2) Operational Organization at the Disposal Site

Table 9.3.5 below shows the detailed staffing and composition of the team for the disposal site. The total number of staff required for operating the site is estimated at 30.

Table 9.3.5 Operational Organization of the Disposal Site

Staffing	Number	Responsibility
Site manager	1	- all the responsibility of handling the site, and contact and reporting to Waste Authority
Secretary (Accountant)	1	- controls and regulates the schedule of Site Manager, register income and outlay daily management
Chief of engineering section	1	- responsible for all engineering matters, planning and conduct of suitable landfill operation method
Truck scale engineer	3	- operates truck scale to measure the waste quantity and quality, and directs to designated landfill area
Site inspector	2	- inspects the site to maintain safe operations and prevent illegal dumping
Chief operator	1	- controls daily operator's work and directs trucks to the designated landfill area in site
Operator/Driver	21	- landfills the waste Bulldozer: 5 ÷ 0.8 = 6.3; say, 7 Excavator: 2 ÷ 0.8 = 2.5; say, 3 Wheel loader: 1 ÷ 0.8 = 1.3; say,2 Dump truck: 5 ÷ 0.8 = 6.3; say, 7 Water tanker: 1 ÷ 0.8 = 1.3; say, 2
Total number of site staff	30	–

3) Procurement Schedule

The required equipment and vehicles for waste disposal should be procured by the time when the other part of SWM system, such as collection and transportation system and sanitary landfill system, starts functioning appropriately. These systems will commence from year 2002; therefore, the equipment and vehicles will be provided by the end of fiscal year 2001.

9.3.3 Illegal Dumpsite Reclamation

1) Required Project Components

As previously mentioned in Section 7.5, project components of the closure and reclamation work comprise land reclamation, final covering to landscape the completed site and post-closure care including leachate and gas management.

The conditions of the sites that are selected to be closed and reclaimed vary, priority for rehabilitation of these sites should depend on their condition. The work required at each site and the priority of this work is detailed below.

Table 9.3.6 Site Conditions and Closure/Reclamation Work Planned

Priority	Site location	Site Conditions	Closure/Reclamation Work Planned
1	• Spasskaya	• Ongoing site; wastes are carried in daily, but no maintenance work is undertaken. • Immediate actions are required.	• Land reclamation (Burying waste) • Final cover • Leachate and gas management • Rainwater drainage
2	• Raiymbek north	• Ongoing site; wastes are carried in daily, and some maintenance work is undertaken by using a bulldozer. • Amount of waste is not large so that immediate actions are not required.	• Land reclamation (Burying waste) • Final cover • Gas management • Rainwater drainage
3	• Existing transfer station	• Inactive site; a large amount of waste to be stored. Some smoke can be seen. • Spontaneous fire should be extinguished, but final cover is not urgently required.	• Land reclamation (Burying waste) • Final cover • Gas management
4	• Zhetysu south-west • Ryskulov north • Near the sludge retention pond • Kulagher north	• Inactive site; stored waste can be removed. • No urgent measures are required.	• Land reclamation (Removal of waste) • Final cover

2) Model Reclamation Project for Spasskaya

The illegal dumpsite near Spasskaya Street, so called Spasskaya site, is the only site within the city boundary that has been receiving wastes generated from the city. The site area is estimated at 2 or 3 hectares (ha) and most of the waste carried to the site is dumped into depressions from the edge of the site. From the environmental point of view, the site should be closed and reclaimed because of its proximity to a river. Therefore, proper leachate treatment is important. Also, waste on the site includes decomposable materials, such as fresh household waste, so that some gas extraction equipment is required.

This closure and reclamation work should be carried out as a model project in the city. Facilities required for the project are listed in Table 9.3.7. Further discussion of the final landscaping of the site are needed with the city planning division. A sketch of the model project is shown in Figure 9.3.5.

Table 9.3.7 Required Work for the Illegal Dumpsite Reclamation Model Project for Spasskaya

Work Category		Item	Remarks
Land Reclamation	Preparatory Work	Banking/Backfilling	
		Excavation	
		Slope adjustment	
Final Cover	Cover Soil	Grading	Including purchase of soil
		Compacting	
	Landscaping	Gardening with trees	
		Installation of lawn	
Leachate and Gas Management	Leachate Retention Pond	Excavation	
		Side slope adjusting	
		Liner laying	
		Clay laying	
	Leachate Collection and Drainage	Piping work	
	Rainwater Collection	Gutter installation	
	Gas Exhaust Equipment	Extraction well	
Fence		Net fence installation	
Access Road			
Auxiliary Work		Small drainage, Gate, etc.	30% of the above work items

3) Reclamation of Other Dumpsites

The other illegal dumpsites including the existing transfer station should also be subsequently reclaimed. However, reclamation work is not as urgent for these sites as the Environmental Survey did not find any adverse impacts on the surrounding environment. Reclamation of the other dumpsites is planned for after the year 2005.

Major facilities required are the same as those for the Spasskaya Model Project, i.e., land reclamation, final cover, and leachate and gas management. The scope for each step should be determined in a separate engineering design.

4) Closure and Reclamation Schedule

The closure and reclamation work for the Spasskaya site will be undertaken in fiscal year 2003, if design and engineering for the work is carried out in 2002. The reclamation work for the other illegal dumpsites including the existing transfer station will be executed in the period 2006 to 2010, as scheduled in Table 9.3.8.

Table 9.3.8 Reclamation Schedule for Spasskaya and the Other Sites

Year	Name of Site to be Reclaimed
Up to 2005	Spasskaya
2006 – 2010	Raiymbek north, Existing Transfer Station, Ryskulov north, Zhetysu south-west, Near the sludge retention pond and Kulagher north

Existing condition

Land Reclamation

Postclosure Land Use Plan

Figure 9.3.5 Illustration of Illegal Dumpsite Reclamation Model Project for Spasskaya

9.4 RECYCLING, MEDICAL WASTE, INDUSTRIAL WASTE AND STREET SWEEPING

9.4.1 Recycling

1) Introduction

To start off on a pessimistic note it must be said that the city of Almaty is not ready to execute an effective recycling system for solid waste. Briefly the reasons are:

- The poor economic situation in the city has contributed to the decreased demand for recyclable materials by end users.
- The very poor condition of the SWM system does not allow for introduction of a special collection system for recyclable materials from waste.
- The lack of enthusiasm on the part of the citizens to separate waste before discharge and to store the separated materials on their premises for long periods prior to collection for recycling.

However recycling cannot be written off and is acknowledged as an important issue in the SWM system. Recycling can produce benefits both by reducing the volume of waste and by reclaiming resources. Therefore this M/P considers the need for the gradual introduction of a recycling system within the following environment:

- An overall improvement in the SWM in the city at the levels of waste collection and sanitary landfill disposal
- Introduction of source separation. The recyclable materials shall be separated from the waste before discharge and collected separately.
- Increased public awareness of SWM issues and the need for cooperation in recycling activities
- An improving economy in the city in order to sustain the recycling system.

Accordingly it is proposed that a recycling system will be established after the year 2005. The target for recycling has been set at 10% of the generated domestic and commercial waste in the year 2010, i.e. an amount of 94 tons/day.

2) Recycling Plan

As described in Chapter 7 two systems for the collection of the recyclable materials are proposed in the master plan. They are:

- Separate collection from pick-up centers
- Amenity Centers

The proposed system flow is shown in Figure 9.4.1.

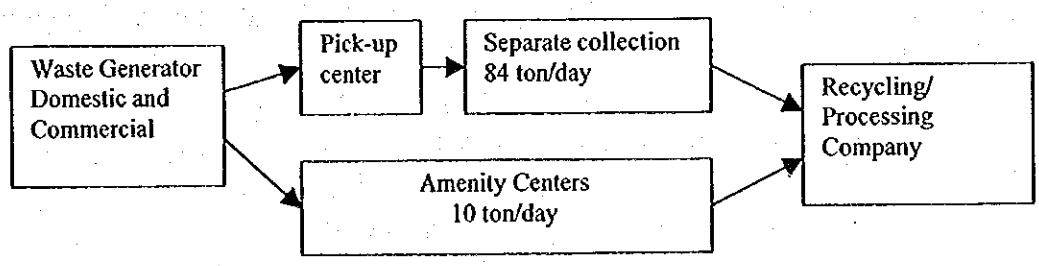

Figure 9.4.1 Flow of Recyclable Materials

(1) Separate Collection

Recyclable materials will be collected separately. In the year 2010 it is estimated that a total of 6,280 containers will be located in the city for waste collection. Similar containers but with different colors will be distributed at every container platform in principle. In the Individual Housing areas, where there are no container platforms, recyclable materials will be collected using the bag system. In total 1,200 containers will be distributed.

These recyclable materials will be collected once a week using compactor trucks. The Waste Authority will contract out for the operation of separate collection as well as ordinary collection.

Required equipment and staff are as follows:

- Recyclable materials — paper, textile, plastic, metal and glass
- Amount to be collected — 84 ton/d (90% of total)
- Collection system — Compactor $8m^3$ and container $1.1m^3$ or bag
- Compactor truck — 12 units
- Containers — 1,200 units
- Staff — Supervisor — 3 persons
  - Driver — 12 persons
  - Workers — 24 persons

It is expected that recycling and processing companies will receive the separated waste without charge. Therefore the demand for recyclable materials is crucial in order to successfully introduce the system.

The costs for purchasing these trucks and their operation are incorporated in the M/P. However it is considered that the revenues that may be gained by the sale of the recyclable materials may be returned to the Waste Authority to offset part of the costs of this special collection system.

(2) Amenity Centers

The Amenity Centers are expected to serve three purposes:

- Provide a location where recyclable materials may be brought by the generators themselves
- A location where end users can come to collect recyclable materials
- A location where some processing activities may be located

Three locations are proposed for the amenity centers, two at the proposed transfer stations and one in the south of the city at the presently illegal dump site south of Al Farabi street.

Outline of the amenity center is shown in Figure 7.2.2. The Amenity Centers will operate under the contract out system as follows:

- Recyclable materials — paper, textile, plastic, metal and glass
- Amount of material — 10 ton/day (10%)
- Number of Amenity Centers — 3 sites
- Equipment — Arm roll truck — 3 units

	Container ($6m^3$)	24 units
• Staff	Site manager	3 persons
	Supervisor/clerk	6 persons
	Driver	3 persons
	Workers	6 persons

The costs for construction of two of the proposed three amenity centers and their operation and maintenance costs are included in the M/P total costs.

9.4.2 Medical Waste

As mentioned in Section 7.3, individual treatment system for infectious waste is recommended because waste separation at the hospitals and clinics is essential for proper treatment. An individual treatment system shall be established by the medical facility itself. Separation of infectious waste should be introduced in all hospitals and clinics to reduce the risks of contamination during collection, transport and disposal.

A special arrangement is recommended for the collection of medical waste in order to handle this waste more carefully. The total waste to be collected will be 9,600 ton/year (31 ton/day) including treated infectious waste. Collection of medical waste is included in the collection plan described in Section 9.2.

9.4.3 Industrial Waste

Each factory shall be responsible for treatment, transport and disposal of its solid waste because the generator itself is most familiar with the characteristics of the waste. A system to accept non-hazardous industrial waste at the disposal site against payment of a tipping fee is recommended. Therefore it is planned that such waste be accepted at Karasai disposal site.

