3%	66.0%	67.9%
Subsidy to Municipal Companies	6,521	9,273	9,797	11,355	9,089
	15.5%	18.1%	17.8%	17.4%	14.3%
Development and Construction	11,792	8,727	7,027	10,639	11,379
	28.0%	17.0%	12.8%	16.3%	17.9%
Special Fund	-	2,176	610	260	-
	0.0%	4.2%	1.1%	0.4%	0.0%
Support to Districts	655	417	-	-	-
	1.6%	0.8%	0.0%	0.0%	0.0%
Total Expenditure	42,178	51,283	54,921	65,429	63,680
	100.0%	100.0%	100.0%	100.0%	100.0%

Note: *1 Planned budget
Source: Budapest Municipal Government

Table 2-17 Structure of the Municipality's Revenue

Unit: Million Ft.

	Actual Bases				
	1989	1990	1991	1992	1993 *1
Central (State) Subsidies					
State Subsidy	23,390	12,925	15,676	17,266	15,632
	52.9%	24.0%	27.5%	26.0%	24.5%
Personal Income Tax	8,690	12,536	9,403	12,140	9,339
	19.7%	23.2%	16.5%	18.3%	14.7%
Social Security Subsidy	0	12,001	15,525	17,042	15,573
	0.0%	22.3%	27.2%	25.7%	24.5%
Municipality's own Revenues					
Stamp & Certificate Fee	1,175	1,962	3,176	6,781	5,940
(local tax by corporations)	2.7%	3.6%	5.6%	10.2%	9.3%
Revenue from V.A.T.	657	1,105	1,083	944	744
	1.5%	2.0%	1.9%	1.4%	1.2%
Cash Reserve and Revenue	2,141	3,456	3,804	4,828	3,243
from Charges	4.8%	6.4%	6.7%	7.3%	5.1%
Others	5,684	7,702	5,807	5,844	7,960
	12.9%	14.3%	10.2%	8.8%	12.5%
Balance Carried from	2,457	2,237	2,539	1,504	0
the Previous Term	5.6%	4.1%	4.5%	2.3%	0.0%
Long Term Loan	0	0	0	0	5,249
	0.0%	0.0%	0.0%	0.0%	8.2%
Total Revenue	44,194	53,924	57,013	66,349	63,680
	100.0%	100.0%	100.0%	100.0%	100.0%

Note: *1 Planned budget
Source: Budapest Municipal Government

Table 2-18 Subsidy to the Municipal Companies

Unit: Million Ft.

	Actual Bases				
	1989	1990	1991	1992	1993 *1
Total Amount	6,521	9,273	9,797	10,790	9,089
of which:					
BKV (City Transportation Co.)	5,920	8,720	9,579	10,500	9,063
IKV (City Dwelling Service Co.)	276	240	83	-	-
FTI (City Cemetery Service Co.)	70	45	6	-	-
FKFV (Public Service Co.)	40	40	-	-	-
Others	215	228	129	290	26

Note: *1 Planned budget
Source: Budapest Municipal Government

4) To supplement a lack of revenue sources, the municipality expects to obtain more revenue from plot sales and long-term rent than before, and also the budget deficit will be covered by taking out a medium-term loan or issuing bonds in 1993 (Table 2-17).

5) All subsidies to municipal companies including FKFV are subject to review by the municipality's competent authority. Recently, subsidies to municipal companies have been cut and FKFV has not received any subsidies from the municipality since 1991 (Table 2-18).

Somehow, the municipality's budget in nominal terms has been increasing. The recent economic situation, however, does not warrant optimism that this trend will be maintained. And as long as the present method for making up the budget continues to be used, the improvement of and increase in the municipality's budget cannot be expected.

There is a need to change the relationship between the central budget and local government budgets. Steps that should be taken to assist local governments can include greater tax distribution by the central government and having local governments make greater efforts to raise revenue locally.

2.8.3 Budget for the Municipal Solid Waste Management

The Budapest Capital City Government appropriated 1,027 million Ft for the MSW management activities in this year's budget. This amount will be paid by the municipality to FKFV as the consignment fee for the MSW management. Its expenditure is 1.61% of the budget in 1993, this ratio is the lowest since 1989. The budgetary shares for 1989 - 1993 are as follows.

Budget Share for the MSW management in the Municipality's Total Expenditure, in %

1989	1990	1991	1992	1993
1.68	1.82	2.12	2.38	1.61

In terms of the amount, budgets for the MSW management show a tendency to rise, but this is thought to only reflect inflation for the period in question. So it is supposed that the level of the real budget share has been constant. Apart from the municipality's budget, some of the 22 district governments are disbursing certain amounts as the management fees to FKFV through IKV (City Dwelling Service Company) but the amounts are very small.

