8.2.3 Institutional and Organizational System

8.2.3.1 Contract Administration[1]

a. Regulatory Base

The effectiveness in the administration of SWM services in AMSS, will depend on the compliance with current norms and the new regulatory and institutional framework proposed in the "Proposal of Law" (see Annex-O).

As a result of this new regulation, the responsibilities of the organizations that should take part in and the conditions for the participation by private sector are outlined, by means of appropriate and transparent procedures that ensure competition and attainment of economic prices.

The quality norms that should be observed and the incentives and sanctions to which the Contractor will be subject to according to its performance are proposed. Also, the information that the Contractor should submit and its submission period is also pointed out, with the purpose of maintaining a true symmetry in the information and avoiding information lag.

On these bases and competition rules previously established in the bid basis contained in the Contract, the required organization can be structured in order to follow up and control all the terms and scope of the subscribed contract.

The contract administration unit should constantly and orderly manage the information that being produced, not only to control the Contractor's performance, but also to analyze the data obtained and be able to gain experience in productivity and costs and negotiate better conditions in the future.

b. Contracts, Effective Regulation and Role by the Organizations

The regulation economy suggests that specific details of each market (or regulation of the distinctive private markets) should be realized by means of the contract specifications.

Hence, with the purpose of improving efficiency and effectiveness in the service provision through the contract with a private sector, it is necessary to establish and adopt certain basic approaches:

- Well-defined performance measures
- obligatory sanctions for non-performance
- permanent monitoring
- costs control

Experience has demonstrated that PPS is successful only if the above basic conditions are complied with and the performance is compared with the productivity of a model company.

[1] Details of this section (Contract Administration) are presented in Annex-N.

Table 8-23: Recommendation for the Execution of the PPS Contracts

- Carry out a pre-qualification process to exclude the companies with no resources or experience
- Increase the responsibility of districts and/or civil society organization in the supervision of contracts
- Improve the quality of the contract documents, especially in the service quality norms, penalty clauses (fines) and amounts of SW handled
- Establish the contract duration for 5-7 years for collection, and use new vehicles during that period.
- Expand the contracts including all the SWM services (collection, manual and mechanical sweeping and ditch and gutter cleaning), in order to prevent any overlapping and potential responsibility conflicts with parallel municipal services being carried out.
- Stress the fact that the Contractor maintains a good image and presence (e.g., obligatory use of uniforms, well-painted and clean vehicles)
- Obligate the Contractor to have an office in the Service Area, so that the contact among the municipality, the service provider and the public improves.

The municipality must be able to efficiently design, negotiate and verify the contracts without having to impose unnecessary fines to the contractors, but generate confidence upon the private sector and attract the best companies.

The municipality should remind that PPS does not exempt them from having technical assistance for training and strengthening of its organization, but supporting them. Likewise, the municipality should develop coordination mechanisms with other actors that participate in the regulation of the service.

The function of the actors of this public service is properly defined in the Proposal of Law of **"Regulatory and Institutional Framework for Solid Waste Management"** that this Study recommends for the authorities' consideration.

This Proposal of Law establishes an effective regulation with the separation of functions among the Ministry of Public Health and Social Assistance (MSPAS), the Regulator (entity that is recommended to be created or render its regulation functions to SIGET) and the Service Provider, in this case the Municipality.

MSPAS will be in charge of the formulation and coordination of the sector policies and long-term planning; dictate the technical norms and regulations related to the provision of the service, protection of public health and environmental preservation.

The Regulator will have the functions of regulation, control, supervision and inspection of the services provided; to dictate the regulations to formulate efficient investment programs for maintenance, rehabilitation and expansion of the services. The regulator will also: intervene as a superior administrative body when clients complain about the services rendered or due to a lack of attention to such claims; oversee that competition is promoted in awarding contracts; revise and approve the tariff studies.

The Service Provider, in this case the municipality, has the obligation to provide the services under conditions that ensure their quality, continuity, regularity and equality so that their efficient provision is guaranteed. In order to comply with this responsibility, the municipality can modify its organizational structure and achieve participation by private sector through competitive bids.

c. Quality Norms and Contract-out Process

c.1 Quality Norms and Procedures for PPS

The quality norms and the procedures for PPP have been established for the rendering of the following services:

- Sweeping (manual)
- Sweeping (mechanical)
- Primary and secondary collection
- Transfer
- Final disposal through a national regulation project
- Forms of PPS
- Fixation of costs and competitive prices
- Participation by customers
- Control procedures
- Delivery of information

c.2 Pre-qualification

Pre-qualification has an objective of selecting the most competent and experienced companies, according to financial and technical requirements of the service to be contracted. Detail of the services to be contracted, contract-out modality, duration of the contract, regulation norms and quality of the requested services, required guarantees and insurance, form of payment should also be established.

An evaluation and qualification commission formed specifically for that purpose will give its judgement on a date established in advance, and the list of the participants that were pre-qualified will be published and communicated.

c.3 Bid

The Instructions to the Bidders will be sent to the pre-qualified participants, which will include the required and enough information for the preparation of their technical and economic offer.

The technical and regulation norms that rule the contract should be clearly established, since the best understanding between the Municipality and the Contractor during contract validity period will depend on the specificity of such norms. The norms will facilitate follow-up and control of the service quality and the information submission.

The Contract Specifications should be delivered, which consist of: definitions; scope of the contract; service, operations and performance; compensations; insurance; guarantees; permissions, licenses and taxes; bases and methods of payment. **Model of Contract Document** for the Solid Wastes Collection is attached in the Section **N.5** of the **Annex-N**.

d. Monitoring and Administration of Contracts

The performance review by the monitoring is a key element in the process of providing services of a good quality and at economical prices.