It is further necessary to establish a recording and documentation system for industrial waste. The Waste Authority shall monitor the nature and extent of the waste received at Karasai disposal site.

9.4.4 Street Sweeping Waste

Street sweeping should continue under the present system because transferring the responsibility for such large operations will unnecessarily burden the newly established Waste Authority. However street sweeping waste shall be received at the transfer stations and Karasai disposal site against payment of tipping fees.

9.4.5 Special Waste included in Domestic Waste

It is common knowledge that domestic waste may include some special wastes which can be hazardous. How to manage this special waste is an important issue in SWM. It is desirable to have a special system to collect and treat these wastes. Although their quantity is small, the treatment of these wastes requires large investment to avoid environmental pollution caused by the treatment process. Therefore the proper system for the management of these special wastes should be studied at the national level and not at the local level. At present the main system employed for these wastes in most countries of the world consists of separate collection and storage. As the quantities of

these wastes is small, such temporary measures could be employed in Almaty City as well. Therefore, it is desirable to collect these wastes separately and landfill together with industrial toxic waste in the future as mentioned above.

9.5 INSTITUTIONAL STRUCTURES

9.5.1 Functions of Institutions

There are four groups of functions that need to be addressed through modified or new institutions. These groups of functions are

- Overall management of Solid Waste Services which requires a new "Waste Authority". Its functions are briefly described in 8.3. Its main activities will be collecting tariffs from households and businesses and the management of contracts to provide actual services
- Ownership and leasing of assets required in the sector which cannot otherwise be provided by the private sector
- Enforcement of environmental and public health standards
- Execution of tasks which are the collective responsibility of residents

9.5.2 The "Waste Authority"

There are two basic structures that could be adopted for the Waste Authority. These are

- A department within the city akimate
- A 100% state owned enterprise

Given the existing legal environment, compromises will need to be made in meeting the objectives of this organization whichever structure is utilized. On balance the Study team recommends that a state owned enterprise structure is adopted at least initially, and the team understands that the akimate has commenced work on forming a special state enterprise. While establishing this enterprise, the following key attributes should be promoted as far as possible:

- Financial independence from other sectors of Government. It is important that the structure guards against the garnishing of funds collected by the Waste Authority for use by other parts of Government. This is more likely to be achieved with a state owned enterprise rather than a Government department. Indeed separation of the accounts of state enterprises from the budgets of the various levels of Government are normal clauses in the foundation documents for state enterprises, though such clauses have not always been honored. This problem will only be resolved fully when the Government carries out a major overhaul of the whole Government budgeting and accounting systems to provide a legal basis for establishing responsibilities and accountability at all levels of the accounting system.
- Independence to set tariffs. The existing system whereby tariffs are set by the AMC must be abandoned. As explained in Section 8.3, the costs of the service should be controlled through competition if the Waste Authority manages the tender process properly. Certainly the Waste Authority should not be given special treatment. Its activities along with those of all other economic agents in the country (including Government Departments) should be subject to scrutiny to ensure that it is encouraging competitive behavior. But direct price control

should be abandoned as it is inappropriate.

It may be easier to abandon direct price setting by the AMC if the Authority has the status of a Government Department. Currently the activities of Government Departments appear to escape the attention of the AMC (even though the policy basis for such an exclusion is questionable). On the other hand if the Authority is structured as a department, then any charges that it sets would be classified as taxes, to be approved in the national budget law, posing a different obstacle to changing of tariffs.

Whichever structure is chosen the problem cannot be fully resolved without some changes either to the budget law or the terms of reference of the AMC. In any event the terms of reference for the AMC should be change to focus its attention on encouragement of competition rather than price regulation.[1]

- Freedom to enter into commercial contracts. As one of the main functions of the Authority will be to arrange contracts for the delivery of waste collection and handling services, it is important that it can operate in a fully commercial manner. In many countries specific audit conditions imposed on Government departments tend to hinder their ability to operate in a commercial manner. The situation in Kazakhstan is unclear as the powers of Government Commissions are not clearly codified though they are certainly extensive. [2]
- Accountability The Waste Authority must be accountable for its actions. One of the fundamental changes that must occur in the Kazakh economy if the transition from a centrally planned economy to a market economy is to be successful is a shift from the use of administrative controls to legal regulation of activities. There has been little movement in this direction so far within the public sector in Kazakhstan, partly because habits from the previous political system are hard to change, and partly because the necessary legal framework is still far from complete. As yet there is no local Government Act or Acts which clearly specifies the responsibilities and competencies of local administrations and leaderships. Effectively their power rests on administrative delegation of powers from the President or Republican Ministries.

  It will be absolutely critical for the success of this restructuring that the "Waste Authority" can be held accountable for overall management. For example if it fails to organize a collection service in a region it should be liable to prosecution by the environmental and/or public health body. In the current circumstances the team believes that it is more likely that the "Waste Authority" can be made accountable if it is state enterprise, but this will to some extent depend on a reorganization of the enforcement agencies.

  In addition, in the interests of administrative efficiency, it would be highly desirable that this Authority has access to various records of the akimate.

[1] For a more detailed discussion see the Supporting Report

[2] Of particular importance will be the freedom of the Waste Authority to apply marginal prices for the sale of recyclable materials once recycling develops. There have been recent cases of Government Commissions disciplining State Enterprises for marginal pricing even though this was commercially realistic. Unfortunately the current guidelines of these commissions have not been brought up to date to recognize the commercial realities of a market economy

- The Authority will need to identify all land and building owners so that it can send out waste collection charge notices to cover all land within the city. (see 8.3.3 for an explanation of the liability for waste collection charges). The akimate must already hold such records, and improving the quality of the land ownership register must be a very high priority for the akimate for many purposes. It would be administratively efficient to combine the collection of the waste management charges with the collection of other land based taxes. It would also facilitate later enforcement of environmental regulations if payments for waste management are recorded on a consistent basis with records of land zoning and approval of use of various blocks of land under building and architectural regulations.

  If the Waste Authority is established as a separate state enterprise then arrangements for granting access to Government records will have to be negotiated.
- The Authority will also have to identify households that need relief from the payment of the waste collection charge. This would most easily be done if the Authority has access to social security records of the Akimate. If the Authority is established as a separate state enterprise, arrangements will need to be negotiated for access to these records while still guaranteeing the privacy of the households applying for exemption from the levy.

The advantages and disadvantages of each approach are summarized in the following table.

Table 9.5.1 Comparison of Structures

(1) Separate State Owned Enterprise	
Advantages	Disadvantages
• Less possibility of leakage of revenues to other budget entities • Free to collect fees from residents without budget law changes	• Cannot integrate with other functions of akimate • Subject to AMC controls • Need special charter to make it non-profit organization
(2) Department within the Akimate	
Advantages	Disadvantages
• Integration of garbage fee collection with land tax collection • Integration of assistance to poor with other social programs • Naturally a non-profit organization • Outside scope of AMC	• Need to change budget laws to isolate departmental budget and stop leakage of fees to other uses • Need to change budget law to allow department to collect fee, rather than tax • Difficult to change the amount of the charge

1) Special Powers and Responsibilities of the Waste Authority

To carry out its role the Waste Authority will need some special powers not normally associated either with a State Enterprise or with a Department of the City Akimate. These issues need to be addressed in the Charter Documents for the Authority:

- Power to require any body wishing to use the transfer station or disposal site to disclose any contract that it has entered into relating to that waste (so that it can verify that the waste is non-toxic etc.)
- Responsibility to disclose to ACDEP (or other Government agency responsible for environmental matters) details of the types of waste being taken to the transfer station and disposal sites, including details of contracts signed by the Waste Authority
- Responsibility not to disclose to any other person or body commercial details of any collection or other contracts that it signs under the powers granted above
- Power to refuse to accept toxic waste or other wastes declared unsuitable for the transfer station and disposal sites under its control.
- Responsibility to report to ACDEP (or other Government agency responsible for environmental matters) any attempts to dispose of unacceptable wastes at any of the sites that it controls
- Responsibility to co-operate with ACDEP (or other Government agency responsible for environmental matters) in the prosecution of waste generators or transporters for illegal generation, transfer or disposal of wastes.
- Powers to enforce payment of waste collection tariffs

2) Structure of Waste Authority

Whichever legal form is used for the Waste Authority, the functions and the internal organization will be similar. The detailed organization chart and duties statements are included in Chapter 14.3

9.5.3 Leasing Organization

Under this plan, the major facilities - the transfer station(s) and the disposal site(s) will remain state property managed by the Waste Authority who will contract out the operation of these sites. Title to this property will reside with the Department of Communal Services of the City Akimate. (This Department has recently taken over most of the functions of the Territorial Committee of the State Property and Privatization Committee (GKI) with respect to state assets used by the city Government. Usage of the assets will be controlled by the Waste Authority. Construction of these assets is likely to be financed by official donor loans. Whether the donor institution or Government is prepared to accept a loan Guarantee from the city or will require a full sovereign guarantee of the Republican Government is discussed in Chapter 20.

The plan also requires that collection companies and companies operating the transfer station and disposal site are re-equipped with a large number of collection trucks and some other new mobile equipment. While these companies might be able to purchase some equipment and to lease some other equipment commercially, most of this equipment will either be provided to the City Government as grant aid, or will have to be purchased by the city Government using official loans guaranteed by the Republican or City Governments. (Guarantee requirements are discussed in detail in Chapter 20). This equipment will have to be leased to the private companies. Title to this equipment will again reside with the Department of Communal Services of the City akimate.

These leases will be administered by the Waste Authority on behalf of the equipment owner, the Department of Communal Services. This arrangement will mirror the

standard arrangement where State Enterprises are responsible for State assets within their enterprise, though the State Property Committee is deemed to be their eventual owner.

The structure adopted for these leases will be critical to the success of the contracting out arrangements and must be coordinated with other details of the contracts between the Waste Authority and the private contractors. The structure of these leases is discussed further in Chapter 14.

The Waste Authority will need technical assistance from the donor organization to establish leasing arrangements for this equipment. The current pro-forma leases developed by GKI and used by GKI and the Department of Communal Services are not appropriate models for leases of this new equipment. These current leases are granted at highly concessional terms, and are designed to try to get old sunk investments operating again. The objective is to extract any remaining value from these old investments. The original scale of the investment is no longer relevant. This is inevitable in the current transition phase of the economy. However it is equally important that such conditions are not applied to new capital investments, but that new investments are subject to stringent tests of economic efficiency. Hence the team strongly recommends that management of these new leases is treated differently to the management of leases of existing state assets.