The budget or new investment for the MSW management is generally allocated from the development and construction expenditures. Out of 11,379 million Ft for the development and construction budgets in 1993, 52.3 million Ft and 45.9 million Ft respectively are appropriated for the preparatory work for HHM2 and the construction of a flue gas treatment system for HHM1 (Hulladek Hasznosito Muvek 1). Furthermore, 56 million Ft has been prepared for studying for the purchasing a new final disposal site, as a continuing expenditure since 1989.

Until now the municipality has been considering a rough estimation of the investment cost for HHM2 in Budapest, and the plan is under negotiation with the central government and other authorities concerned. There is, however, no concrete financial plan for this.

According to the municipality authorities, the Budapest Capital City Government will be the project owner of HHM2 and is responsible for the fund raising for the project. The municipality plans to use a vacant lot that it owns, and state funds available at a conceptional interest rate. It seems to be difficult for the municipality to carry out the project on its own budget due to the limited availability of

the budget funds for development and construction. Therefore, the municipality needs financial support from the government or others.

CHAPTER 3 PRESENT CONDITIONS OF THE MUNICIPAL SOLID WASTE MANAGEMENT

3.1 Overview of the Municipal Solid Waste Management Situation in the Budapest City

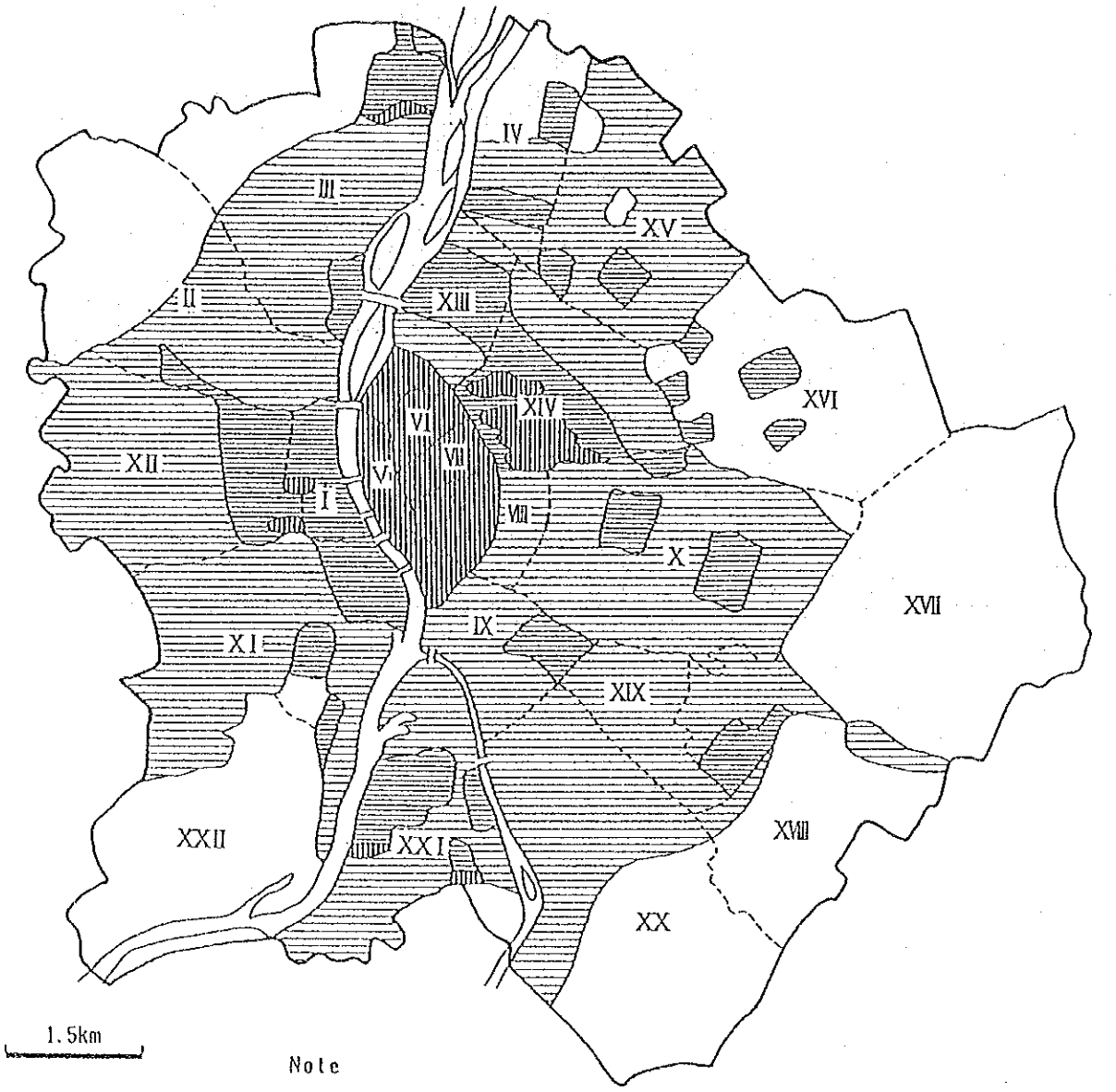
The population of the Budapest city, consisting of 22 districts, was about 2,000,000 in 1992. City cleaning services have been provided with over 99% coverage.