It is the process by which the service efficiency is monitored and compared with the parameters of quality agreed on in the Contract.

Data gathered should be processed in order to transform it into useful information. It should be reminded that the information itself is valuable only when if it is managed and used for a specific purpose.

d.1 Strengthening the Monitoring Performance

The analysis of the service status should be carried out along with the data obtained in a formal way and in accordance with a certain procedure. The following can lead to lamentable errors: data obtained by visual observations, comments by workers and/or customer claims; when considered exclusively to raise an opinion about the service status and quality. The service monitoring performance has numerous goals, such as the following:

Table 8-24: Monitoring Performance

- Closely observe the quality of the services provided in order to maintain or improve the service quality
- Encourage efficient use of available resources
- Relate the expenditures with revenues and eventually costs
- First of all, improve the service quality and its relative costs
- Encourage the responsibility of the service providers
- Cut the service provision costs
- Compare and evaluate the services provided against the goals stated in the Contract
- Provide information with which the administration can work out policies and make decisions about the service.
- Compare the services provided for two or more municipalities.
- Compare the service received in a municipality month by month.
- Monitor the services provided by the Contractor in general

d.2 Definitions of the Performance Indicators

In order to determine the performance of SWM services in general, as well as individual components of the services in particular, data and information so called "performance indicators" and "performance measures" are used.

The "performance indicators" are quantitative data related with the services, such as:

- Number of served ICIs
- Kilometers of streets swept
- Number of employees in the collection

The "performance measures" are the result of processing the indicators while relating them to time or cost, and they represent the main tools for evaluating the performance of the system being analyzed. These are:

- Cost per collected ton
- Time of collection per ton
- Sweeping performance per day

d.3 Performance Indicators

Details of performance indicators that are recommended to be utilized for evaluating the service are shown herewith in the Annex-Q.

8.2.3.2 SWM Execution Unit of OPAMSS (UE-OPAMSS)[2]

a. Main Objective

In order to reach these goals and objectives, it is necessary that the municipal authorities that conforms COAMSS, should make the political decision of establishing a **Regional Solid Waste Program for AMSS** whose serious objective would be the implementation of the Master Plan. The programming of this plan has duration of ten years (2000-2010).

The development of said Program requires having a formal and permanent structure that supports the municipalities so that they can make it effective.

For such a purpose, the creation of an **Execution Unit of Solid Waste Management of OPAMSS (UE-OPAMSS)** is proposed, and whose aims would be the following:

- To act as a specialized body for supporting the provision of the solid waste management service for AMSS
- To participate in the urban development planning of AMSS in its areas of jurisdiction
- To coordinate the activities of technical support and international financing
- To provide the necessary technical support to the municipalities of AMSS, so that the provision of solid waste management services can reach the goals and objectives established in the Master Plan.
- To promote the formation of Communal Associations for Cleansing in the neighborhoods of AMSS.
- To have consent among public and municipal interests, private activities and the communities in SW generation reduction programs and recycling
- To verify the compliance with the norms, ordinances, laws and regulatory framework.
- To advise the municipalities in the selection of the most convenient modality for the participation by private sector in the provision of services.

It should be noted that the Unit is not to deprive the municipalities of their works regarding SWM, but to support and help them.

b. Functional Structure

The functional structure proposed for the SWM Execution Unit of OPAMSS is as presented in the figure below.

[2] Details of UE-OPAMSS proposed are presented in Annex-P.