9.5.4 Enforcement Organizations

The structure of enforcement organizations must to a large extent reflect the structure of the laws that they are intended to enforce. It is expected that as the current economic transition proceeds there will eventually also be some significant structural changes in the legal structure (particularly in areas such as environmental law) to accommodate the changing economic system. Three types of changes might be anticipated:

- A shift in emphasis in the application of fines and penalties back towards enforcement rather than revenue raising for financing local activities. In the current public finance crisis, fines are seen as a useful source of revenue, and the priorities of organizations such as ACDEP in policing existing environmental laws appear at least in part to be driven by revenue objectives rather than enforcement objectives. This will only be possible once the national budget has been placed on a sounder basis and formal revenue sharing arrangements between the Republican and lower levels of Government developed
- Increased emphasis in the drafting of laws on specifying the enforcement process. There has been a tendency in the past for laws in areas such as the environment to be a statement of the norms and standards that should be met, with only limited attention paid to the processes that might be applied to determine whether these norms had been met. Choice of evaluation processes used by the enforcement agency was typically monitored through the administrative system rather than the legal system. While there were still strong administrative links between the enforcement agencies and the agencies being monitored, such a process was regarded as acceptable, but is likely to come under increasing pressure as the economic changes being promoted by the Government break down these traditional links.
- Formal delegation of specific powers to lower levels of Government. Under the previous system, lower levels of Government were effectively administrative

branches of the central Government, which administratively assigned various tasks to these branches but retained final authority. As previously discussed the economic changes now occurring will make it highly desirable this traditional pattern is replaced by a system of formal delegation codified through legislation. This in turn will be closely linked to rewriting of laws to place greater emphasis on codifying the enforcement process itself.

Eventually there are likely to be major changes in the responsibilities and structure of ACDEP, including a severing of the existing "dual sub-ordination" arrangements. Such changes however should be undertaken as part of a broader restructuring of intra-government relations, not as part of restructuring of SWM in Almaty. These changes will probably include the formal assignment of responsibility for SWM to the city, at the same time making the city responsible for enforcement of the lower level regulations needed to ensure efficient management of these services.

Until these broader structural changes occur, the team recommends that ACDEP should retain its current enforcement roles. At a later stage consideration should be given to merging the Sanitary and Epidemiological station with ACDEP as many of their enforcement activities are closely related, and amalgamation of these two organizations would reduce the opportunities for violators to evade enforcement actions by arguing about jurisdictional responsibilities.

However ACDEP should be the key organization for enforcing regulations intended to ensure effective waste collection and to prevent illegal dumping of wastes. ACDEP needs to monitor not only the activities of waste generators and collectors, but also the efficiency of the arrangements put in place by the Waste Authority. It would be a mistake to make the Waste Authority the principal organization for enforcing these regulations: this would simply be an invitation for the Waste Authority to prosecute waste generators and collectors rather than address systemic faults within its own organization. Of course in most cases which involve prosecution of waste generators or collectors there should be close co-operation between the ACDEP and the Waste Authority, but there remains the need for a monitoring and enforcement body separate from the manager of the service.

9.5.5 Residents' Organizations

Most of the existing KSK's and KSD's appear to be working effectively, and to enjoy considerable support from their members. Hence the team recommends that these organizations be retained and strengthened to assist them in fulfilling the roles of the residents in the SWM plan.

While the KSK's in particular enjoy widespread support, there are two systemic weaknesses in their organization.

- Membership is in effect voluntary, and the organizations lack an effective legal basis to force members to meet their joint obligations
- There is no effective mechanism to ensure that KSK's are formed to cover all multi-owner buildings.

The same systemic weaknesses face the KSD's but in this case there is less joint property that must be maintained or managed collectively; hence the solution to this problem may be somewhat different.

The team recommends that the existing KSK's should continue to fulfil their current roles, but that legal changes should be made to provide a firm legal basis for their activities. This would be done by creating a legally responsible entity for each building, with clearly defined powers which could then be assigned to a KSK or other agent.

This recommendation follows the practice of many other countries with a longer history of private ownership of buildings. The basic approach is that the registration of a building plan which allows for separate ownership of different parts, and which involves some common areas automatically creates a legal entity (frequently called a "body corporate") which includes all the owners of the building. Under the housing law all owners are members of this body, which is held legally responsible for the structural, sanitary and environmental safety of the building. The same legislation gives these "bodies corporate" specific powers to force its individual members to comply with key health and safety regulations.

In other countries these "bodies corporate" frequently employ commercial building agents to carry out its duties; indeed in larger cities there is frequently a large competitive market amongst building management agencies. In Kazakhstan, at least for the present, the "bodies corporate" would in most cases simply assign their powers and duties to an existing KSK which has the confidence of the members of the body corporate. This provides a practical management arrangement for facilities such as container platforms which might technically be jointly owned by the bodies corporate for several different buildings.

At first site these "bodies corporate" may appear similar to the existing building committees. The key difference would be that they have clearly defined legal powers which can be assigned to the KSK to provide the KSK with a legal basis for operation.

Initially the Waste Authority would negotiate with the larger KSK's for them to continue to collect charges for waste collection as the agent of the Authority. The KSK's would then transfer funds collected to the Waste Authority. Actions for collection of unpaid charges would be lodged in the name of the Authority rather than the KSKs though at least in the initial stages of actions for recovery of unpaid charges the Authority might continue to use the KSK as its agent.

The KSD's in general do not receive the same level of support from the community as the KSK's. If the technical solution adopted for collection of wastes from individual houses involves collection directly from each house, then the Waste Authority will deal directly with individual households billing them directly, though it should negotiate with the Peoples Bank and similar institutions for the actual collection of payments. Unless the technical solution involves communal containers for groups of houses, the KSD's will not become involved in the organization of waste collection.

This restructuring of Residents organizations, particularly the KSK's is important for the management of many communal services not just Solid Waste Management.

9.5.6 Legal Requirements

The Republican Government is required to issue a Law, an Edit or a Decree stating the responsibilities and powers of Almaty City Government for SWM in Almaty City. This should be modeled on the devolution/ decentralization principles observed in a majority

of developed countries.

(1) Permission shall be granted to Almaty City local government to establish an Almaty City Autonomous Waste Authority (hereinafter called Waste Authority) with the establishment costs to be met by Almaty City.

(2) Autonomy of the Waste Authority shall be guaranteed as a public entity financially independent of and without any intervention from any other governmental bodies/departments/entities at any level.

(3) Almaty City government shall exercise Governance rights over the Waste Authority. Almaty City Government will have no rights to intervene in the operations of the Waste Authority. Neither Almaty City government nor any other governmental organization will have any rights to receive dividends or any other form of distribution of profits from the Waste Authority.

(4) Tariffs shall be set based on the actual cost of operations. These costs will include payments to external contractors for the collection of wastes and the operation of key facilities, including but not necessarily limited to the transfer stations and the disposal site, as well as the internal costs of operation of the Waste Authority.

The letting of contracts for collection of wastes and the operation of facilities will be effected through a fair and open tendering process. The AMC should ensure that the tendering process conducted by the Waste Authority is fair and open, but the AMC will not set Tariffs.

(5) The Department of Communal Services shall exercise on behalf of Almaty City Government and the Republican Government any rights that are attached to or result from the holding of shares by Almaty City Government in the Waste Authority. The board of directors of the Waste Authority shall be responsible for the management of all assets and all operations of the Waste Authority. The Department of Communal Services, the Republican Committee and the Territorial Committee of the State Property and Privatization Committee (GKI) will not have any rights to intervene in the operations of the Waste Authority. The rights of the Department of Communal Services and of GKI will be restricted to those rights normally associated with the holding of shares under other jurisdictions. These rights are:

- to vote in elections of members of the Board of Directors
- to vote at any meetings of shareholders convened to consider matters that may be referred to a meeting of shareholders under the articles of association for the Authority.

These Articles of Association will be modeled on generally accepted practices in other developed countries.

(6) The Waste Authority shall have the right to retain profits as internal reserves for its sound management and future expansion. The articles of Association however may limit the size of these reserves that the Authority is allowed to accumulate.

(7) In the event that the Waste Authority reports a deficit, the existing Board or Directors will be required to stand down and a new election must be held for the Board of Directors. The existing directors will be ineligible for re-election. If the deficit exceeds the existing accumulated retained profits, then the excess of the

deficit over the (previously) retained earnings shall be transferred to the Waste Authority from the Almaty City budget.

(8) The Republican Government shall review and rectify provisions of the existing Law/Edit/Decree/Act etc., at present in force relating to SWM and Housing. The amendments should identify all entities liable to pay SWM charges, and the basis for determining the liability for these charges (for example, shall liability be based on ownership of property or registration of residency in the city).

The Law of April 16, 1997 on "Housing Relations" shall be amended to provide the Waste Authority with a statutory basis to collect waste management charges from all households and commercial entities. In addition, the Law shall be amended to clarify both ownership of and responsibility for common areas such as container platforms, and so forth.

(9) The Republican Government and local governments shall review Budget Laws including provisions of Law No.359 of April 1, 1999 on "the Introduction of Amendments and Additions to the Republic's Budget for 1999", Law No.357 of April 1, 1999 regarding "the Budget System", Law No.318 of December 16, 1998 concerning "the Republic's Budget for 1999" etc., to ensure that there are clear demarcations by item among the Republican, Oblast and City/municipal budgets. This should be the first step towards codifying devolution of specific powers of the Republican Government to local governments, inter alia to Almaty City local government.

(10) The "Polluters-Pay" principle is stated in many laws including Law No.160 of July 15, 1997 on "the Protection of the Environment" and Law No.162 of July 15, 1997 on "the Specially-Protected Natural Territories", albeit Articles 16, 60, etc., of Law No.160 and Article 23, etc., of Law No.162 are prescribed as for wastes. The "Polluters-Pay" principle shall be applied fairly to the people/ citizens and/or legal entities. Excessive charges that may encourage illegal dumping and falsification of licenses to generate waste shall not be applied.

(11) Law No.359 of April 1, 1999 stipulates the subventions to and from provinces (Oblasts). Law No.357 of April 1, 1999 prescribes the provision on subventions in Article 1, independent local budgets in Article 3, the percent and kinds of local budgets in Article 11, and the implementation of local budgets in Article 25. Law No.318 of December 16, 1998 prescribes kinds of local budgets in Articles 4 and 5, the percentage allocated to Almaty City in Article 6, and the percent of Environmental Protection Funds (29%) in Article 7. Amendment of Laws Nos.359, 357 and 318 shall be required to guarantee that the budget of the Waste Authority is independent of and discrete from any other governmental bodies/institutions including the Akimate of Almaty.

(12) The Decision or Resolution on the establishment of the Waste Authority shall be promulgated by Almaty City government based on the Law/Edit/Decree etc. issued by the Republican Government. Almaty City Government shall be responsible for developing implementing regulations required to establish the Waste Authority. Almaty City Government shall also be responsible for developing any regulations required to control relations between the Waste Authority and waste collection companies, companies contracted to operate the transfer station and the final disposal site, any other users of these facilities, KSKs and KSDs. The Almaty City Government shall also be responsible for

developing the regulations needed to codify the tariff setting principles, including the Cross Subsidy system.

(13) The Minister of Finance acting on behalf of the Republican Government shall issue an official Letter of Guarantee to donor governments on behalf of the Waste Authority and the GKI before the disbursement of any loan moneys for the implementation of this project. In the event that a donor is prepared to accept a guarantee issued by the City Akimate in lieu of a Sovereign Guarantee then the above condition may be replaced.

(14) The budget laws of the Republic shall be amended so that the proportion of taxes that are retained by local governments are fixed and cannot be altered year by year as currently occurs.

(15) The budget laws shall be amended to grant an unequivocal right to local governments to appropriate revenues assigned to them from the taxes collected in their areas of jurisdiction, including the right of local Governments to pledge a proportion of those revenues as a guarantee of a loan to the local Government or as a guarantee for a loan to a third party.