At present over 92% of the MSW generated in the city area is collected and disposed of by FKFV under the contract with the Budapest Capital City Government.

The collection and transportation of the MSW are basically performed through Monday to Friday with the exception of holidays.

The frequency of collection is set according to the amount of the MSW generated in each district. As shown in the Figure 3-1 the MSW are collected either every day, three times a week, twice a week or once a week depending on the district. The detail of the MSW collection areas is presented in the Figure 3-1 and the distribution of the MSW hauled from the 22 districts is shown in the Table 3-1.

Figure 3-1 Municipal Solid Waste Collection Areas and the Frequency of Collection in Budapest



Source : FKFV (FOVAROSI KOZTERULET FENNTARTO VALLALAT)

Table 3-1 Distribution of the Solid Waste Volume Hauled from the 22 Districts

DISTRICT	I	II	III	IV	V	VI	VII	VIII
Volume %	1.4	5.3	6.5	4.7	3.4	3.6	3.4	5.5
DISTRICT	IX	X	XI	XII	XIII	XIV	XV	XVI
Volume %	5.3	6.0	8.0	3.9	6.7	5.5	4.5	2.4
DISTRICT	XVII	XVIII	XIX	XX	XXI	XXII		
Volume %	3.7	4.8	3.9	4.9	4.6	2.0		

Source: FKFV, 1992

3.2 Municipal Solid Waste Flow

As shown in the Figure 3-2, almost 50% of the MSW generated in the city is incinerated by HHM1; the remaining 50% is dumped at four final disposal sites.

Presently, the MSW generated in Budapest is collected, transported and disposed of by the Public Service Enterprise (FKFV) and other small-scale companies. In 1992, FKFV handled approximately 92% of the total MSW generated in Budapest. Flow of the MSW management and disposal volume of the MSW in Budapest is shown in the Figure 3-2.

Presently the MSW and incineration residues generated in Budapest are disposed of at the four final disposal sites shown in the Figure 3-3.

Akna site	District X
Micsurin site	District XVII
Peteri major site	District XX
Dunakeszi siste	Outside Budapest city

