

d.2.2 Construction Plan

When the new landfill starts its operation from the year 2006, the expected final disposal amount by the year 2015 is estimated in the following table.

Table 10-31: Prospect of Required Landfill Volume and Construction Plan

unit : m³

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Waste volume	470,385	957,627	1,458,540	1,974,352	2,503,536	3,047,121	3,605,239	4,179,252	4,769,424	5,376,784
Cover soil volume	94,077	191,525	291,708	394,870	500,707	609,424	721,048	835,851	953,885	1,075,357
Total	564,462	1,149,152	1,750,248	2,369,222	3,004,243	3,656,545	4,326,287	5,015,103	5,723,309	6,452,141
*Required volume of Etapa 3	286,462	871,152	1,472,248	2,091,222	2,726,243	3,378,545	4,048,287	4,737,103	5,445,309	6,174,141
Service period	Phase 1		Phase 2		Phase 3		Phase 4			
Available volume	1,300,000 m ³		1,200,000 m ³		1,100,000 m ³		2,800,000 m ³			
Total available volume	1,300,000 m ³		2,500,000 m ³		3,600,000 m ³		6,400,000 m ³			

notes : *assumed Etapa 2 remaining volume of end year 2006 is about 278,000 m³

Consequently, the new landfill requires a capacity of approximately 5,400,000m³ for waste volume. In case of including cover soil volume, it becomes about 6,200,000m³. Constructing the landfill with this capacity at once questions on durability of a synthetic liner due to long time exposure to the sunlight. In addition, it enlarges the scale of a leachate treatment facility, which is uneconomical. In this planning, the service period from the year 2006 to 2015 is divided into four steps.

10.2.4 Institutional System

The present institutional system should be adjusted to lead the Panama District to the goal of the M/P, Establishment of Sound Solid Waste Management System.

The M/P sets three major policies in order to achieve the goal. Those are i) elimination of waste from the living environment in order to preserve citizens' health, ii) establishment of appropriate final disposal system and iii) encouragement of waste minimization.

From now on, DIMAUD should consult on the previous three major policies and attain the targets set under the policies such as improving waste collection coverage, ensuring final disposal capacity by 2015 and keeping down waste generation rate. And, DIMAUD has to acquire capabilities to realize them. Such capabilities are SWM policy planning, high-tech such (transfer and transport, material recovery, sanitary landfilling, etc.), social and environmental consideration and business management. Especially, ability to carry out "Plan-Do-Check-Action" is crucial for SWM executing bodies, as technical, social, political and natural environments that surround the SWM change as time go on.

Consequently, this institutional system of the M/P aims to strengthen capacity of DIMAUD and organizations and individuals concerned in order to achieve the goal of the M/P, i.e., **“Institutional Capacity Building.”**

The Institutional Capacity Building applied in the Study consists of the followings.

- Sector Policy and Regulation
- Organizational Structure Adjustment
- Human Resource Development
- Management Development
- Financial Development

This section describes the contents of the Institutional Capacity Building.

a. Sector Policy and Regulation

This M/P was prepared together with the Panamanian side in order to bring in characteristics of the Study Area, to make the M/P realistic and to strengthen their planning capability, because the M/P needs to be implemented, checked and modified continuously (*Plan-Do-Check-Action*) by themselves.

Besides the M/P, a municipal ordinance was prepared with support of the Study Team, which is under a procedure of approval in the Panama Municipal Council as of November 2002. The ordinance is a tool of establishing a legal framework where the M/P can be appropriately carried out and lead to the goal.

The municipal ordinance stipulates definition of waste to be managed by the Panama Municipality through DIMAUD, responsibilities and roles of the service render (Panama Municipality/DIMAUD) and waste dischargers, private sector participation, service quality, waste minimization and so forth.

b. Organizational Structure Adjustment

Organization structures should be adjusted to meet with needs to achieve the goal of the M/P. We can define such organizational structure as a system, which can be described as follows:

- i) A set of elements (a General Management office, Departments and Units)
- ii) dynamically intertwined (in interaction, forming a communications network whose elements are dependent of each other)
- iii) that conduct an activity (sustainable management of solid wastes in the district of Panama)

- iv) in order to achieve an objective or purpose (to keep the district clean and promote its dwellers' well-being, contribute to health protection and preservation of the environment)
- v) by utilizing data, power and resources (human and material resources)
- vi) along with the environment surrounding the system (customers of the service, community, public and private entities)

With taking into account the above definition, a proposal of organizational structure adjustment of DIMAUD is made, aiming the following.