(16) The Laws on State Guarantees shall be amended to limit both the proportion of revenues of local Governments that can be pledged under guarantees issued by the said local Governments.

(17) The Laws on State Guarantees shall be amended to limit the total amount of property or other assets that can be pledged by local governments pledged under guarantees issued by the said local Governments.

(18) The laws on State Guarantees shall be amended to require all local Governments to register all pledges of assets or revenues made by it with a prescribed Republican Body. Potential lenders to local Government will be allowed to inspect this register. In the event that a lender accepts a guarantee from a local Government he will be entitled to demand a statement from the Republican Minister of Finance detailing all guarantees issued by the local Government. The issue of this statement by the Republican Government will include an undertaking to replace the local Government Guarantee with a Sovereign Guarantee if:

- the statement of pledges is later shown to be materially incorrect at the date of issue, or
- the local Government breaches the Republican Laws on State Guarantees at any time.

9.6 MASTER PLAN (M/P) IMPLEMENTATION SCHEDULE

The M/P period will be divided into two phases:

a. Phase I Up to the year 2005
b. Phase II Year 2006 to 2010

The projects to be implemented in each phase are described below.

9.6.1 Phase 1

Phase I shall be the period to establish the basic system of SWM in Almaty city and to facilitate an appropriate organization and a concrete financial base. Therefore, the priority project package shall be formed of the following projects and shall be implemented in this period as shown in Figure 9.6.1.

(1) Establishment of Waste Authority
- Establishment of Waste Authority
- Introduction of new tariff system with cross subsidy
- Introduction of contract out system
- Provision of universal service

(2) Introduction of new collection system
- Introduction of new collection system in individual housing area
- Introduction of new collection system in block housing area
- Introduction of new collection system for commercial waste
- Procurement of collection equipment for above

(3) Construction of transfer stations
- Construction of West transfer station
- Construction of Spasskaya transfer station
- Provision of equipment for above transfer stations

(4) Improvement of Karasai disposal site
- Improvement of facilities of Karasai disposal site
- Procurement of equipment for sanitary landfill operation

(5) Rehabilitation of illegal dump sites
- Model rehabilitation of Spasskaya illegal dump site

9.6.2 Phase 2

Phase 2 shall be the period to establish the system to achieve minimum requirements on waste reduction and recycling. Following projects shall be implemented in this period as shown in Figure 9.6.1.

(1) Expansion of new collection system

(2) Introduction of separate collection and recycling system
- Introduction of separate collection system

- Construction of amenity centers
- Procurement of equipment for above

(3) Capacity expansion for year 2010
- Equipment for transfer stations
- Equipment for disposal site

(4) Rehabilitation of illegal dump sites

(5) Revision of tariff

9.7 MASTER PLAN COST

9.7.1 Investment Costs

(1) Conditions of Cost Estimation

Investment cost of the M/P is estimated based on the following conditions.

a.	Exchange rate	US$ 1.00 = KZT 115	(May 3, 1999)
		US$ 1.00 = Yen 121.10	(May 6, 1999)
b.	Price	As of May, 1999	

(2) Investment Cost

The investment cost for the M/P is estimated to be KZT 4,544 million excluding VAT as shown in Table 9.7.1. Engineering service cost is estimated to be 5% of the construction and procurement cost. VAT shall be included in the investment cost for the M/P but it shall be paid by the Government or exempted. It is noted that Almaty city shall provide initial working capital which will be KZT 140 million (around 10 % of annual expenses) for the establishment of the Waste Authority.

Figure 9.6.1 Master Plan Implementation Schedule

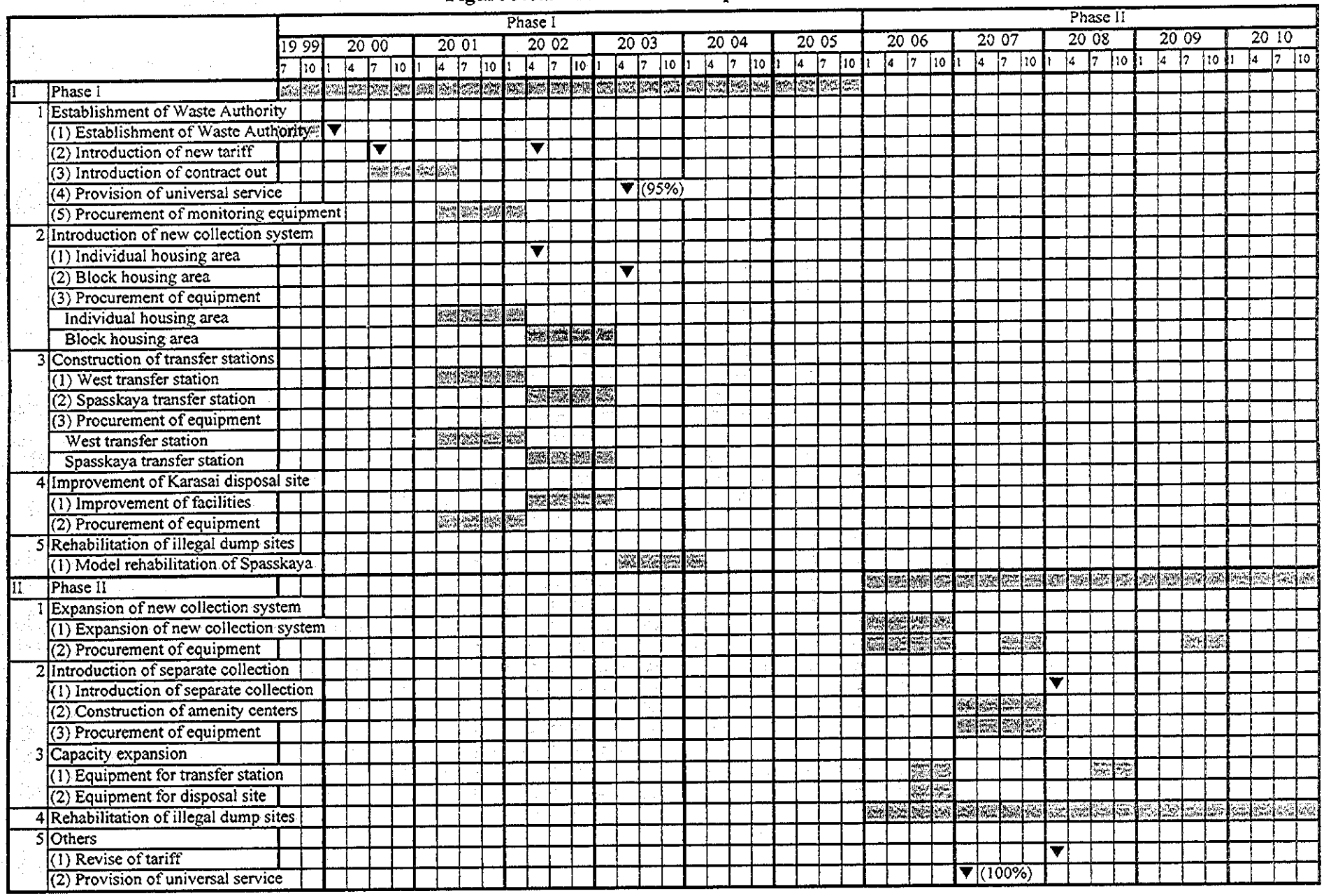

Table 9.7.1 Master Plan Investment Cost

(unit: KZT million)

	2000 – 2005	2006 – 2010	Total
1. Establishment of Waste Authority	4.6		4.6
(1) Procurement of equipment	4.6		4.6
2. Introduction of new collection system	808.7	478.4	1,287.1
(1) Procurement of equipment	808.7	478.4	1,287.1
3 Construction of Transfer stations	1,149.4	39.6	1,189.0
(1) West transfer station	398.3	0	3,98.3
(2) Spasskaya transfer station	289.9	0	289.9
(3) Procurement of equipment	461.2	39.6	500.8
4. Improvement of Karasai disposal site	1,123.3	33.8	1,157.1
(1) Improvement of facilities	874.5	0	874.5
(2) Procurement of equipment	248.8	33.8	282.6
5. Rehabilitation of illegal dump sites	198.1	282.5	480.6
(1) Model rehabilitation of Spasskaya	198.1	0	198.1
(2) Other sites	0	282.5	282.5
6. Introduction of recycling system	0	208.9	208.9
(1) Construction of amenity center	0	18.6	18.6
(2) Procurement of equipment	0	190.3	190.3
Sub total	3,284.1	1,043.3	4,327.4
Engineering	164.2	52.2	216.4
Total	3,448.3	1,095.5	4,543.8
(US$ million)	(30.0)	(9.5)	(39.5)
VAT	689.7	219.1	908.8
Grand total	4,138.0	1,314.6	5452.6

9.7.2 Basic Operation and Maintenance Costs

(1) Condition of Cost Estimation

a. Price As of May, 1999

b. Depreciation

Life time of equipment
- Collection and other vehicles: 8 years
- Large containers: 5 years
- Small containers: 3 years
- Heavy equipment: 8 years

Remaining value of equipment: 0%

Life time of facilities (for estimation of depreciation)
- Transfer station: 20 years
- Disposal site: Up to full capacity
- Amenity center: 20 years

Remaining value of facilities: 0%

c. Maintenance and repair cost of equipment and facilities

Vehicle and heavy equipment	40% of initial cost/life time
Facilities	1 to 3% of construction cost/year

d. Major unit price

Fuel	Gasoline	40 KZT/litter
	Light oil	25 KZT/litter
Personnel	Site manager	19,900 KZT/month
	Technician, Supervisor	18,000 KZT/month
	Driver	12,000 KZT/month
	Worker	10,000 KZT/month

(Note: Personnel cost includes 21% of social tax after deduction of pension fund.)

(2) Basic Operation and Maintenance Cost

As mentioned in chapter 9.6, the Waste Authority will be established and actual collection work, management of transfer stations and disposal site will be contracted out. Contract out cost will consist of basic operation costs and other costs including profit and VAT. Basic operation cost (consisting of personnel, fuel and lubricants, maintenance, miscellaneous, and depreciation costs, and excluding profit and VAT) will be KZT 730.4 million in 2005 and KZT 872.9 million in 2010 as shown in Table 9.7.2. Total expenses of the Waste Authority are described in section 9.8.

Table 9.7.2 Basic Operation and Maintenance Costs in 2005 and 2010

(Unit: KZT million)

Item	2005	2010
1. Waste Authority (Head office)	15.3	15.3
2. Collection	331.1	388.4
3. Transfer stations	192.8	203.6
(1) West transfer station	122.5	127.9
(2) Spasskaya transfer station	70.3	75.7
4. Karasai disposal site	191.2	202.1
5. Recycling	0	63.5
(1) Amenity center	0	16.4
(2) Separate collection	0	47.1
Total	730.4	872.9
(US$ million)	(6.4)	(7.6)

9.8 FINANCIAL PLAN

9.8.1 Financial Principles for SWM

SWM services should be based on the following financial principles, considering the present financial situation of Almaty City.

1) Responsible Organization

As mentioned in Section 9.6, it is planned that the Waste Authority is established as the responsible organization for SWM in Almaty City. Thus, this financial plan is prepared from the viewpoint of the Waste Authority.