Figure 3-2 Flow of the Municipal Solid Waste in Budapest

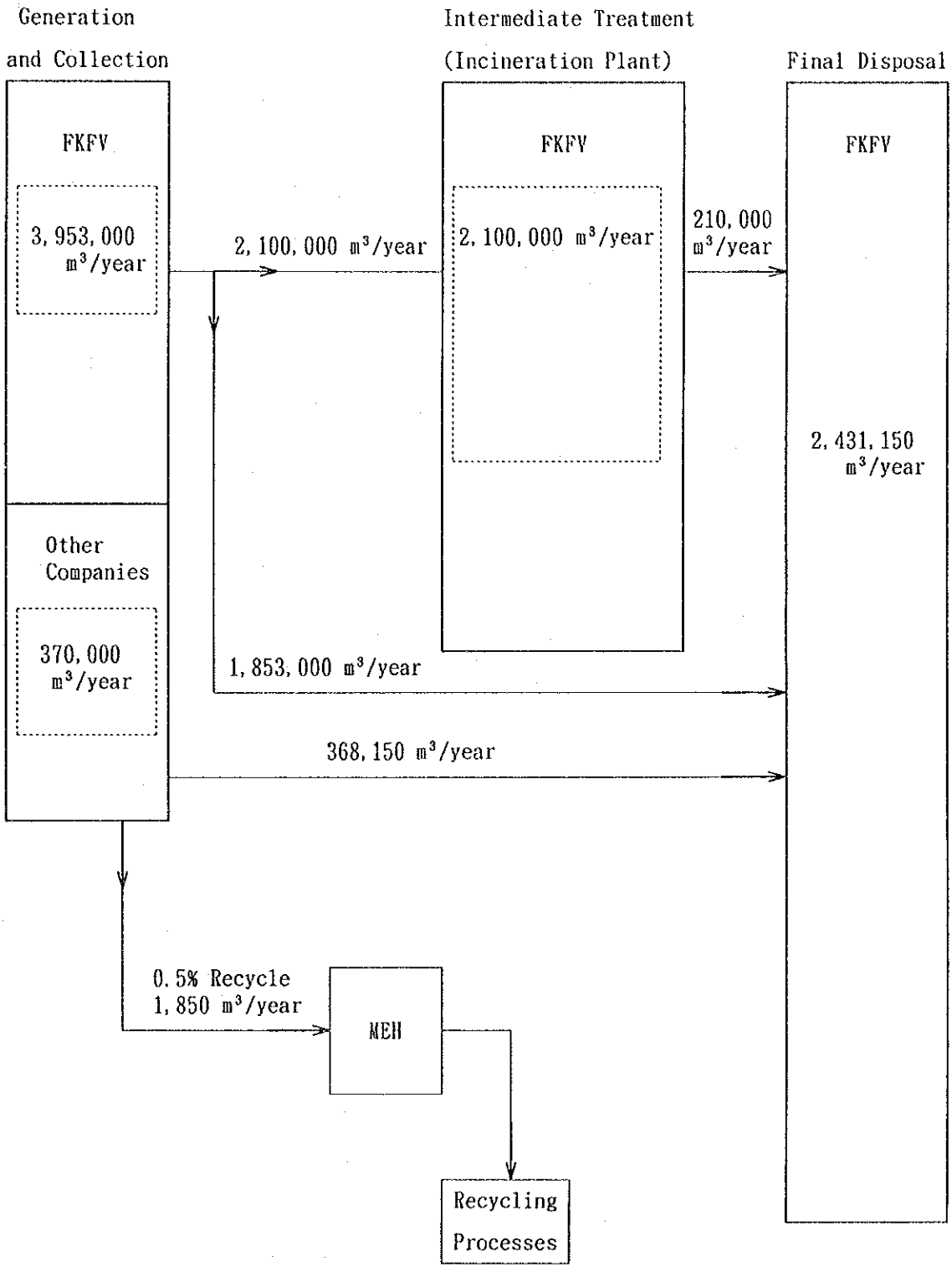
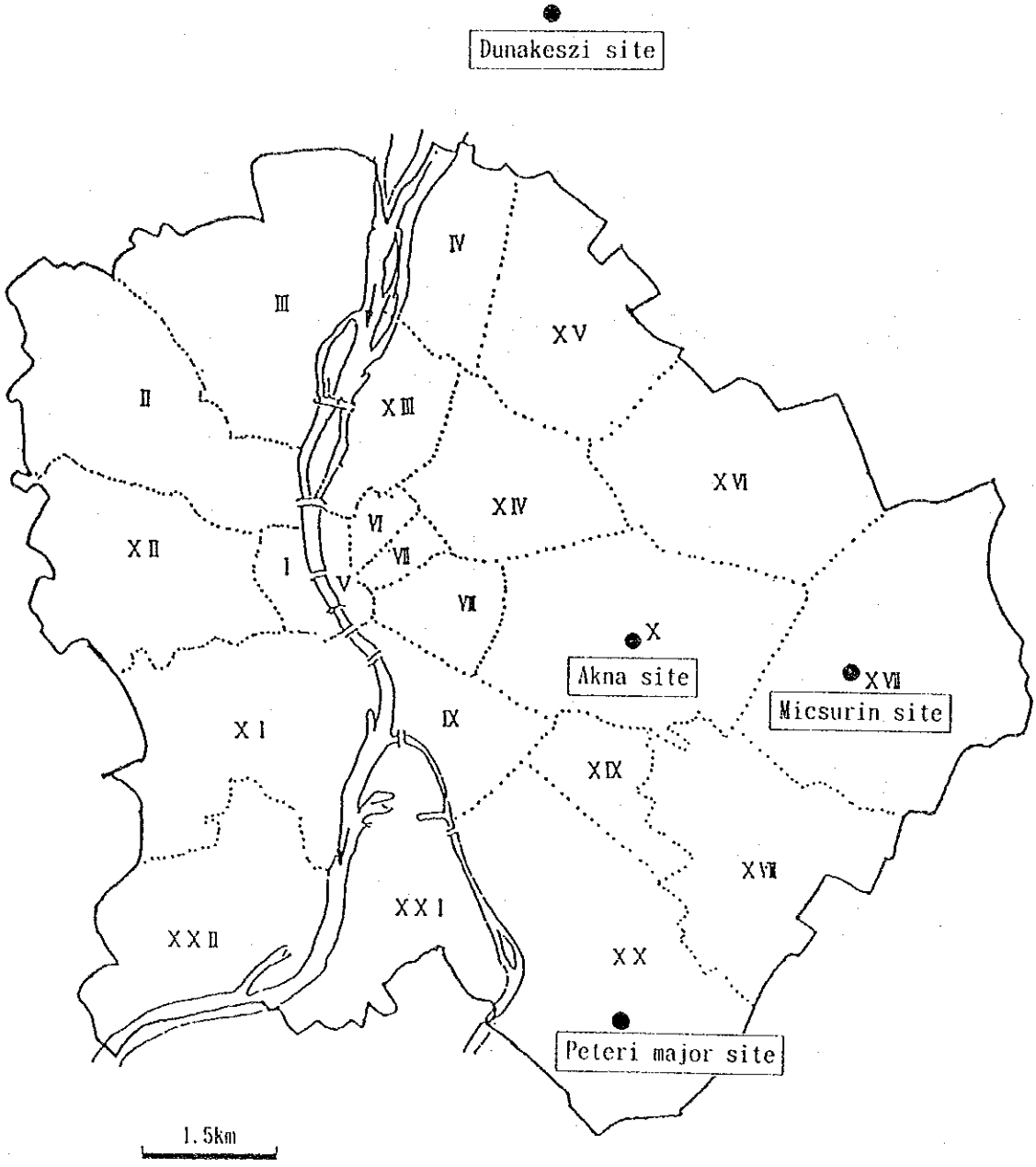