- To clarify responsibilities and tasks of respective departments and units.
- To outline a communications system within the entity that allows for the interaction among the administrative units.
- To increase the synergy of functions performed by all the administrative units
- To head towards efficiency through the most adequate and duly programmed means, methods and procedures, so as to ensure the optimal use of the available resources.

This section describes the proposed organization structure of DIMAUD, and responsibilities and tasks of respective departments and units.

b.1. Proposed Organization Structure of DIMAUD

The proposed organization structure of DIMAUD is presented in as follows.

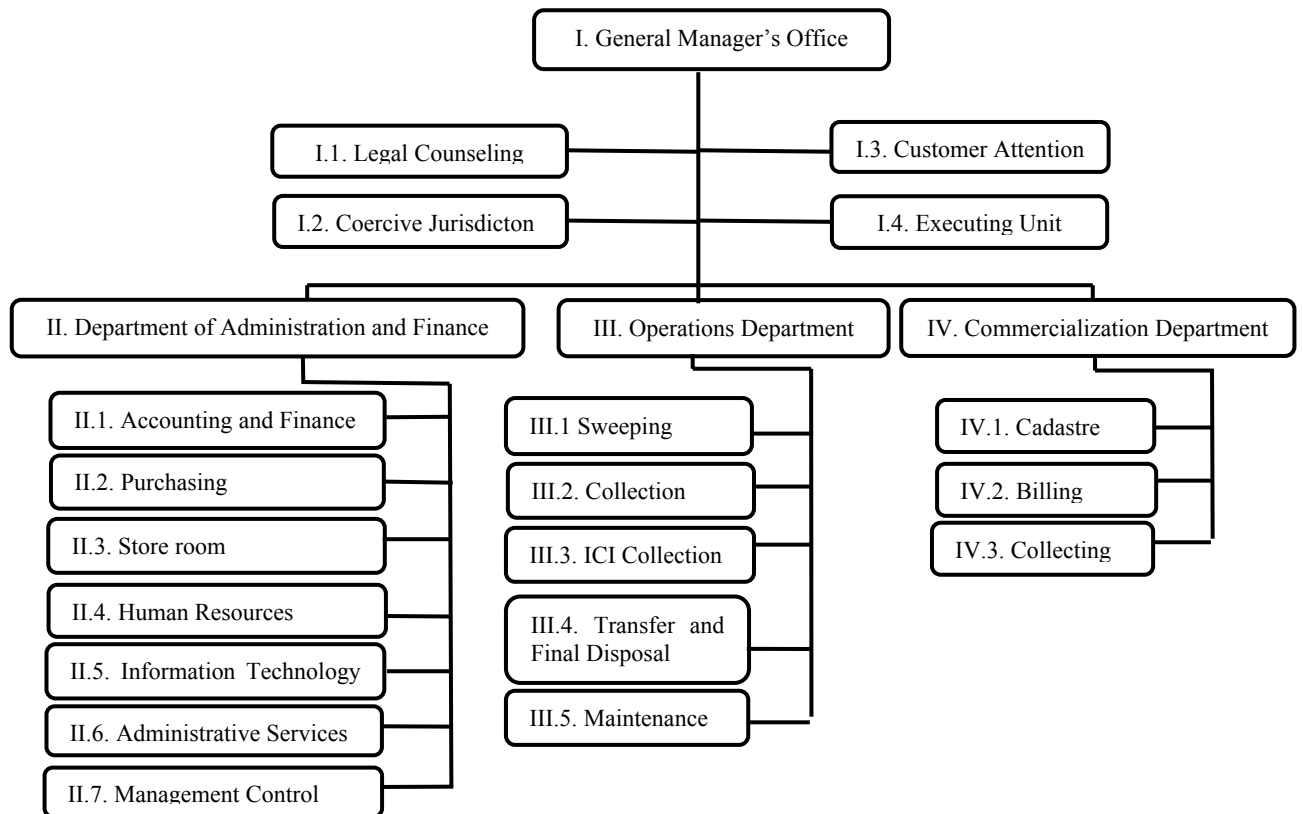


Figure 10-14: Proposed Organization Structure of DIMAUD

b.1.1 General Organization Structure

The proposed organization structure has three levels, Directive, Intermediate and Operational Level. Descriptions of respective levels are given in the following.

Directive level

It encompasses the General Manager's Office Legal Counseling Office, Coercive Jurisdiction, the Customer Attention Unit and the Executing Unit of the Master Plan.