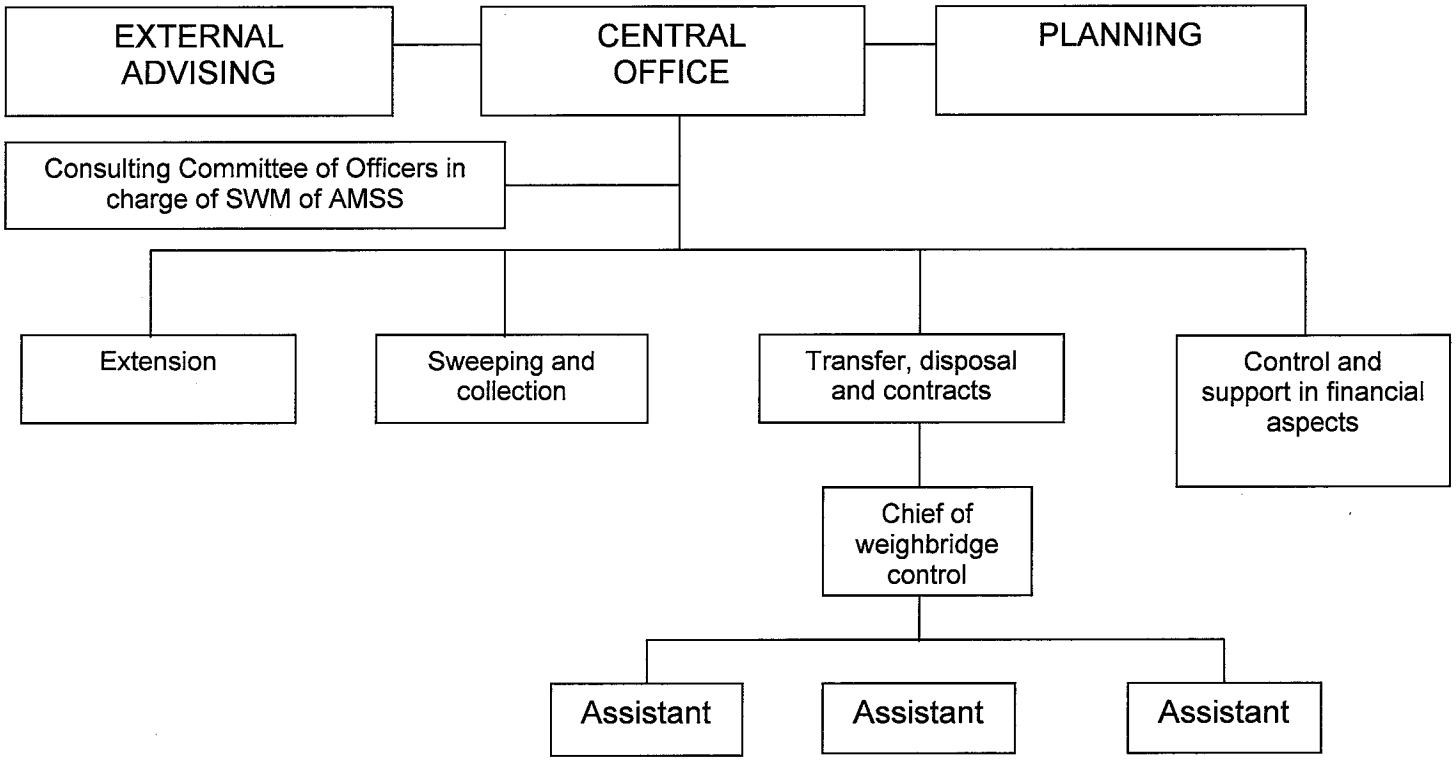

Figure 8-9: Functional Structure of SWM Execution Unit of OPAMSS

c. Description of Functions

c.1 Central Office

It constitutes the executive body of the Execution Unit and will be in charge of a professional sanitary engineer or an administrator, with a minimum five-year experience in solid waste management. It will be the entity that responds on the conduction and steering of the Program and will also represent the Execution Unit. It will depend directly from OPAMSS Executive Direction.

c.2 Planning and Development

It generates the medium and long-term technical project of the Execution Unit and it designs their development. The Central Office will be in charge of it.

c.3 External Consulting

With the initial purpose of consolidating the Execution Unit and developing its human and technical resources, having an external consulting for a minimum of two years becomes necessary. The efforts devoted to improve the service on the basis of foreign help in terms of equipment and vehicles have shown limited results. This is mainly due to the lack of experienced and motivated human resources to assist the planning, operation and monitoring of the services activities, as well as the operation, maintenance and repair of damaged equipment for the collection and final disposal.

Hence, by considering the possibility of PPS in the rendering of collection, transfer and sweeping services, this does not mean that the public sector is exempted from its responsibility. On the contrary, having a professional and trained staff to plan, supervise and monitor the quality of the contracted service and achieve economical prices will be more necessary. A professional civil or sanitary engineer with a minimum international experience of fifteen years will be in charge of it.

c.4 Consulting Committee of Municipal Officers

The officers in charge of SWM services in the 14 municipalities of AMSS will create a consulting committee with the purpose of coordinating the activities they carry out in a regional manner.

c.5 Extension

It promotes, establishes and maintains the public participation and collaboration in the activities of the Execution Unit. Organized public participation is of vital importance in order to achieve the sustainable development of the service.

It is necessary to promote a prideful attitude and self-esteem in the entire population in general, but very especially among downtown pedestrians and in marginal, low-income urban areas. Little will be achieved with the application of the best engineering and administration practices if population does not participate nor collaborate by all means. 50% of the success depends on public participation. A health promoter with five-year experience will be in charge of it.

c.6 Collection and Sweeping

It has the mission of advising the municipalities in the management of the services they render, so that they meet the qualified and efficient conditions at economical and environmentally acceptable prices. It will coordinate and control the activities of

storage, collection, sweeping (manual and mechanical), haulage and maintenance and repair of equipment and vehicles. It will be under the conduction of a civil or sanitary engineer with at least five-year experience in solid waste management.

It will also analyze the participation of micro-enterprises in the provision of services.

Micro-enterprises can cover the collection services in marginal, low-income areas where it is difficult to use collection vehicles due to urban layout and slopes reasons. These micro-enterprises should be organized with the participation of residents of the place where such service is provided. There are many successful experiences in Latin America (Peru, Bolivia and Colombia). The system uses non-conventional low-cost tools and vehicles. In general, they are in charge of the service by means of a regulated concession; i.e., a fee rate is established and the concessionaire charges it to the user directly.

The sweeping service can also be endowed to this modality of PPS. It is convenient that the micro-enterprises are formed with legal status in order to be subject to credit.

This section will be in charge of the promotion and relationships with the collection and sweeping micro-enterprises. The institution would place the necessary containers and be in charge of haulage and final disposal, as well as of the promotion, planning and technical assistance.

c.7 Transfer, Final Disposal and Contracts

To inspect and audit whether the operation of transfer station(s) (T/S) comply with the established service quality norms and with the management and environmental impact plan, as well as to keep the corresponding registrations.

To ensure that the disposal of municipal SW at the sanitary landfill in Nejapa and/or another sanitary landfill is environmentally acceptable by means of the correct operation of the service. It will be in charge of a civil or sanitary engineer with five-year experience.

The weights of the SW that enter Nejapa sanitary landfill will be controlled by full-time municipal officials.

Advising through the entire process for contract-out to the private sector and administration of the corresponding contracts.

c.8 Support in Financial Aspects

Advice for the control of the activities linked to the economy and finances of the SWM services; analysis and confirmation of the financial position.

Advice for the generation of municipal income through identification and classification of customers; calculation of the volume produced by ICI (Institutional, Commercial and Industrial) customers to achieve a fair and equitable allocation of service costs; billing and collection for the SWM services provided.

Advice and processing of whatever information is required which will be used to support and assist the municipalities in AMSS.