2) Fees and Revenues

SWM services should be funded by fees collected from users. In addition, such fees should be used only for the management of the SWM services. It should be prohibited to finance other costs (e.g. salaries of other departments of the city government) in order to secure enough revenues to cover costs and keep the fees as low as possible.

3) Full Cost Recovery

Fees from service users are planned to cover all the costs including operation and maintenance costs, depreciation and financial costs.

4) Tariff and Cross Subsidy

An increase in tariff rates for the improvement of SWM services is inevitable. Thus, rates should be differentiated among income groups of households in order to lighten the burden on low income households. Firstly, the average cost is calculated for each category of the user without any cross subsidy. Then, the rates are adjusted for different income groups according to the following principle:

- Households whose incomes fall in the lowest 25% (of incomes) shall be exempt from payment of SWM fees. Remaining 75% households shall make up for the exemption.

5) Actual Operation

Actual operation of SWM is contacted-out to private companies. The Waste Authority makes up the total SWM plan and coordinates/manages the operations undertaken by the contractors.

9.8.2 Revenue of Waste Authority

1) Solid Waste Service Charge (Fees)

(1) Type of Service Charges

Fees included in the financial plan include (1) waste collection, (2) transfer stations and (3) the final disposal site.

Costs to be covered by these fees include all costs of the basic service and some other costs such as management of recycling project and Waste Authority administration.

Street sweeping is managed by the Road Maintenance Board, which is funded directly by the Akimate. Street waste is received at transfer stations, and the RMB pays a fee for depositing street waste at these stations.

Non-hazardous industrial waste is collected by private companies. These deliver the waste to the disposal site and pay a fee for tipping this waste at the site.

Details of the fees are presented as follows:

Table 9.8.1 Solid Waste Service Charges (Fees)

Fees	Unit	Fee Collection	Rate setting	Whose revenue?	Other cost covered by fee
Domestic waste collection	Per person per month	Waste Authority /KSKs	Waste Authority	Waste Authority	Share of MT, RP, MF, RI and AS
Commercial waste collection	Per ton	Waste Authority	Waste Authority	Waste Authority	Share of MT, RP, MF, RI and AS
Medical waste collection	Per ton	Waste Authority	Waste Authority	Waste Authority	Share of MT, MF, RI and AS
Street sweeping	—	—	—	—	—
Non-hazardous industrial waste collection	Per ton	Collection companies	Contract with users	Collection companies	—
Transfer stations[1), 4)]	Per ton	Waste Authority	Waste Authority	Waste Authority	Share of MT, MF, RI and AS
Final disposal site[1), 4)]	Per ton	Waste Authority	Waste Authority	Waste Authority	Share of RI[2)] and AS[2)]

Other costs) MT: management of transfer station, RP: recycling project (net cost[3)]), MF: management of final disposal site, RI: reclamation of illegal dump site, AS: administration of the Waste Authority

Note 1) Waste collection Contractors do not have to pay fees.

Note 2) Waste from other cities do not have to pay.

Note 3) If the recycling project makes a net profit, the fee can be reduced.

Note 4) Any entities delivering waste to the transfer stations at disposal sites other than those operating under the contract of the Waste Authority will be required to pay an excess fee.

(2) Cost Sharing

SWM costs should be shared among 1) households, 2) commercial entities, 3) hospitals, 4) street sweeping, 5) industrial entities and 6) other city users basically in proportion to the waste amount. Cost shares are decided for each cost category as shown below.

Table 9.8.2 Cost Share

Cost category	Households	Commercial entities	Hospitals	Industrial entities	Street Sweeping Company	Other city users
Domestic waste collection	100%	0%	0%	0%	—	—
Commercial waste collection	0%	100%	0%	0%	—	—
Medical waste collection	0%	0%	100%	0%	—	—
Transfer stations	Ratio of transferred waste	Ratio of transferred waste	Ratio of transferred waste	Ratio of transferred waste (1)	Ratio of transferred waste	Ratio of transferred waste
Recycling project	Ratio of waste amount	Ratio of waste amount	Ratio of waste amount	—	—	—
Final disposal site	Ratio of dumped waste	Ratio of dumped waste	Ratio of dumped waste	Ratio of dumped waste	Ratio of dumped waste	Ratio of dumped waste

Note Non-hazardous waste is currently not transported through transfer stations.

(3) Collection Rate of Service Charges

At present, the collection rate of service charges is estimated to be around 70%. After introduction of the new tariff system, the collection rate is expected to increase to 90% because the low income group is exempted from the new tariff.

(4) Required Tariff Rates in 2005 and 2010

Actual tariff rates are calculated based on the total accrued costs of the Waste Authority estimated for 2005 and 2010. Total costs in 2005 and 2010 are KZT 1.2 billion and KZT 1.4 billion respectively excluding VAT and corporate income tax. The required tariff is shown in Table 9.8.3.

Table 9.8.3 Required Tariff Rates of Users in KZT

	2005	2010
Domestic	75 /person/month	90 /person/month
Commercial	3,900 /ton	4,680 /ton
Medical	3,900 /ton	4,680 /ton
Transfer Station	1,750 /ton	2,100 /ton
Disposal Site	770 /ton	924 /ton

Note VAT is not included in costs.

2) Tariff Schedule for Household

Since it may be difficult to introduce new tariffs in one step, a step-wise approach should be considered. New tariffs should be introduced in accordance with the progress of the M/P, which will improve the quality of SWM services. Following are key milestones:

Date	Milestone	Domestic Rate	Commercial Rate
July, 2000	Start of Waste Authority's service	55.89 KZT/person/month	2,509 KZT/ton
April, 2002	Start of universal service	75 KZT/person/month	3,900 KZT/ton
January, 2008	Start of separate collection	90 KZT/person/month	4,680 KZT/ton

3) Vehicle Leasing Fee

During the tendering process, a deemed vehicle leasing fee is set and included in the deemed tender price for tender evaluation purposes. This is necessary to ensure fairness between those who use their own vehicles and those who borrow the vehicles from the Waste Authority. Contractors will not pay this amount to the Waste Authority, nor will this amount be included in the payments made to the Contractor by the Authority

4) Revenues in 2005 and 2010

Revenues in 2005 and 2010 are shown in Table 9.8.8 at the end of this section.

9.8.3 Cost Items of the Waste Authority

Costs of the Waste Authority consist of the following items:

(1) Administrative Costs of the Waste Authority
   a. Personnel Cost
   b. Public Relations
   c. Fuel & Lubricants for the Patrol Truck
   d. Maintenance & Repairs
   e. Others (25% of a. to c.)
   f. Overhead (70% of a.)

(2) Cost of Waste Services
   a. Commission on Service Charge Collection (2.5% of collected amount)
   b. Contract-out Cost
      i) Waste Collection
      ii) Management of Transfer Stations
      iii) Management of the Final Disposal Site
      iv) Recycling

(3) Ownership Costs
   a. Equipment (1% of asset value)
   b. Facilities (1% of asset value)

(4) Other Operating Costs
   a. Payment to Environmental Fund (KZT 80 per ton of waste dumped in the final disposal site)
   b. Illegal Dump Sites Reclamation

(5) Depreciation
   a. Equipment (straight-line method)
   b. Facilities (straight-line method)

(6) Interest Payable
   a. Long-term Loan Interest
   b. Short-term Loan Interest

(7) VAT (20%)

(8) Corporate Income Tax (30%)

9.8.4 Details of the Contract-out Cost

Details of the contract-out cost are as follows:

(1) Personnel Cost
(2) Fuel & Lubricants
(3) Maintenance & Repairs for Equipment
(4) Maintenance & Repairs for Facilities (in case of transfer stations, final disposal site and recycling facilities)
(5) (Others (25% of (1) to (4))
(6) (Overheads (70% of (1))
(7) (Ownership Costs (if the contractor use its own vehicles; 1% of asset value)
(8) Depreciation of Vehicles (if the contractor uses its own vehicles; straight line method)
(9) Interest Payable (if the contractor use its own vehicles)
(10) Business Reward (20% of (1) to (9))
(11) VAT (20%)

9.8.5 Cost Breakdowns of the Waste Authority in 2005 and 2010

Cost breakdowns for the Waste Authority is shown in Table9.8.9 at the end of this section.

9.8.6 Investment Plan

1) Investment Cost

The total investment cost of the M/P is as follows:

2000 – 2005	2006 – 2010	Total
KZT 3,448.3 million (USD 30.0 million)	KZT 1,095.5 million (USD 9.5 million)	4,543,8 million (USD 39.5 million)

* VAT is not included.

Note) Number of necessary equipment and facilities are estimated in the Equipment and Facility Plan. It should be noted that collection vehicles owned by private companies are estimated to be 15 units (KO type) in 2005. Also it is assumed that half of the replacements required for the collection fleet after 2006 will be procured by private companies. As a result, collection vehicles owned by private companies in 2010 are as follows.
   (1) Compactor 8m^3: 16 units,
   (2) Compactor 12m^3: 20 units, and
   (3) Arm Roll Truck 6m^3: 14 units.

2) Construction/Procurement Schedule

Construction and investment in vehicles and others items are assumed to be carried out in accordance with the most effective procurement schedule. For example, vehicles are expected to be employed year-by-year in accordance with the waste collection amount.

3) Replacement Cost

Replacement costs of equipment and facilities are estimated after their lives have expired.

4) Financing Sources and Terms of Loans

It is assumed that the capital investment in 2000 to 2005 is financed with a loan. Investments after 2006 are financed from internal cash reserves. See Section 9.7 for the details of the investment cost. Loan terms and conditions are as follows.

Interest rate (real, %)	Repayment period (years)	Grace period (years)
8	20	0

9.8.7 Cash Flow of Waste Authority

Cash flow of the Waste Authority is prepared for the following two (2) cases.

Case (1) VAT and corporate income tax included
Case (2) VAT and corporate income tax excluded

In case (2) the total long term debt in 2010 will be KZT 2.0 billion while the accumulated profit will be KZT 871 million in the same year. In case (1), there is a net deficit in shareholders' funds of KZT 167.5 million in 2010 even though a long-term loan has been drawn to cover the full investment cost (KZT 4,338.7 million). The total long-term debt outstanding in 2010 is KZT 2,760.8 million in case (1).

In case (2), the total drawings of long-term loans are KZT 3,448.4 million. The total debt outstanding in 2010 is KZT 2011.7 million, and no short-term loan is required to cover losses. A detailed long-term loan schedule is shown in Table 9.8.5.

The results show that the Waste Authority has no capacity to pay VAT based on the conditions mentioned so far in this Section. Thus, the Waste Authority should be exempt from VAT and corporate income tax. Estimated cash flows for case (1) and case (2) are shown in Tables 9.8.8 and 9.8.9 respectively. The balance sheets for both cases are shown below.

	Case (1)	Case (2)
Asset	2,274.9	2,882.9
Cash	0.0	608.1
Facilities/Equipment	2,274.9	2,274.9
Liability/ Equity	2,274.9	2,882.9
Short term debt	167.5	0.0
Long term debt	2,760.8	2,011.7
Accumulated profit	-653.5	871.2

9.8.8 Sensitivity Analysis

1) Objectives

The principal objective of this analysis is to examine the viability of the financial plan for the Waste Authority based on the Cash Flow statement.