It is known as the strategic level, since decisions are made at this level and the entity's objectives are set forth, as well as the strategies to meet them.

The above is in search of efficacy by making decisions that will maximize the environmental opportunities, will defend from menaces and will neutralize environmental restrictions and contingencies to achieve satisfactory results.

Intermediate level

It groups the chieftainships of the Administration and Finance, Operations and Commercialization Departments.

Also known as the tactic, mediator or managerial level. It ranges between the directive and the operational level, allowing internal correlations between these two levels. It oversees that the decisions made at a directive level be adequate to the actions conducted at the operational level and that the agreed strategies to meet the organizational objectives be translated into action programs.

Operational level

It encompasses all the administrative units subordinated to chieftainship offices of the corresponding departments (Accounting and Finance, Purchasing, Store room, Human Resources, Information Technology [IT], Administrative Services, Management Control) (Sweeping, Collection, ICI Collection, Transfer and Final Disposal, Maintenance) (Cadastre, Billing, Collecting).

Also known as the technical level or nucleus, it is located at internal and lower areas of the entity. Tasks and operations are carried out at this level; it includes the entity's programming and daily activities.

Its functioning follows predetermined routines and regularly continued procedures that ensure the total use of the available resources and maximize the efficiency on operations.

This level seeks the efficiency on the operations executed within the standardized, cyclical and repetitive programs, routines and procedures, so as to achieve optimal results.

b.1.2 Proposed New Administrative Units

The creation of the new administrative units is being proposed herein: Customer Attention, Management Control and the Executing Unit of the Master Plan.

Customer Attention Unit

It integrates the current functions of the Public Relations and Community Relations administrative units and creates the Marketing and Service Quality sections. It has the support of the 800ASEO service, which was upgraded and expanded to a communications system with the proper features of a Call Center.

The purpose is to achieve greater synergies among the concurring administrative units; to strengthen liaisons with the organized civil society by means of the brand new Cleansing and Ornate Committees; to promote the entity's services; to provide support to the operational units (sweeping and collection), to achieve the positive image of the entity and to verify the quality of the services being rendered.

Management Control Unit

It has the responsibility of managing the entity's operations through the obtainment of performance indicators and their assessment versus a model with acceptable range.

It checks and evaluates the entity's productivity and competitiveness with the help of indicators; it issues statistical and managerial follow-up information to control operational costs; it generates aggregate data for the financial, operational and commercial areas.

It maintains an information flow on the performance of the selected administrative units, which in turn feedback the system and interact to achieve greater efficiencies.

Executing Unit of the Master Plan

It gathers a group of professionals and technicians of the entity who have the task of developing the activities required to implement the Master Plan within the entity. Such officials work full time and exclusively are devoted to the above purpose. It may have outside technical assistance. The Executing Unit will have the features of a private consulting firm.

b.2. Responsibilities and Tasks

This section describes responsibilities and tasks assigned to respective departments and units of DIMAUD (Refer Figure 10-14).

I. General Management Office

Structure

General Manager, Legal Counseling, Coercive Jurisdiction, Customer Attention Units and the Executing of the Master Plan

Responsibility

- Runs the entity
- Appoints the mission, establishes the objectives and generates the entity's policies.
- Approves the functional and organizational structure
- Approves the budget and its execution
- Ensures the provision of the service and audits its performance
- Executes and enforces the Urban Cleansing Regulation in the municipality of Panama

Duty Assignments

To achieve DIMAUD's vision and mission:

- VISION "The city of Panama is being acknowledged again as the "golden small cup" for its ornate and cleanliness of its roads and public places, as well as for the life quality of its dwellers.
- MISSION "To promote its inhabitants' well-being through the implementation of a Sustainable Solid Waste Management that contributes to the protection of health and preservation of the environment"

Activities

1. To inform the entity's staff on the new Cleansing Regulation
2. To inform the entity's staff on the new functional and organizational structure of the entity
3. To define the marketing, billing and collecting policies
4. To analyze the entity's feasibility to set up a municipal company of urban and household cleansing.

Internal relations

The Mayor's office; with all the departments' chieftainships and with the Legal Counseling and Customer Attention Units and the Executing Unit of the Master Plan.

External Relations

With all the public entities, specially the Ministry of Health (MINSa) and the ANAM; private entities, international organizations, NGOs.

I.2 General Management Office Unit LEGAL COUNSELING

Structure

Chieftainship

Responsibility

- Advises in juridical matters to the General Management Office and other administrative units to correctly interpret legal provisions.