Table 8-25: Required Personnel for the Execution Unit

Position	Qualification	Number
Central Office	Civil or sanitary engineer Seven (7) year experience in SWM	1
Planning and Development	In charge of the Central Office	---
External consulting	Civil or sanitary engineer Fifteen (15) year international experience in SWM	1
Extension	Public health promoter Five (5) year experience	1
Collection and sweeping	Civil or sanitary engineer Five (5) year experience in SWM Sweeping and collection	1
Transfer, final disposal and contracts	Civil or sanitary engineer Five (5) year experience in SWM Transfer, sanitary landfills and contracts	1
Administration and Finances	Administrator Seven (7) year experience	1
Weighbridge control	Administrative experience 1 chief and 3 assistants	4

8.2.3.3 San Salvador Municipal Public Company of Urban Cleansing (EMAUSS)[3]

a. Proposed New Administration and Organizational System

The proposed municipal public company will be entirely administratively and financially autonomous, and will have the purpose of achieving an integrated municipal solid waste management in the Municipality of San Salvador.

b. Proposed Organization for Implementing Waste Management

The administrative structure for the new proposed municipal company (EMAUSS) is shown in Figure 8-10. It is very similar to a private company with the same degree of independence and autonomy; all its features are within the judicial framework established by the laws of the Republic of El Salvador for public companies.

[3] Details of EMAUSS proposed are presented in Annex-Q.

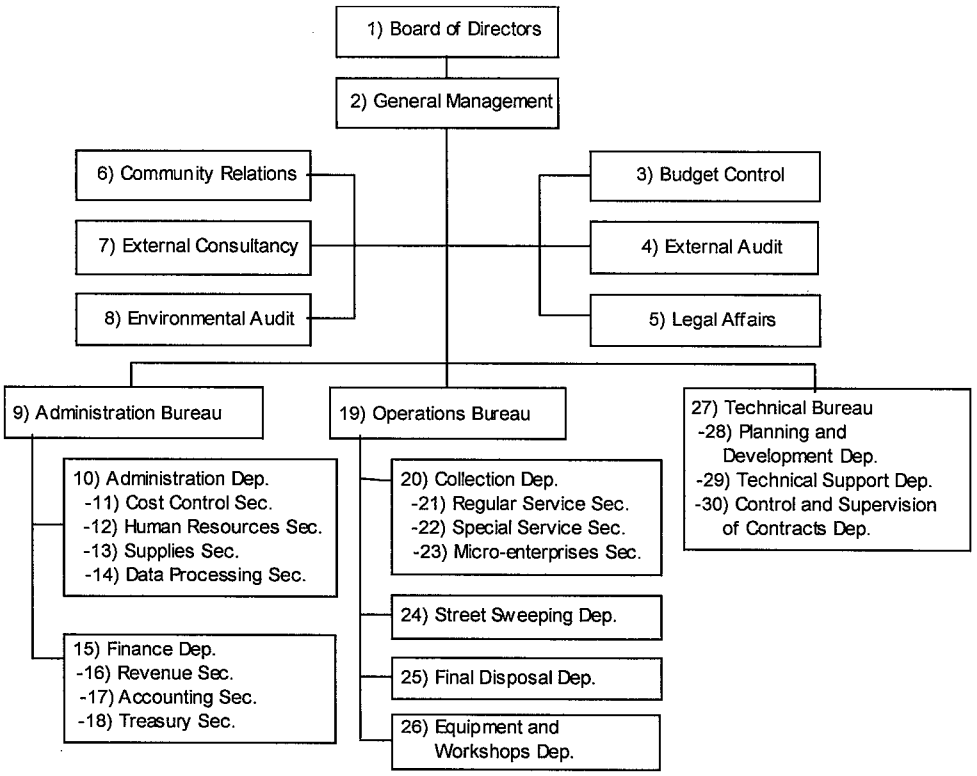

Figure 8-10: Proposed Administrative Structure for the Municipal Company

c. Description of Roles and Functions

The structure proposed to manage the municipal company is designed to be in conformity to service needs. If all the operations are to be provided using its own equipment and personnel, enough human resources and materials should be provided; this will ensure duties are performed smoothly (see Table 8-26). On the other hand, if services all or a part of are to be contracted to private sector there should be a proportional decrease in human resources and materials. In this sense, the Operations Bureau's operational level would be reduced to a minimum which would ensure services to a small sector and be free to counter emergency cases. On the other hand, the Department for Control and Supervision of Contracts would be strengthened.

In the Administration Board, all the sections' activities would be concentrated under the Department of Administration and Finances.

Table 8-26: Personnel Table

Ref. No	Position	Qualification	Number
1)	Board of Directors	Representatives	7
2)	General Management	Civil or Sanitary Engineer (more than 10 years experience)	1
3)	Budget Control	Economist or Business Administrator	1
4)	External Audit	Contracted out	-
5)	Legal Affairs	Lawyer	1
6)	Community Relations	Public Relations Person to answer complains by phone	1 2
7)	External Consultant	Expert on International Cooperation	-
8)	Environmental Audit	Contracted out	-
9)	Administration Bureau	Chief Business Administrator	-
10)	Administration Department	Business Administrator	1
11)	Cost Control Section	Statistician	1*
12)	Human Resources Section	Sociologist	1*
13)	Supplies Section	Supplier	1*
14)	Data Processing Section	Programmer (System Engineer)	1*
15)	Finance Department	Public Accountant	
16)	Revenue Section	Public Accountant	1
17)	Accounting Section	Accountant I	1*
18)	Treasury Section	Accountant II	1*
19) 20) 21) 22)	Operations Bureau Collection Department Regular Service Section Special Services	Civil or Sanitary Engineer (5 years experience)	1
23)	Micro-enterprises Section	Social Promoter (PR Manager)	1
24)	Street Sweeping Department	Engineering Technician	1*
25)	Final Disposal Department	Civil or Sanitary Engineer	1*
26)	Equipment and Workshops Department	Mechanical Engineer	1*
27) 28)	Technical Bureau Planning and Development Department	Civil or Sanitary Engineer (5 years experience)	1
29) 30)	Technical Support Department Control and Supervision of Contracts	Civil or Sanitary Engineer (3 years experience)	1 (1)

Notes: * Personnel who will not be needed if most of the services are contracted out to the private sector. Their functions will be assigned to the respective director.
Control and Supervision of contracts would be strengthened with a professional with more experience.

d. Revenue Control System

The control of revenue is one of the most important functions to achieve the management of a financially sustainable EMAUSS.