The analysis estimates revenues and costs for the proposed SWM plan. Additionally, sources of funds are assumed. Financial viability of the project is determined by the ability to finance the projected costs using the projected revenues over the project period 2000-2010. A projected cash flow table is developed for the project period. All prices are quoted in constant 1999 terms, so inflation is excluded from all tables.

2) Check of the Sensitivity to Interest Rates

It is assumed that the initial investment cost is financed by long-term loans from an international aid agency (70% of the total long-term loan) and local loan agency (30% of the total long-term loan). Shortages of working capital are financed by short-term bridging loans from a local financing agency. Several long-term interest rates are applied to examine the sensitivity of the financial plan. Detailed terms and conditions of loans are as follows:

Table 9.8.4 Terms and Conditions of Loans for Sensitivity Check

Loan	Source	Interest rate (real, %)	Repayment period (years)	Grace period (years)
Long-tern loan (Foreign) - 70%	International aid agency	0, 8, 16, 20	20	0
Long-tern loan (Local)(1) - 30%	Local loan agency	0, 8, 16, 20	20	0
Short-term bridging loan	Local loan agency	15	1	0

Note (1): Dollar base, exchange rate 1 USD = KZT 115

Initial investment cost in 2000 to 2005 is assumed to be financed by a loan. In principle, no long-term loans are borrowed after 2005. Thus, the amount of long term loans is fixed at the total investment cost for the period 2000 to 2005 in order to examine the sensitivity of the waste service charges to changes of the interest rate.

Table 9.8.5 Loan Schedule

Unit: KZT million

	2000	2001	2002	2003	2004	2005	Total
Loan Disbursements (foreign)	0.0	948.0	1320.2	145.6	0.0	0.0	2413.9
Loan Disbursements (local)	0.0	406.3	565.8	62.4	0.0	0.0	1034.5
Loan Disbursements Total	0.0	1,354.3	1,886.0	208.0	0.0	0.0	3448.4

From the results of Section 9.8.7, it is assumed that the Waste Authority is exempt from VAT and corporate income tax.

9.8.9 Results of Sensitivity Analysis

Average total costs were estimated for different long-term interest rates. Results for 2010 are shown in the following table:

Table 9.8.6 Sensitivity to Interest Rate

Real Long-term Interest Rate	Average Cost in 2010 (KZT/ton)
0.00%	3,524
8.00%	4,043
16.00%	4,560
20.00%	4,818

The average cost fluctuates with the changing interest rate. When the loan interest rate is 8%, the required cost of the whole SWM system of the M/P is KZT 4,043 in 2010. When the interest rate is increased to 20%, the cost in 2010 increases to KZT 4,818 per ton or 120% of the cost at the base interest rate. Thus, it is very important to decide the interest rate for financing the construction of facilities and procurement of equipment to keep the M/P financially viable.

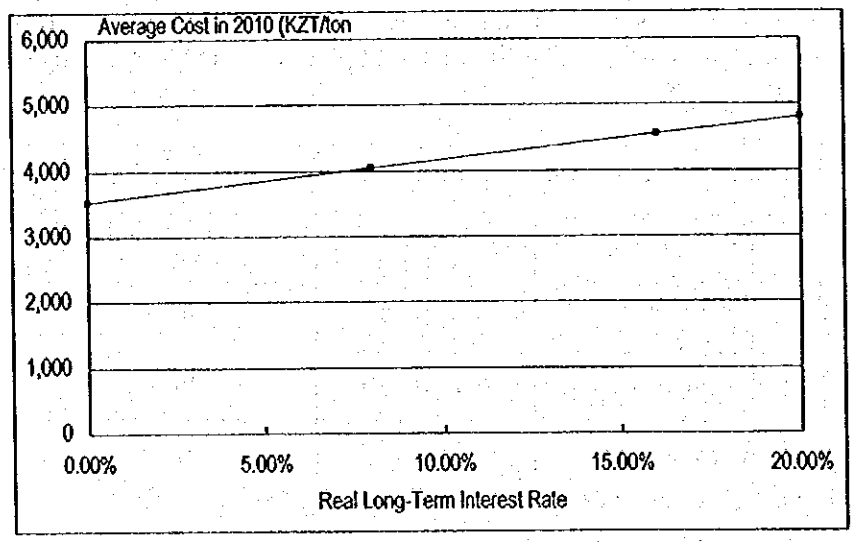

Figure 9.8.1 Sensitivity of Cost to Interest Rate

Please note that the interest rates mentioned here are "real" rates. Thus to apply market rates to the above discussion, they should be converted to real rates by the following relation:

(Real interest rate) = (Market interest rate) – (Expected inflation rate).

9.8.10 Viability of the Financial Plan

The total costs of the Waste Authority in the period 2000-2010 are estimated in accordance with the financial plan. The estimate includes costs of operation, depreciation, interest on long-term loan (8%) and payments to contractors but excludes VAT and corporate income tax. The result is as follows:

Table 9.8.7 Total Cost of Waste Authority for period 2000 - 2010

M/P Component	Cost (KZT million, 1999 price)
O&M of Waste Authority	156.4
Commission for Fee Collection	321.7
Payment to contractors	5,545.8
Ownership	244.9
Other Costs	792.6
Depreciation	3,060.9
Interest on Long-term	1,874.9
Total	11,997.2

The total Gross Regional Domestic Products (GRDP) of Almaty City for the period 2000-2010 is projected to be KZT 3,105.2 billion in 1999 prices. Thus, the total cost of the M/P amounts to 0.4% of the GRDP. This is not a heavy burden for the economy of Almaty City and the M/P can be carried out without difficulty if appropriate financial sources are provided.

Table 9.8.8 Cash Flow of the Waste Authority (Case (1))

Unit: KZT million; 1999 price

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
I Cash Inflow	299.0	2,164.5	3,023.2	1,395.6	1,198.7	1,206.8	1,568.9	1,662.3	1,559.8	1,684.5	1,721.1	17,464.5
a Charge Revenue	299.0	810.2	1,137.2	1,187.6	1,198.7	1,206.8	1,221.8	1,237.7	1,504.3	1,523.0	1,542.1	12,868.5
1 Domestic	198.4	430.9	619.0	663.5	665.9	668.3	674.3	680.4	823.8	831.1	838.4	7,153.9
2 Commercial	87.0	267.9	421.5	426.6	433.0	438.2	445.8	454.8	556.5	565.8	576.5	4,673.6
4 Medical	5.9	18.1	29.5	29.5	30.7	30.7	32.0	32.0	38.4	40.0	40.0	326.9
5 T/S Charge	5.1	22.4	45.4	46.0	46.6	47.1	47.1	47.7	57.9	58.6	59.3	483.4
6 D/S Charge	2.5	10.9	21.8	22.0	22.5	22.5	22.5	22.8	27.6	27.6	27.9	230.6
b Subsidy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c Loan	0.0	1,354.3	1,886.0	208.0	0.0	0.0	347.1	424.5	55.5	141.5	179.1	4,596.0
1 Long-term Loan Disburse	0.0	1,354.3	1,886.0	208.0	0.0	0.0	347.1	424.5	55.5	51.7	11.6	4,338.7
Foreign	0.0	948.0	1,320.2	145.6	0.0	0.0	242.9	297.2	38.8	36.2	8.1	3,037.1
Local	0.0	406.3	565.8	62.4	0.0	0.0	104.1	127.4	16.6	15.5	3.5	1,301.6
2 Short-term Loan Disburse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.8	167.5	257.3
II Cash Outflow	291.3	1,989.7	2,884.7	1,370.6	1,224.2	1,190.6	1,504.0	1,843.7	1,464.9	1,979.6	1,721.1	17,464.5
a Expense for Business Operation	275.4	488.9	709.0	631.0	631.7	632.2	633.1	711.4	763.9	773.0	801.8	7,061.4
1 O&M of State Comp	11.5	11.5	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	156.4
Personnel	5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	62.0
Public Relations	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.0
Fuel & Lubricant	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	18.0
Maintenance & Repair	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.1
Others	1.4	1.4	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	20.0
Overhead	3.8	3.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	43.4
2 Commision for Fee Collection	7.5	20.3	28.4	29.7	30.0	30.2	30.5	30.9	37.6	38.1	38.6	321.7
3 Contract Cost (VAT included)	201.4	402.9	582.9	484.6	484.6	484.6	484.6	562.5	605.1	612.9	639.6	5,545.8
Collection	167.5	335.1	412.2	276.4	276.4	276.4	276.4	344.8	344.8	344.8	371.5	3,426.2
Transfer Station	16.6	33.2	119.7	136.1	136.1	136.1	136.1	136.1	136.1	136.1	143.8	1,273.9
Final Disposal Site	17.3	34.6	51.0	72.2	72.2	72.2	72.2	81.6	81.6	81.6	81.6	717.9
Recycling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.6	42.6	42.6	127.8
4 Ownership Cost	0.5	1.0	12.3	28.5	28.5	28.5	28.5	26.7	29.5	29.9	30.9	244.9
State Comp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Collection	0.0	0.0	4.1	9.9	9.9	9.9	9.9	7.7	7.7	7.7	8.8	75.6
Transfer Station	0.5	1.0	5.7	7.4	7.4	7.4	7.4	7.4	7.4	7.8	7.8	66.9
Final Disposal Site	0.0	0.0	2.5	11.2	11.2	11.2	11.2	11.6	11.6	11.6	11.6	93.7
Recycling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	2.8	2.8	8.3
5 Other Operating Cost	54.4	63.2	70.6	73.4	73.7	74.1	74.6	76.4	76.9	77.4	77.9	792.6
Environmental Payment	8.6	17.3	24.8	27.5	27.8	28.2	28.7	30.5	31.0	31.5	32.1	287.9
Illegal Dump Site Reclamation	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	504.6
b Capital Investment	0.0	1,354.3	1,886.0	208.0	45.0	23.3	347.1	587.5	78.8	592.3	213.4	5,335.8
Initial Investment	0.0	1,354.3	1,886.0	208.0	0.0	0.0	347.1	424.5	55.5	51.7	11.6	4,338.7
Replacement	0.0	0.0	0.0	0.0	45.0	23.3	0.0	163.0	23.3	540.6	201.9	997.0
c Debt Service	0.0	0.0	176.1	415.8	429.9	416.1	402.3	433.6	473.7	454.0	556.9	3,768.4
1 Long-term Interest	0.0	0.0	108.3	253.8	257.5	243.7	229.9	243.9	262.7	250.2	237.3	2,087.3
Foreign	0.0	0.0	75.8	177.7	180.2	170.6	160.9	170.7	183.9	175.2	166.1	1,461.1
Local	0.0	0.0	32.5	76.1	77.2	73.1	69.0	73.2	78.8	75.1	71.2	626.2
2 Short-term Interest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5	13.5
3 Long-term Loan Repayment	0.0	0.0	67.7	162.0	172.4	172.4	172.4	189.8	211.0	213.8	216.4	1,577.9
Foreign	0.0	0.0	47.4	113.4	120.7	120.7	120.7	132.8	147.7	149.6	151.5	1,104.5
Local	0.0	0.0	20.3	48.6	51.7	51.7	51.7	56.9	63.3	64.1	64.9	473.4
4 Short-term Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.8	89.8
d VAT	15.4	67.0	91.0	115.8	117.6	119.0	121.5	111.2	148.5	150.3	149.0	1,206.2
e Corporate Income Tax	0.6	69.5	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.7
III Net Cash Flow	7.7	174.8	138.4	24.9	-25.5	16.2	64.9	-181.4	94.9	-315.1	0.0	
IV Cash Reserve	7.7	182.5	320.9	345.9	320.4	336.6	401.6	220.1	315.1	0.0	0.0	
V Net Debt	7.7	-1,171.8	-2,851.7	-2,872.7	-2,725.8	-2,537.2	-2,646.9	-3,063.1	-2,812.6	-3,055.4	-2,928.3	
a Long-term Debt Outstanding	0.0	1,354.3	3,172.7	3,218.6	3,046.2	2,873.8	3,048.4	3,283.2	3,127.7	2,965.5	2,760.6	
1 Foreign	0.0	948.0	2,220.9	2,253.0	2,132.4	2,011.7	2,133.9	2,298.3	2,189.4	2,075.9	1,932.6	
2 Local	0.0	406.3	951.8	965.6	913.9	862.1	914.5	985.0	938.3	889.7	828.3	
b Short-term Debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.8	167.5	
c Cash Reserve	7.7	182.5	320.9	345.9	320.4	336.6	401.6	220.1	315.1	0.0	0.0	