Duty Assignments

1. To elaborate projects for decrees generated by the Mayor's Office
2. To represent and defend the entity
3. To review documents and issue juridical concepts
4. To release legal consultations and orientate in tenders
5. To advise on working conflict topics

Activities

1. Please refer to the activities of the Executing Unit

Internal Relations

With the General Management Office, with all the departments' chieftainships, the Customer Attention Unit and the Executing Unit. Municipality of Panama: General Secretaryship, Purchasing Department.

External Relations

MINSA, MEF, MINTRA, CGR

I.2 COERCIVE JURISDICTION UNIT, General Management Office

Structure

Two Administrative Courts (Plaza Concordia and San Francisco)

Responsibility

- To oversee the compliance with the cleansing regulations currently in force.

Duty Assignments

1. To raise awareness, cite and punish the infringers to the cleansing regulations.

Internal Relations

General Management Office and Legal Counseling

I.3 CUSTOMER ATTENTION UNIT, General Management Office

It is a new administrative unit that integrates the functions of the current Public Relations and Community Relations units, and also adds news functions associated with marketing topics and quality control of the service.

It has the objective of achieving a greater synergy among the concurrent administrative units; strengthening the relations with the organized civil society by means of the Cleansing and Ornate Committees; to merchandise the service and promote a positive image of the entity; to verify and ensure the quality of the services offered.

Structure

A chieftainship, the S.O.C.I.O (Organized Civil Society) section, the Public Relations and Marketing sections; Service Quality section. It has the support from the 800 ASE0 service, which has been restructured as a Call Center and a communications system.

This unit fuses the functions of the current Public Relations and Community Relations units and adds the verification feature of the quality of the service.

Responsibility

- Establishes, enhances and maintains relations with the community and with the customers
- Promotes the management of solid wastes

- Takes care of the entity's public image
- Promotes the entity's services
- Monitors and controls the quality of the service being rendered

Duty Assignments

Chieftainship

1. To enforce the policy, the scope of the objectives and renders the entity's strategic plan effective in regards to customer attention
2. To direct and coordinate the activities from the sections
3. To assess the performance of the sections and the quality of the service on the basis of annual and monthly goals set out by the General Management Office
4. To receive feedback and adjust the activities consequently.

800ASEO Service

1. It performs as a communications unit to support the Cleansing and Ornate Committee promotion and the promotion of DIMAUD's services.

S.O.C.I.O section –(Organized Civil Society)

1. Promotes organization of the civil society in solid waste management issues.
2. Plans and carries out the educational programs and activities at teaching centers , public and private entities and communities.
3. Coaches residential and institutional, commercial and industrial customers in the management of solid wastes.
4. Designs and produces the educational and support material for the promotion of the solid waste management.

Public Relations and Marketing Section

1. To achieve the entity's positive public image on the basis of accomplishing its mission with the society and achieving the organization's objectives.
2. To handle information with mass media.
3. To design, organize and manage the relationships with the entity's customers.
4. To lay out and handle the marketing of the services being offered.

Service Quality Section

1. To verify the strict compliance with the service quality standards set forth in the Cleansing Code.
2. To be aware of the infractions on the quality of the service by the supplier of the service.
3. To propose the required adjustments for the operational activities, with the purpose of permanently raise the quality of the service.
4. To be aware of and fine public infractions to the Cleansing Code.

Activities

Chieftainship

1. To convey the customer attention policy throughout the entity by means of talks. It is very important that all the officials get a deep acquaintance of this policy, in order to control their behavior.

800ASEO service

1. Improvement of the customers' telephonic database (with the Executing Unit)
2. Arrangement of the telephone database per corregimiento, household and ICI customers (with the Executing Unit)

3. Receiving and recording of customer complaint calls and their submittal to the Service Quality section for their attention and follow-up.
4. Installation of the communications network among the Cleansing and Ornate Committees of Communal Boards, Cleansing and Ornate Committees at a neighborhood level and the DIMAUD (Customer Attention Unit)
5. Beginning of the marketing activities for the ICI customer services.
6. Beginning of public opinion surveys in accordance with the instructions by the Public Relations and Marketing sections.