Information Flow

Figure 8-11 shows the information flow of routine work.

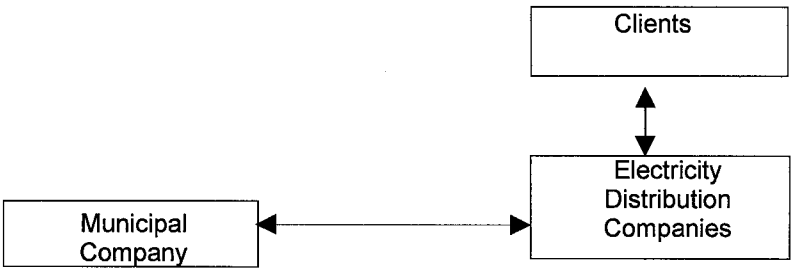

Figure 8-11: Information Flow Diagram of Waste Fee Collection

Database

In order to control the revenue effectively, an information system based on following database should be developed.

- Household Customer Database
- ICI Customer Database
- Database of Large Dischargers and Those who Directly Transport

Reporting System

In order to act against non-payment of fees and to improve SWM services, the reporting system should be established.

e. Expenditure Control System

In order to have a financially sustainable management system, the overall service costs must correspond to the expected revenue. The Expenditure Control System should therefore consider the following functions:

- Prior approval for requests to acquire goods and services.
- Control the use of the budget.
- To achieve better conditions for acquisition.
- To record expenses in an organized manner in order to establish an effective control on costs per activity
- To control the quality and certify execution of contracted services; to authorize payments and to impose sanctions.

The Operation Department will assess the activities' efficiency by using Performance and Productivity indicators. Success will be measured by the amount of proposed technical goals reached in relation to the expenses spent.

Information Flow

The information flows are shown in the following figures: Figure 8-12 "Acquisitions", Figure 8-13 "Hiring Personnel", and Figure 8-14 "Contracts to the Private Sector".

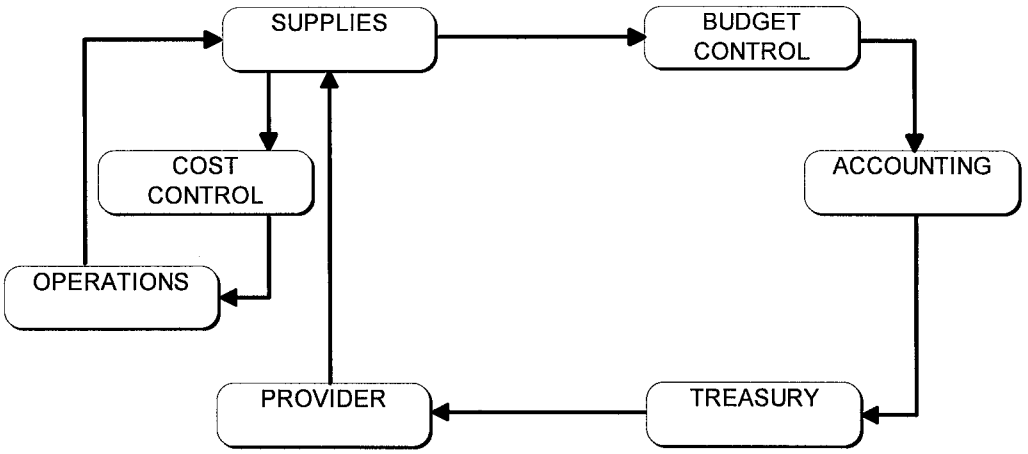

Figure 8-12: Expenditure Control System; Information Flow for Making Acquisitions