Figure 3-3 Location of the Final Disposal Sites



3.3 Municipal Solid Waste Discharge and Storage

Those who discharge the MSW are basically obliged to use the designated containers which are rented by FKFV by the month.

Houses use 110 or 240 liter containers for discharging and storing. High rise apartments discharge the MSW through a dust chute and store in a 1.1 m^3 container placed in a special chamber in the building.

The Table 3-2 shows the kinds of containers and their usage in the Budapest city.

Table 3-2 Kinds of Containers and Usage

Capacity	Material	Places	Container leasing fee	Way of payment	Remarks
110-liter	plastic	apartments	90 Ft/mon.	case by case	
240-liter	plastic	ciyt street, markets	180Ft/mon.	same as above	
1,100-liter	plastic & galva-nized steel	high rising apt. curbsides	1,200Ft/mon.	users to FKFV	
5 m^3 & 6 m^3	steel plate	parks, public facilities, companies, factories, construction sites etc.	depend on contract condition	users to FKFV	

Source: FKFV, 1992

3.4 Municipal Solid Waste Collection and Transportation

FKFV has three dispatch stations (motor pool stations) in the city. Each station has its own designated territory for the MSW collection and haulage to the final disposal sites and/or HHM1.

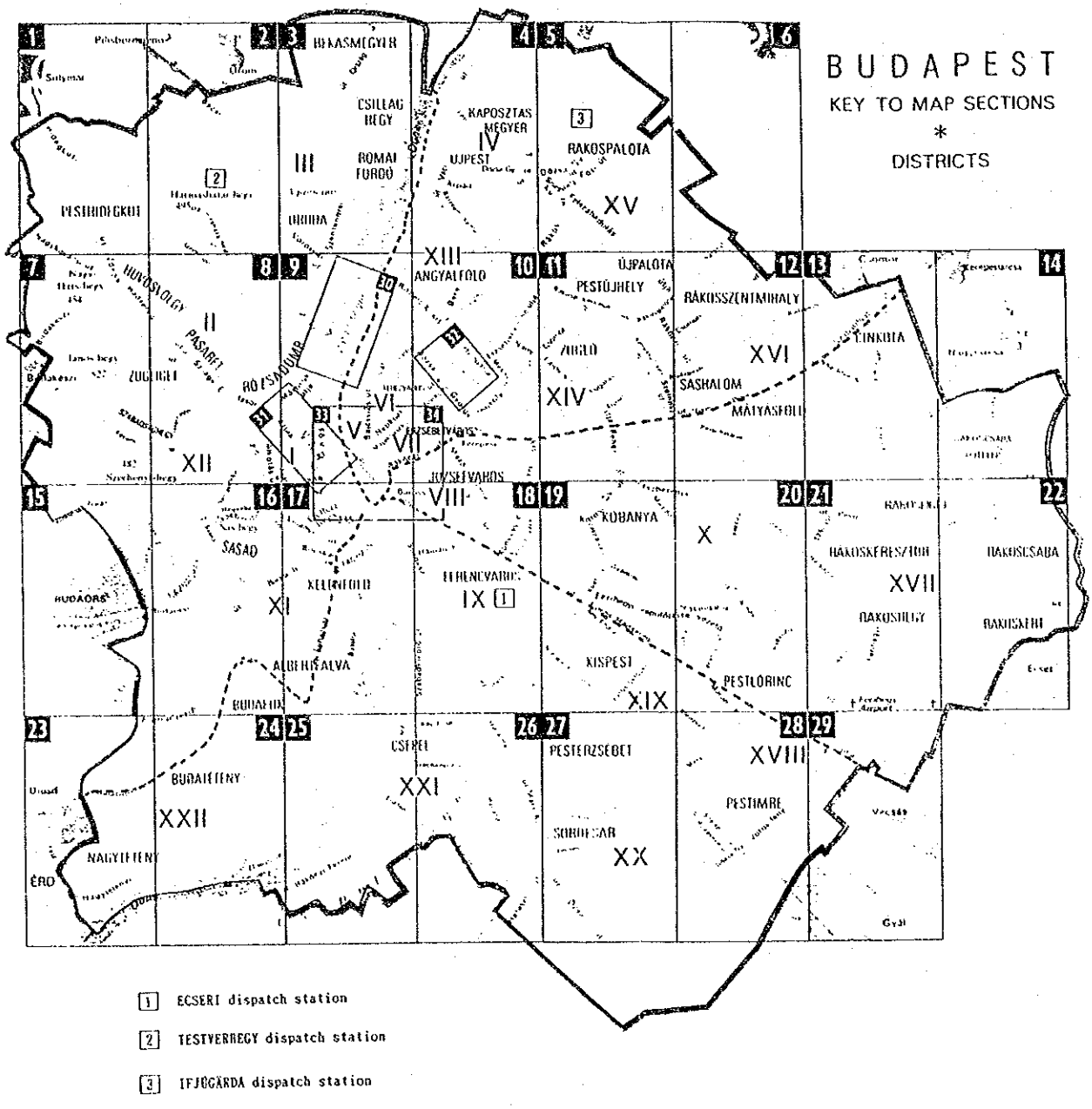
The location of each station is shown in the Figure 3-4. Numbers and kinds of collection vehicles belonging to each station are shown in the Table 3-3.