Table 9.8.9 Cash Flow of the Waste Authority (Case (2))

Unit: KZT million; 1999 price

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
I Cash Inflow	299.0	2,164.5	3,023.2	1,355.6	1,198.7	1,206.8	1,221.8	1,237.7	1,504.3	1,523.0	1,542.1	16,316.9
a Charge Revenue	299.0	810.2	1,137.2	1,187.6	1,198.7	1,206.8	1,221.8	1,237.7	1,504.3	1,523.0	1,542.1	12,868.5
1 Domestic	198.4	490.9	619.0	663.5	665.9	668.3	674.3	680.4	823.8	831.1	838.4	7,153.9
2 Commercial	87.0	267.9	421.5	426.6	433.0	438.2	445.8	454.8	556.5	565.8	576.5	4,673.6
4 Medical	5.9	18.1	29.5	29.5	30.7	30.7	32.0	32.0	38.4	40.0	40.0	326.9
5 T/S Charge	5.1	22.4	45.4	46.0	46.6	47.1	47.1	47.7	57.9	58.6	59.3	483.4
6 D/S Charge	2.5	10.9	21.8	22.0	22.5	22.5	22.5	22.8	27.6	27.6	27.9	230.6
b Subsidy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c Loan	0.0	1,354.3	1,886.0	208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,448.4
1 Long-term Loan Disburse	0.0	1,354.3	1,886.0	208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,448.4
Foreign	0.0	948.0	1,320.2	145.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,413.9
Local	0.0	406.3	565.8	62.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,034.5
2 Short-term Loan Disburse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
II Cash Outflow	275.4	1,853.2	2,771.1	1,254.9	1,106.6	1,071.7	1,382.5	1,687.4	1,217.5	1,726.2	1,362.4	15,708.8
a Expense for Business Operation	275.4	498.9	709.0	631.0	631.7	632.2	633.1	711.4	763.9	773.0	801.8	7,061.4
1 O&M of State Comp	11.5	11.5	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	156.4
Personnel	5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	62.0
Public Relations	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.0
Fuel & Lubricant	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	18.0
Maintenance & Repair	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.1
Others	1.4	1.4	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	20.0
Overhead	3.8	3.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	43.4
2 Commision for Fee Collection	7.5	20.3	28.4	29.7	30.0	30.2	30.5	30.9	37.6	38.1	38.6	321.7
3 Contract Cost (VAT included)	201.4	402.9	582.9	484.6	484.6	484.6	484.6	562.5	605.1	612.9	639.6	5,545.8
Collection	167.5	335.1	412.2	276.4	276.4	276.4	276.4	344.8	344.8	344.8	371.5	3,426.2
Transfer Station	16.6	33.2	119.7	136.1	136.1	136.1	136.1	136.1	136.1	143.8	143.8	1,273.9
Final Disposal Site	17.3	34.6	51.0	72.2	72.2	72.2	72.2	81.6	81.6	81.6	81.6	717.9
Recycling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.6	42.6	42.6	127.8
4 Ownership Cost	0.5	1.0	12.3	28.5	28.5	28.5	28.5	26.7	29.5	29.9	30.9	244.9
State Comp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Collection	0.0	0.0	4.1	9.9	9.9	9.9	9.9	7.7	7.7	7.7	8.8	75.6
Transfer Station	0.5	1.0	5.7	7.4	7.4	7.4	7.4	7.4	7.4	7.8	7.8	66.9
Final Disposal Site	0.0	0.0	2.5	11.2	11.2	11.2	11.2	11.6	11.6	11.6	11.6	93.7
Recycling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	2.8	2.8	8.3
5 Other Operating Cost	54.4	63.2	70.6	73.4	73.7	74.1	74.6	76.4	76.9	77.4	77.9	792.6
Environmental Payment	8.6	17.3	24.8	27.5	27.8	28.2	28.7	30.5	31.0	31.5	32.1	287.9
Illegal Dump Site Reclamation	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9	504.6
b Capital Investment	0.0	1,354.3	1,886.0	208.0	45.0	23.3	347.1	587.5	78.8	592.3	213.4	5,335.8
Initial Investment	0.0	1,354.3	1,886.0	208.0	0.0	0.0	347.1	424.5	55.5	51.7	11.6	4,338.7
Replacement	0.0	0.0	0.0	0.0	45.0	23.3	0.0	163.0	23.3	540.6	201.9	997.0
c Debt Service	0.0	0.0	176.1	415.8	429.9	416.1	402.3	388.5	374.7	360.9	347.1	3,311.6
1 Long-term Interest	0.0	0.0	108.3	253.8	257.5	243.7	229.9	216.1	202.3	188.5	174.7	1,874.9
Foreign	0.0	0.0	75.8	177.7	180.2	170.6	160.9	151.3	141.6	132.0	122.3	1,312.5
Local	0.0	0.0	32.5	76.1	77.2	73.1	69.0	64.8	60.7	56.6	52.4	562.5
2 Short-term Interest		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 Long-term Loan Repayment	0.0	0.0	67.7	162.0	172.4	172.4	172.4	172.4	172.4	172.4	172.4	1,436.7
Foreign	0.0	0.0	47.4	113.4	120.7	120.7	120.7	120.7	120.7	120.7	120.7	1,006.7
Local	0.0	0.0	20.3	48.6	51.7	51.7	51.7	51.7	51.7	51.7	51.7	431.0
4 Short-term Loan Repayment		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d VAT												0.0
e Corporate Income Tax												0.0
III Net Cash Flow	23.6	311.3	252.1	140.7	92.2	135.1	-160.6	-449.7	286.8	-203.2	179.7	
IV Cash Reserve	23.6	334.9	587.0	727.7	819.9	955.1	794.4	344.7	631.6	428.4	608.1	
V Net Debt	23.6	-1,019.4	-2,585.7	-2,490.9	-2,226.3	-1,918.7	-1,906.9	-2,184.2	-1,725.0	-1,755.7	-1,403.6	
a Long-term Debt Outstanding	0.0	1,354.3	3,172.7	3,218.6	3,045.2	2,873.8	2,701.4	2,529.0	2,356.5	2,184.1	2,011.7	
1 Foreign	0.0	948.0	2,220.9	2,253.0	2,132.4	2,011.7	1,891.0	1,770.3	1,649.6	1,528.9	1,408.2	
2 Local	0.0	406.3	951.8	965.6	913.9	862.1	810.4	758.7	707.0	655.2	603.5	
b Short-term Debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
c Cash Reserve	23.6	334.9	587.0	727.7	819.9	955.1	794.4	344.7	631.6	428.4	608.1	

Table 9.8.10 Balance Sheet of the Waste Authority (Case (1))

Unit: KZT million; 1999 price

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
I Assets	1.3	1,517.9	3,389.0	3,265.4	2,928.4	2,611.3	2,666.8	2,739.0	2,544.3	2,448.2	2,274.9
a Cash	7.7	182.5	320.9	345.9	320.4	336.6	401.6	220.1	315.1	0.0	0.0
b Facilities and Equipment	-6.3	1,335.4	3,068.0	2,919.5	2,607.9	2,274.7	2,265.2	2,518.8	2,229.3	2,448.2	2,274.9
II Liabilities/Equity	1.3	1,517.9	3,389.0	3,265.4	2,928.4	2,611.3	2,666.8	2,739.0	2,544.3	2,448.2	2,274.9
a Short-term Debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.8	167.5
b Long-term Debt	0.0	1,354.3	3,172.7	3,218.6	3,046.2	2,873.8	3,048.4	3,283.2	3,127.7	2,965.6	2,760.8
c Accumulated Profit	1.3	163.5	216.3	46.7	-117.9	-262.5	-381.7	-544.3	-583.4	-607.2	-653.5

Table 9.8.11 Balance Sheet of the Waste Authority (Case (2))

Unit: KZT million; 1999 price

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
I Assets	17.3	1,670.3	3,655.0	3,647.2	3,427.8	3,229.7	3,059.6	2,863.6	2,860.8	2,876.6	2,882.9
a Cash	23.6	334.9	587.0	727.7	819.9	955.1	794.4	344.7	631.6	428.4	608.1
b Facilities and Equipment	-6.3	1,335.4	3,068.0	2,919.5	2,607.9	2,274.7	2,265.2	2,518.8	2,229.3	2,448.2	2,274.9
II Liabilities/Equity	17.3	1,670.3	3,655.0	3,647.2	3,427.8	3,229.7	3,059.6	2,863.6	2,860.8	2,876.6	2,882.9
a Short-term Debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b Long-term Debt	0.0	1,354.3	3,172.7	3,218.6	3,046.2	2,873.8	2,701.4	2,529.0	2,356.5	2,184.1	2,011.7
c Accumulated Profit	17.3	316.0	482.4	428.6	381.6	355.9	358.3	334.6	504.3	692.5	871.2

9.9 PUBLIC AWARENESS AND PUBLIC EDUCATION

9.9.1 General

To improve SWM, it is indispensable to have the cooperation of waste generators (residents and commercial entities, etc.) on proper storage, discharge, separation and reduction of solid waste, and to have residents' acceptance of proposed service level, tariff and facilities construction. To ensure cooperation of the residents, the Waste Authority shall make efforts to explain, persuade and educate residents to understand the importance of sanitation in the city.

- General explanation of SWM
- Explanation of requirements of SWM
- Explanation of proper storage and discharge of solid waste to maintain sanitary conditions
- Explanation and education on separation and reduction of solid waste

To achieve the above, the following shall be considered.

a. Advertising campaign
b. Regional education
c. School education
d. Preparation of guidelines
e. Cooperation and assistance of NGO's and social groups

It is noted that restoration of fixed-schedule collection is essential to ensure resident cooperation. The Waste Authority must make special efforts to win the support of the residents who initially may have little faith in the Waste Authority given the recent history of Waste Collection in the city.