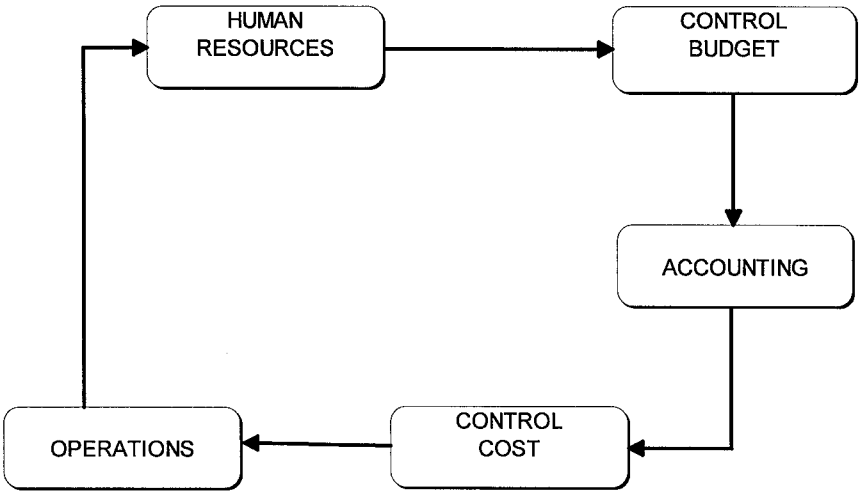

Figure 8-13: Expenditure Control System; Information Flow to Hire Personnel

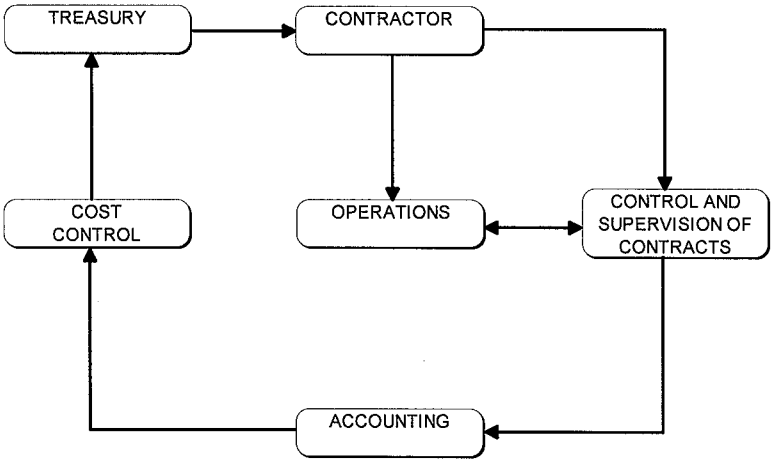

Figure 8-14: Expenditure Control System; Information Flow to Control and Supervise Contracts

Recording Information

In order to effectively control expenditure, an information system should be developed which should include the following data base.

- Acquisitions
  - Capital Goods
  - Consumable Goods and Materials
- Personnel
- Services Contracted
- Reports

f. Contract Systems

f.1 Requirements for the Introduction of the Participation by Private Sector

Before the private sector can participate in the operation of solid waste services, the following conditions should also be satisfied.

- A collection and haulage system should be designed.
- A street sweeping system should be designed.
- Transfer station.
- Equipment and workshops should be strengthened.
- A system to control revenues should be established.
- A system for monitoring and supervision should be established.

Design for the Collection and Haulage System

- Urban area
- Marginal area

These designs should include the following:

- An even selection of routes, frequencies, and schedules.
- Define the number and type of vehicles, equipment, and containers.
- Determine the operational costs.
- Training for personnel involved in technical and operational aspects.

Design for the Street Sweeping System

This design should include:

- Street sweeping routes, frequencies, and schedules.
- Formation of crews.
- Location of sweeping offices (warehouses).
- Definition of operational costs.
- Promotion and establishment of small workers' organization (micro-enterprises) in order to provide the service by themselves.
- Training for micro-entrepreneurs.
- Training for technical personnel.

Equipment and Workshop Strengthening

It is necessary to integrally reorganize the Preventive and Corrective Maintenance System for equipment and machinery in the Cleansing Office.

Currently, there are neither maintenance programs nor indispensable spare parts in stock; acquisitions are made just when the equipment breaks down and then only following a long bureaucratic process (30 to 60 days).

Establishment of a System to Control Revenues

It is important that enough funds should be provided for municipal company's operation and contracted operation on a timely basis to ensure the success of this service.

Establishment of a System for Monitoring and Supervision

Permanent control and monitoring on service quality and performance will bring about public support and loyalty to the municipal company.

f.2 Guidelines and Specifications

In order to create the best conditions for contracts, it is necessary to pre-establish (in a transparent manner) bidding and contracting procedures that will be used. The following should be considered.

Open Competition

It is the most important factor and consists of cost reduction and introduction of the best technologies and procedures.

Precise Specifications

Technical specifications and legal requirements will be presented to the bidders in a very precise manner. An opportunity will be given to answer all questions. A draft contract will be attached.

Pre-qualification

It is advisable to set minimum requirements that bidders should satisfy such as experience in similar works, technical support, and financial capacity.

Scope of Works

Bidders should know the exact scope of works required and quality and level of service required for the contract.

f.3 Service Level and Quality

Bid base and, subsequently, the contract should establish the level and quality of service. Differences can be established based on the type of service, urbanization, and economic level.

Standards related to storage and discharge manner will be defined; these standards should be satisfied by all MSW generators. Standards related to collection, sweeping, transportation, and final disposal should also be respected by contractors.

g. Quality Control System

The information system to monitor and control is an important resource to verify and improve SWM tasks. Most of the services are repetitive, with small variations from time to time and with special services upon request. Planning and design for these

tasks and final evaluation of services make up the quality control system (Figure 8-15).

First, guidelines and quality levels that need to be attained (parameters) should be defined; also, procedures to be followed and activities to be monitored should be determined. This information should be provided to the general public, municipal company's workers, and contractors.