The collection territory of each station is presented in the Table 3-4.

Each dispatch station has facilities for the maintenance and repair of the collection vehicles. Details of these facilities are presented in the Table 3-5.

Numbers of employees working at the three dispatch stations, and their working conditions and annual incomes, are presented in the Table 3-6 and the Figure 3-5.

Figure 3-4 Location of the Dispatch Stations



[1] ECSERI dispatch station

[2] TESTVERHEGY dispatch station

[3] IFJUGARDA dispatch station

Table 3-3 Collection Vehicles and Allocation

Unit: Number of Collection Vehicles

	ECSERI	TESTVERHEGYI	IFJUGARDA	Total	Capacity
Raba (Hungary)	16	21	18	55	10 ton
Bedford (England)	14	23	19	56	10 ton
Steyr (Austria)	3	5	4	12	10 ton
Liaz (Czechoslovakia)	42	16	34	92	8 ton
Ifa (DDR)	16	19	17	52	5 ton
Csepel (Hungary)	1	2	-	3	
Total	92	86	99	277	

Source: FKFV, 1992

Table 3-4 Three Dispatch Stations and Collection Areas

Dispatch station	Collection district	Remarks (main area)
ECSERI	VIII, IX, X, XVII, XVIII, XIX, XX, XXI	Pest side, southern half
TESTVERHEGYI	I, II, III, XI, XII, XXII partly V	Buda side
IFJUGARDA	IV, V, VI, VII, XIII, XIV, XV, XVI	Pest side, northern half

Source: FKFV, 1992

Table 3-5 Reconditioning, Repair Results and Parts Inventory in the Three Stations

		ESSERI	TESTVERHEGYI	IFJUGARDA	Total	Remarks
	Preventive maintenance (unit/month)	42	30	35	107	
	Small repairs (unit/month) (break reconditioning, etc.)	28	24	23	75	
	Big Repairs (unit/year)	205 ± 30	220 ± 20	260 ± 20	About 685	
	Overhaul (unit/year) (Engine, Transmission, etc.)	3	2	3-4	8-9	
	Overhaul of unit exchanged (Engine, Accelerator, transmission, etc.)	197 units	-	-	197	
	Producing parts to be changed	corresponding quantity	-	-	-	
	Other maintenance service	Engine/pump batteries electric parts, etc.	-	Batteries (change)	-	
Parts	Parts warehouse	4 buildings	1 building	1 building	-	
Inventory	Inventory quantity	About 40,000 pcs.	About 13,000 pcs.	About 20,000 pcs.	-	
	Inventory amount	1,820,000Ft	95,000Ft	190,000Ft	About 2,100,000Ft	