(1) Advertising campaign

Advertising campaigns, letter box drops etc. should be undertaken periodically. It is important to provide information on efficient solid waste management through as many different media outlets as possible.

General advertisements will include:

a. Present situation of SWM
b. Effect of solid waste
c. Improvement program (M/P)
d. Proper discharge, treatment and disposal

Special advertisements shall be planned at the time of major changes to the SWM system.

(2) Resident education

It shall be stressed that resident cooperation is indispensable to the introduction of a new collection system, new tariffs, and new facilities. Therefore, clear and careful explanation is necessary when the new system is introduced. Also medium and long term improvement programs shall be explained to residents.

(3) School education

The purpose of school education is to provide knowledge about sanitation and proper treatment and disposal of solid waste. Children can help develop good habits in the family. The program shall cover:

- Solid waste (definition, type and problems)
- Necessity of proper treatment and disposal of solid waste
- Examples of proper discharge and treatment
- Possible contribution by residents and children

9.9.2 Public Awareness Program

A public awareness program consists of periodic campaigns and direct campaigns for major events. The program shall include all the elements explained in section 9.9.1.

According to the implementation schedule of the master plan, main events and topic are shown in Table 9.9.1. Efforts shall be concentrated on related topics and a public awareness survey shall be conducted to check the effectiveness of the campaign and other activity.

It is desirable that the Waste Authority should work together with KSK and KSD associations concerning the public awareness program. Also it is important to educate residents concerning the necessity of separation of special wastes which may be hazardous to avoid environmental pollution.

Table 9.9.1 Main events of Public Awareness Campaign

Timing	Events	Topics
2000 Jan.	Establishment of Waste Authority	Necessity, function and major program of Waste Authority
July	Introduction of interim tariff	Necessity, new tariff and payment method
2001 Apr.	Construction of West transfer station	Necessity, outline of transfer station, mitigation measure
2002 Apr.	Introduction of New tariff	Necessity, new tariff and payment method
Apr.	Introduction of new collection system in individual housing area	Necessity, system, frequency and time, and required cooperation
2002 Apr.	Construction of Spasskaya transfer station	Necessity, outline of transfer station, mitigation measures
2003 Apr.	Introduction of new collection system in block housing and commercial area	Necessity, system, frequency and required cooperation
2007 Jan.	Expansion of new collection system in block housing area	Necessity, system, frequency, and required cooperation
2008 Jan.	Introduction of new tariff	Necessity, new tariff and payment method
Jan.	Introduction of separate collection	Necessity, system, frequency and required cooperation

Chapter 10

EFFECTIVENESS OF THE MASTER PLAN

CHAPTER 10 EFFECTIVENESS OF THE MASTER PLAN

10.1 TECHNICAL ASPECT

The technologies chosen in the M/P were selected for their suitability for Almaty city. The M/P includes the following technical systems.

	Technical system	Application in Kazakhstan
Collection	Separate collection Compactor truck New containers	Ordinary waste & reusable material Used all over the world Used all over the world
Transportation	Transfer station	Simple type transfer station
Intermediate treatment and disposal	Sanitary landfill -Liner -Leachate treatment	 Clay liner Aeration pond and re-circulation
Recycling	Separate collection Amenity center	
Medical waste	Auto-clave	
Industrial waste		Receiving non hazardous wastes at the disposal site
Street sweeping	Existing system	Existing system

All the systems recommended in the M/P satisfy the requirements of economy, easy acceptance by the operators and adaptability to the needs of the residents.

In conclusion, the proposed M/P is justified from the view point of technical aspects.

10.2 ECONOMIC AND FINANCIAL ASPECT

10.2.1 Economic Effectiveness

In any urban environment SWM services are necessary to minimize the environmental impact of wastes and to minimize public health risks associated with these wastes. Estimation of the economic benefits from minimizing these impacts is difficult, and so the approach taken has been to minimize the economic cost of reducing these impacts and risks to levels that are generally regarded as acceptable.

The plan has greatly reduced environmental and public health risks by the following measures:

a. Raising the collection ratio to 100% by the year 2010
b. Improving the cleanliness and effectively eliminating overflows at collection points by specifying better containers and more effective collection trucks and providing a mechanism to ensure that sufficient collection capacity is provided
c. Minimizing the incentives for illegal dumping
d. Improving the enforcement procedures to deter illegal dumping
e. Introducing superior performance transfer stations
f. Introducing sanitary land-fill principles
g. Introducing a recycling system at a later stage of the M/P period when both the strengthened economy and increased public awareness can sustain that system

The M/P achieves this improved performance at a minimum economic cost. It should be noted that the economic cost of the existing system is considerably higher than is indicated by the current financial charges. These charges have been held below the true economic cost of the existing system by continuing to run down assets and by the accumulation of debts that have not been recognized in the setting of the tariffs.

While some uncertainty remains about the method of finance, this will have only a minimal impact on the overall economic cost of the proposed system (though it may have a larger impact on some financial aspects). It is estimated that the economic cost of the new system will only be lower than the real economic cost of the existing system. The M/P has contained costs by:

a. Introducing a range of collection trucks to better suit the collection needs of different areas of the city
b. Provide incentives for the more effective utilization of collection trucks, while ensuring universal coverage
c. Minimize transport costs by improving transfer station capacities and locations
d. Provide a mechanism to introduce recycling when this becomes feasible to help offset collection costs

10.2.2 Financial Effectiveness

Central to the plan is the creation of a financially stable "Waste Authority" to provide overall SWM services in Almaty City. This Authority will be financially independent of the City and will not pose any financial burden on the City. The Authority has been structured to take account of the Government's wish to involve the private sector wherever possible to improve the efficiency of operations.

The M/P creates a new charging mechanism for SWM services which will ensure that funds are available for carrying out this essential public service, and ensures the financial stability of the Waste Authority, and ensures that this Authority is isolated from budgetary problems of the City or Republican Government. Another important aspect of the M/P is the reform of leasing and land tenure laws to provide a clear legal basis for the collection of waste management charges and ensure that the Waste Authority can collect the revenues needed to provide the service.

The M/P provides a realistic market mechanism for determining tariffs for waste collection, for the first time ensuring that the income of the collection companies will be sufficient for them to be financially viable. During the first five years there may be some failures and amalgamations amongst these companies as they adjust to the new economic environment. Market forces will weed out the poorer managed companies, but what will emerge will be a group of more efficient better managed collection companies which are better able to use their assets effectively.

At the same time the interests of the poorest strata of society have been protected. The M/P provides for a cross subsidy system so that the poorest households will be exempt from the tariff. For the average household, the SWM tariff will be approximately 1% of the officially reported average household income (which appears to be extra-ordinarily low when compared to the official GDP estimate)

10.3 SOCIAL AND INSTITUTIONAL EFFECTIVENESS

The M/P provides a blueprint for effective co-operation between the public and the private sector for the provision of SWM services. This draws on the experience of developed countries that have privatized similar services over the past two decades, but has been modified to take account of the particular economic and legal conditions now applying in Kazakhstan. This blueprint could easily be modified for other cities or for other public services.

The M/P separates public responsibilities from operational procedures that can best be carried out by competitive private firms. It provides for the creation of a public entity the "Waste Authority" to discharge these public responsibilities largely through contracting out actual operations. Key social concerns – responsibility for ensuring that the service is universal to protect public health and the environment, and the protection of the interests of the poorest members of the community - remain in the public sector. Operations – such as the management of truck fleets etc. – is carried out by the private sector.

At the same time the plan recognizes that the private sector in Kazakhstan is currently extremely weak and has only very limited access to capital. Hence the plan provides for Government involvement to provide a funnel for funding much of the equipment needed through foreign aid. Key fixed facilities will remain state property controlled by the Waste Authority and operated by private contractors. Collection vehicles will be leased to private contractors through the Waste Authority.

The M/P also provides for important reforms to separate more effectively system operation from enforcement in order to improve compliance with environmental protection laws. The changes to institutional structures and contractual relationships will also make it realistic for citizens, commercial firms and collection companies to comply with the law.

For the first time there will be a body; the "Waste Authority" that is both accountable for the overall effectiveness of the system and has access to resources that make it possible for it to achieve its objectives.

Enforcement activities will be consolidated in the ACDEP, whose effectiveness in monitoring and enforcement should improve progressively as reforms of republican laws and relations between the republican and local levels of Government are undertaken to clearly define the powers of each level of Government.

The role of various state institutions in managing the overall system and in protecting the state assets employed are summarized in the following table.

	Relation with Waste Authority
a. AMC (Anti-Monopoly Committee)	Supervise tender process for fair and open competition.
b. GKI (Territorial Committee of State Property and Privatization)	Supervise efficient use of state property
c. Dept. of Communal Property of Almaty City	Supervise efficient use of state property
d. Almaty City Government	Overall control of Waste Authority
e. ACDEP (Almaty City Department of Environmental Protection)	Monitoring of performance of Waste Authority and companies
f. Almaty Oblast Department of Environmental Protection	Monitoring of performance of Waste Authority and company concerning disposal site
g. KSK and KSD (Resident Cooperative Organization)	Payment of service charge to Waste Authority
h. Companies related to SWM	Collection of solid waste, management of disposal site and transfer stations
i. Ministry of Finance	Provision of Government Guarantee for foreign loans

The M/P also proposes to introduce a cross subsidy to support the poor who need social support. It will reduce the burden on low income households and will contribute to acceptance of the "beneficiary to pay principle" in public service. It is noted that the proposed tariff is approximately 1 - 2% of resident's income.

Although there will undoubtedly be some objections to the proposed sites for new facilities, the proposed transfer station sites are in more acceptable locations than the existing transfer station and compost plant. The M/P proposes to continue to use the existing disposal site which is located far from residential areas.

10.4 ENVIRONMENTAL ASPECT

The rapid development of new transfer facilities will contribute greatly to the elimination of illegal dumping. Currently waste collection companies are effectively forced to dump illegally as there is insufficient capacity to transport all waste to the disposal site. Once the new transfer station and transfer trucks become operational collection contractors will no longer need to dump illegally.

In general, proper collection service contributes to maintain cleanliness and healthy living environment of the city. Rehabilitation of existing illegal dump sites will improve environment conditions of surrounding area. Therefore, implementation of the M/P will have great contribution to improve the environment of Almaty city. However, the environmental impact on the areas surrounding the disposal site and transfer stations will be examined.

Rehabilitation of the existing illegal dump sites will rectify the current environmental problem. This improvement will be maintained by eliminating or greatly reducing future illegal dumping by:

- Providing sufficient transfer and line-haul capacity to allow all collection contractors access to the transfer stations
- Greatly reducing the incentive for illegal dumping, by ensuring that the collection companies receive a fair payment for their service, and are not forced to dump illegally to avoid transfer station fees to stay solvent
- Improved enforcement procedures

The M/P proposes to continue to use the existing disposal site with improvement of its facilities and operation. At present solid waste is tipped in an open dump. It is proposed to cover waste daily with soil according to sanitary landfill principles. The environmental impact will be reduced through improved operation in the site.

Areas surrounding the new transfer stations will be affected by increased traffic, odor etc. However, it is planned to avoid overnight storage of solid waste at the transfer station. Also, mitigation measures against water pollution and odor will be taken to minimize environmental impact in design stage. Therefore, the environmental impact on the surrounding area will be minor.