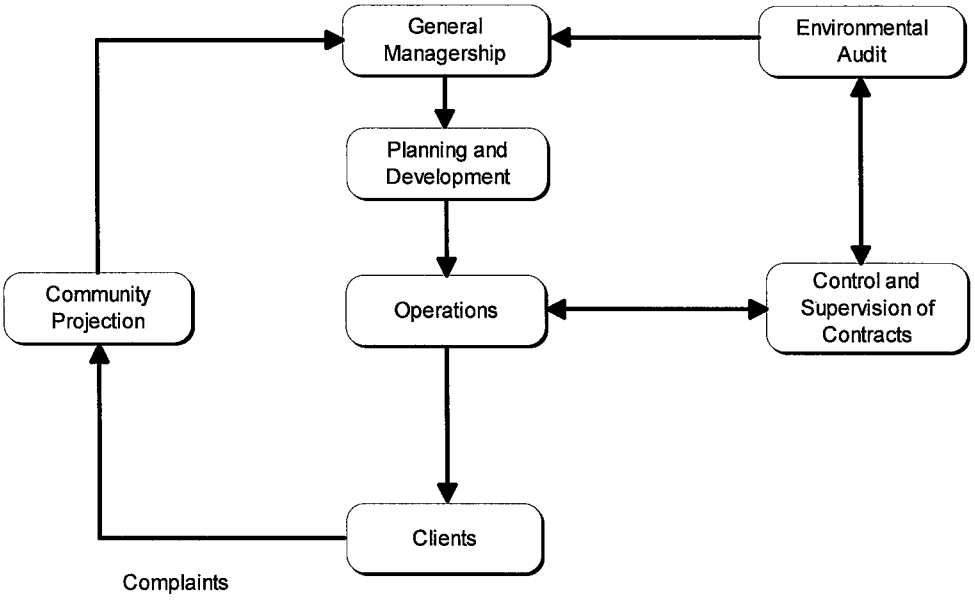

Figure 8-15: Quality Control, Monitoring and Supervision System

h. Human Resources Development System

The improvement of public services requires the continuous development of strength and skills of the service providers. This basic concept shows two objectives on training human resources. The first is to instill a sense of pride in the public servants toward their work so that they develop a positive attitude and gain public trust for the municipal company. The second is to provide the public servants with necessary skills to improve their work and to ensure a cleaner environment which is comfortable for their citizens.

In order to attain those objectives, it is necessary that the municipality's legislative council approves a new institutional structure and selects appropriate personnel who will provide the services.

It consists of three training courses

- Public Affairs;
- Operations; and
- Support Services.

h.1 Public Affairs

Training on public affairs will help develop morale and good sense to help their community as a group. In this category, there are six classifications that are considered as groups.

Course for New Public Servants

It targets newcomers to the public company, such as administrators, engineers, operators, drivers, etc. They are instructed on institutional activities and indispensable issues about their duties with the objective that they can adapt quickly to their assignments.

Course for Heads of Departments and Sections

It targets directors and chief engineers. It provides them with knowledge and special skills to take care of administrative aspects of their assignments.

Course for Supervisors

This course is aimed at group leaders and sub-leaders directly in charge of supervision on field operations. It helps them to develop skills to face and solve situations and problems that may arise during operations under their supervision.

Course for Directors

This training will be for directors; the objective is to help them with their activities and help them to solve problems at the institutional and governmental level.

Public Relations

This course provides public servants with basic knowledge to help develop better manners that should be used to communicate with and to welcome all citizens. The public servants' behavior reflects the quality of the municipal company to the citizens.

Prevention of Criminal Acts

This course is directed to public servants to help them acknowledge the moral and ethical duties that they should undertake as public officials. This course will deal with the manners in which they should behave and how they should react when they encounter criminal and corrupt activities. Topics are such as alcoholism, non-work related personal activities during office hours, tardiness, unjustified absences, corrupt activities such as sale or unauthorized removal of goods and materials belonging to the institution (oil, tires, batteries, spare parts, use of vehicles), accepting bribery in exchange for leniency towards transgressors, giving favors in contracts or purchases, etc.

h.2 Operations

The specific objective is to provide the municipal company and the personnel with technical and operational skills to improve the SWM services in the following areas.

- Collection and haulage in urban and marginal areas
- Cleansing of roads and public areas
- Sanitary landfill operation
- Planning and development
- Control and monitoring
- Administration and finances
- Community relations
- Environmental education

h.3 Support Services

There are a number of activities that are necessary to be carried out to ensure support for SWM operations. A preliminary list of short courses should pay attention to:

- Preventive and corrective maintenance for vehicles and machinery.
- Safe driving techniques for drivers.
- Safety practices for collection, sweeping, and final disposal workers.
- Basic course on computer use.

8.2.4 Financial System

In order to establish the financial system that enables sustainable municipal SWM with the target year of 2010, present tariff structure and fee collection system should be reviewed and improved to assure the stable income for the SWM services. Furthermore, the efficiency of this service should be raised by technical, administrative and institutional improvement. Practical measures to reduce the present costs should take place.

The M/P proposes projects that schematize the measures to improve the service efficiency. The table below summarizes financial scenarios of the 14 municipalities as a whole, for the cases of without M/P and with M/P (for the period of 2001 to 2010).

Table 8-27: Total Expenditure Comparison of With/Without M/P

	With M/P	Without M/P	Difference
Investment cost (million colones)	195.2	197.7	- 2.5
Operation and maintenance cost (million colones)	1,862.0	1,955.1	- 93.1
Total expenditure (million colones)	2,057.2	2,152.8	- 95.6

If the M/P is implemented, about 96million colones expenses will be curtailed for the period of 2001 to 2010.

8.2.4.1 Basic Principles of Metropolitan Approach

In order to implement the proposed projects in the M/P that have metropolitan approaches, total investment costs of about 16 million US$ and annual O&M costs of about 1 million US$ will be required during the 2001 to 2010. As a matter of course, those projects in M/P will introduce the beneficial cost saving of the services and environmental benefits that is more than these expenditure amount mentioned here.

Table 8-28: Summary of Expenditure of Regional Management System

Unit : US$ 1,000

		Phase I	Phase II	Phase III	Total
Investment	T/S #1 & Transport	2,845	0	1,096	3,941
	T/S #2 & Transport	1,217	3,867	314	5,398
	Tonacatepeque S/L	814	1,635	0	2,449
	S/P	0	123	1,199	1,322
	MWI	2,795	0	84	2,879
Investment total		7,671	5,625	2,693	15,989
O&M	T/S #1 & Transport	0	951	1,356	2,307
	T/S #2 & Transport	0	1,411	3.013	4,424
	Tonacatepeque S/L	0	112	224	336
	S/P	0	0	465	465
	MWI	0	606	808	1,414
	Exec. Unit in OPAMSS*	240	240	320	800
O&M total		240	3,320	6,186	9,746
Total		7,911	8,945	8,879	25,735

Note: * Total amount of 80,000US$/year are assumed.