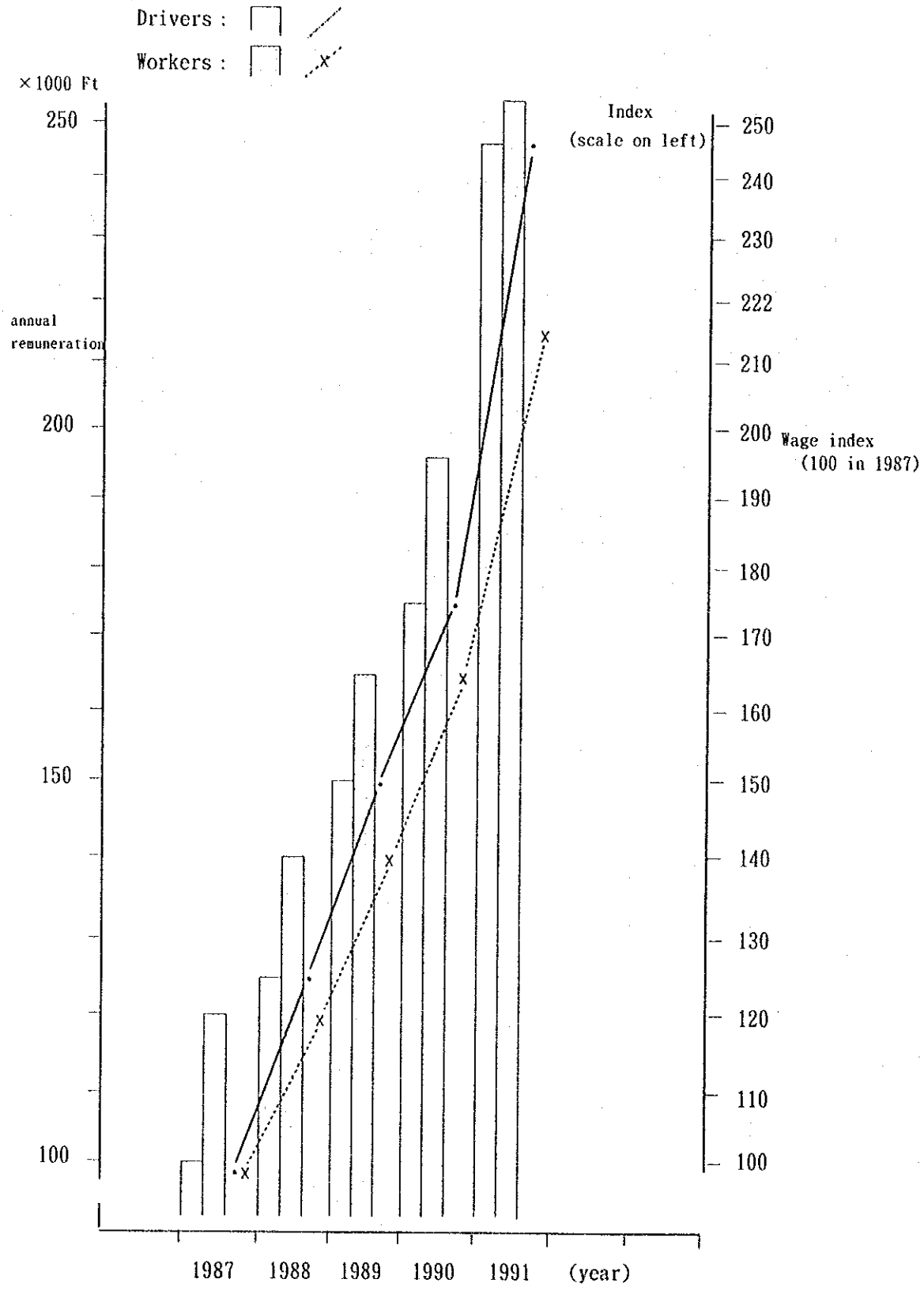
Source: FKFV, 1992

Table 3-6 Number of Personnel, Absenteeism and Salary

		ECSERI	TESTVERHEGYI	IFJUGARDA	Remarks
Number of workers	Drivers	72	69	86	Total 227
	Collection workers	103	98	122	Total 323
	Mechanics	28	29	26	Total 83
Absenteeism	Drivers & collection workers	18.6%	16.9%	14.4%	
	Mechanics	23.3%	16.9%	17.7%	
Workers left during the last 3 years	Drivers	30	16	8	Total 54
	Collection workers	52	44	39	Total 135
	Mechanics	3	10	3	Total 16
Percentage of workers left during the last 3 years (to present workers)	Drivers	41.7%	23.2%	9.3%	
	Collection workers	50.5%	44.9%	32.0%	
	Mechanics	10.7%	34.5%	11.5%	
Salary	Drivers	Average 247,000Ft/year			
	Collection workers	Average 253,000Ft/year			

Source: FKFV, 1992

Figure 3-5 Trends of Annual Income of Drivers and Collection Workers



Source: FKFV, 1992

3.5 Street Cleaning

The organization responsible for the public area cleaning in the Budapest city is the Public Service Enterprise (FKFV).

According to decision of the establishing authority, FKFV is also responsible for cleaning streets, roads, squares and similar public areas.