The above costs other than what required for medical waste incineration (MWI), should be incurred by municipalities that utilize these facilities in proportion to the waste amount handled by respective projects.

However, all municipalities are not in such financial conditions that can afford investment costs of in the order of million US$. Therefore, it will be necessary to have a system that the projects be operated by private initiatives or regional entity or others, and the user municipalities pay the fees (in proportion to the amount handled).

Merits of having the private initiative system for municipalities are that they can avoid peak expenditure in municipal finance, etc., however, in exchanging contract between the user municipalities and private operator, it is important to reach fee rates paying attentions for the following:

- If the fee rate is set at lower than the appropriate range of fee rate (i.e., discounted non-lucrative rate), it means the appropriate works can not be done, or the private sector will not show interests in participating such activities.
- On the contrary, if the rate is set higher than the appropriate rate (i.e., very lucrative rate), private sector will have a strong incentive for the participation, however, cost burden by users (i.e., citizens) will be crucially heavy.

This fee rate should be determined through a public open bid. If the project is to be operated by private initiatives, the prerequisite for that will be that it should have more merits than the case that the project is operated by other means (e.g., the initiative of regional entity, public company, etc.).

Therefore, in order to show guidelines for reaching the appropriate fee rates, three (3) cases of project operation modalities are assumed and fee rates for respective project modalities are calculated with certain conditions.

- **Case 1: Authority's Direct Operation**

  OPAMSS/COAMSS becomes the project executor[4], obtaining financing with conditions of 8.1% interest rate (i.e., London market rate 7.1% at June 2000 plus 1.0% is assumed as available).

Case 2: Public Company

It is assumed that OPAMSS/COAMSS establishes a public company[5] that will prepare the capital and obtain the financing of low interest rate (e.g., Japan Bank for International Cooperation loan for environmental improvement projects).

Case 3: Private Initiative

It is assumed that a private company execute the project with certain financing conditions estimated as shown in the table below.

Table 8-29: Condition for Projects' Cost Estimation

	Case 1	Case 2	Case 3
Debt security	0 %	15.5%	15.5%
Interest rate	8.1 %	1.7 %*	10.75 %
Corporation tax	0%	25%	25%
Capital	0%	20% of capital investment	
Required achievement	FIRR>8.1%	Profit rate (profit after tax/revenue)>5%	Return on own capital>13.5%

Note: * Loan rate for environmental improvement projects by Japan Bank for International Cooperation, 25 year repayment and 7 years deferment.

Based on the financing conditions assumed above, fee rate for respective cases are calculated (see the table below).

[4] As for the medical waste incineration project, MSPAS is assumed as the project executor.
[5] As for the medical waste incineration project, MSPAS is assumed to establish a public company.

Table 8-30: Results of Projects' Cost Estimation

		Case 1	Case 2	Case 3
Transfer station #1 & Trailer Transport				
Input waste amount		input amount of year 2004 to 2010		
Project period		20 years (trailer and heavy equipment 7 years)		
Evaluation period		year 2004 to 2010		
Base unit cost (U$/ton)		5.43		
Required unit cost (U$/ton)	**inc. VAT (13%)**	**-**	**7.3**	**9.6**
	exc. VAT(13%)	**7.0**	**6.5**	**8.5**
Transfer station #2 & Trailer Transport				
Input waste amount		input amount of year 2005 to 2010		
Project period		20 years (trailer and heavy equipment 7 years)		
Evaluation period		year 2005 to 2010		
Base unit cost (U$/ton)		4.70		
Required unit cost (U$/ton)	**inc. VAT (13%)**	**-**	**6.2**	**7.8**
	exc. VAT(13%)	**5.8**	**5.5**	**6.9**
Landfill (Tonacatepeque landfill)				
Input waste amount		landfill amount of SMT & TN (2005 to 2022)		
Project period		18 years (heavy equipment 7 years)		
Evaluation period		year 2005 to 2022		
Base unit cost (U$/ton)		13.6		
Required unit cost (U$/ton)	**inc. VAT (13%)**	**-**	**18.8**	**31.0**
	exc. VAT(13%)	**20.2**	**16.6**	**27.4**
Selection Plant				
Input waste amount		recyclable waste from 14 cities (2008 to 2010)		
Project period		15 years (heavy equipment 7 years)		
Evaluation period		year 2005 to 2022		
Base unit cost (U$/ton)		15.3		
Required unit cost (U$/ton)	**inc. VAT (13%)**	**-**	**28.9**	**41.0**
	exc. VAT(13%)	**27.2**	**25.6**	**36.3**
Medical Waste Incineration				
Input waste amount		medical waste from 14 cities (2004 to 2010)		
Project period		15 years (heavy equipment 7 years)		
Evaluation period		year 2001 to 2018		
Base unit cost (U$/ton)		234		
Required unit cost (U$/ton)	**inc. VAT (13%)**	**-**	**371.0**	**530.0**
	exc. VAT(13%)	**390.0**	**328.3**	**469.0**

The above table clearly shows that project fees (US$---/ton) of Case-3 (private initiative cases) turn out the most expensive, although it exempts authorities from troubles of finance recruitment, etc. Unit costs of Case-2 (public company cases) are almost always the cheapest if the VAT is exempted and the low interest international financing is gained. As the Case-1 (authority's direct operation) does not need to pay the VAT, project fees (US$---/ton) of the case stand at very competitive places among the set of alternatives listed above.

Meanwhile, in order for a public company to receive an international finance, there are some prerequisites such as that a proper capital equal to 20% of the initial investment should be available for the authority (public company), etc.