FKFV has a specialized commercial management division undertaking all the necessary tasks, employing 510 full-time workers in charge of the public area cleaning. FKFV also transports the collected street sweepings either to HHM1 or to the final disposal sites according to the schedule established for the MSW.

As the volume of street sweepings is extremely low in comparison with the total volume of the MSW, it can be neglected in the waste flow and mass-balance in the MSW management system.

3.6 Intermediate Treatment

3.6.1 Resource Recovery and Recycling

MEH is the biggest national scale company dealing with the resource recovery and recycling of raw materials which will be reused in the processing industry. In this way considerable saving is achieved on energy and raw materials. The recuperation of raw materials from the MSW also means a substantial reduction in the MSW management system.

The recycling activities concern iron, steel, non-ferrous metals, paper, textiles, glass and plastic.

The company is supervised by the Hungarian Ministry of Industry and Trade, but is at present under privatization procedure. In addition to the raw materials recovered from the industrial wastes, it also collects recyclable wastes from the MSW.

The recyclable materials are collected in the following ways.

- Collecting network /about 50 shops/where the public can sell the collected materials.
- Private collectors deliver the recovered materials directly to the MEH collection centre.
- MEH's trucks collect the recovered materials on sidewalks during bulky waste collection according to a fixed schedule.
- MEH's trucks collect the materials separated at the final disposal sites and HHMI.

The amount of the recycled materials in 1989-1991 was as follows.

- Ferrous metal	120,000 - 130,000 t/year
- Glass	80,000 - 10,000 t/year

- Paper	40,000 -	45,000 t/year
- Plastic /PE/	100 -	200 t/year
- Non-ferrous metals /Cu, Al, Zn, Pb/	8,000 -	10,000 t/year

60 to 70% of the collected metals is processed before transportation to metallurgical plants.

The processing operations consist of:

- Cold cutting,
- Compressing,
- Crushing, and
- Screening.

At the present time there are no facilities in Hungary for the recycling of car batteries and dry cells. They are either transported abroad or disposed of at the special disposal site for harmful wastes in Aszod, about 40km from Budapest.

In 1992 the Budapest Capital City Government carried out an experiment on separate collection of the MSW in order to increase the volume of the recycled materials.

The experiment consisted of two parts.

The separate collection of light and colored bottles started from February 1, 1992. For these fifty special containers were placed at the eleven points in the central downtown and in district XIX (No. 1 sampling area). From April 1, 1992 four more fractions /paper, plastic, metal, dry battery/ were included and the collection area was expanded to district II (No. 2 sampling area). The collected wastes were sold to MEH according at the following prices.

- Light glass	0.50 Ft/kg
- Colored glass	0.05 Ft/kg
- Paper waste	0.08-1.00 Ft/kg
- Metal	0.60-2.00 Ft/kg

The dry batteries were disposed of at the hazardous waste disposal site in Aszod. This experimental selective collection of waste continued until the end of September 1992. Another experiment carried out by the Budapest Capital City Government in cooperation with the Ministry of Environment concerns the separate collection of hazardous materials contained in the MSW. This action was connected with the Earth Day, from April 22 to 26, 1992, and was preceded by an advertising campaign (press, TV, radio).

During the five days in the experiment the following types of hazardous waste were collected: car batteries, dry cells and small batteries, used oil, paint residues, solvents, pesticides, insecticides, medications, fluorescent tubes and bitumen-based waste. The total amount of collected wastes were about 40 m^3. The collected wastes were transported to the special disposal site for hazardous waste (Aszod), incinerated in the hazardous waste incineration plant (Dorog) or recycled.

The results of the experiment were as follows.

- The reaction of residents was generally positive.
- The success of the collection depended on preparatory work and advertising.
- Types of hazardous waste collected separately should be expanded to other types of materials contained in the MSW.
- A deposit system should be introduced for some types of wastes, like batteries, dry cells, fluorescent tubes, etc.
- More advertising should be done on the possibility of deposition of some materials at dealers and

distributors/medicaments, pesticides, etc.

3.6.2 Composting

Composting is a means by which some organic materials are decomposed to carbon dioxide and water, while stabilized products, principally humic substances, are synthesized.

At present, in Budapest there is one primitive type green waste composting yard.

At the same time the sewage treatment plant in Budapest is carrying out a small scale composting experiment.

Two compost plants are operating successfully, in Gyongyos and Eger, about 50 - 60 km from Budapest. Raw materials used for composting by those plants are agricultural waste, green waste from parks and gardens, wood dust, slaughterhouse waste, sewage sludge, etc.

Analytical sludge data are presented in the Table 3-7 and the characteristics of compost produced by TERRA-VITA in Eger are presented in the Table 3-8.