S.O.C.I.O (Organized Civil Society) section

- 1.1 Arrangements before the Corregimiento Representatives to create a Cleansing and Ornate Committee within the Communal Board structure.
- 1.2 Collaboration with the Communal Boards to organize Cleansing and Ornate Committees at a neighborhood level, urbanizations and housing complexes. The citizen security committees are a good example of what can be accomplished with communal participation.
- 1.3 Creation of the Regional Network of Cleansing and Ornate with the committees that gradually start to appear, which will use the 800ASEO service to telephonically link the DIMAUD, the Communal Boards and the Cleansing and Ornate Committees at a neighborhood level.
- 2.1 The organization of training workshops aimed at the members of the Cleansing and Ornate Committees at a neighborhood level begins. At the end of the workshop, these members will be trained to raise awareness among the population to achieve the following:
 - To actively participate in the provision of the collection and sleeping services and in the maintenance of ornate and cleanliness of public areas.
 - To collaborate in the cleansing operations.
 - To verify and assess the quality of the service being rendered and inform their communities and the DIMAUD's Service Quality inspection on these topics.
 - To encourage and control the neighbors discharging solid wastes as per the provisions of the cleansing code.
 - To promote the maintenance of cleanliness in front of the properties and at public roads and areas.
 - To control, avoid and report the unlawful dumping of solid and/or liquid wastes in private or public areas, water streams, ravines, vacant property, rainwater drainage or sewerage systems or other unauthorized places for such purpose.
 - To pay the bills for the solid waste management services rendered, as this ensures the sustainability and quality of the service.
 - To organize together in groups responsible of the activities programmed.
 - To maintain a close relation with the DIMAUD's Service Quality unit.
- 3.1 Execution of the environmental education activities programmed by the Executing Unit of the Master Plan, by using the educational material donated by JICA.
- 3.2 Raising of awareness and backup to the school students in the district by attaching the "CUMPLE TU PAPEL" ("perform your task"), which is part of the solid waste minimization activities of the Master Plan.Coordinates the free provision of haulage by the DIMAUD to carry the recycled paper from schools to the receiving place.
- 4.1 Gathering, evaluation, design and reproduction of the support and educational material required for the accomplishment of its obligations.

Public Relations and Marketing section

- 1.1 Establishment of the public relations strategy, taking into consideration the enforcement of the new Urban and Household Cleansing Code, as well as the General Management's office policy and strategic guidelines.

- 2.1 Creation and maintenance of a RR.PP officials' database of public and private entities that hold relations with the DIMAUD.
- 2.2 Creation and maintenance of a mass media journalist database (radio, press and television) that cover the news related to the management of solid wastes and/or environmental issues on a routinely basis.
- 2.3 Publication of a newsletter on a regular basis with news on the DIMAUD. To be distributed among the RRPP officials (clause 2.1) and the journalists (clause 2.2). (Via e-mail and fax). Creation of a website and keep it updated. Invitation to visit the site and send opinions and suggestions on the service.
- 3.1 Relationship program with the customers by means of the 800ASEO service and the Cleansing and Ornate Committees.
- 4.1 Marketing program for ICI customers, in coordination with the Commercialization Department and the Executing Unit of the Master Plan (EUMP), on the basis of the Special Collection Service for ICI customers.
- 4.2 Conduction of the marketing program for ICI customers. Prepares progress reports of the program.
- 4.3 Training of promoters (salesmen) of the Special Collection Service.
- 4.4 Maintenance of a personalized relationship with ICI customers.
- 4.5 Designing of public opinion surveys, both at the spot as mobile ones.

Service Quality section

- 1.1 Training to the inspectors on the enforcement of quality standards of the service contemplated in the Cleansing Code.
- 1.2 Training to the inspectors on the enforcement of infractions to the Cleansing Code
- 1.3 Beginning of service quality inspection activities of the service.
- 2.1 To be aware of and forward public complaints and inspectors reports on the infractions to the quality of the service to the corresponding administrative units, so that the alter can correct deficiencies and impose the respective sanctions. The public claims will be attended via the 800ASEO service and the Cleansing and Ornate Committees.
- 3.1 Recording of claims and/or events that breach the service quality standards; analysis and evaluation of complaints and/or events that took place on a monthly basis, so as to reach conclusions about the variants in the quality of the service and to prepare suggestions and recommendations for its correction. A monthly report on the quality of the services supplied will be prepared, to be submitted to the General Management Office.
- 4.1 The service quality inspectors will impose fines to the public on the infractions to the Cleansing Code.

Training

1. Procedures workshop for the operation of the 800ASEO service (800ASEO service operators)
2. Workshop on the Operation of Telephone Opinion Surveys (800ASEO service operators)
3. Participation of the organized community/Regional Network of Cleansing and Ornate (S.O.C.I.O staff and communal boards)
4. Seminal on the Enforcement of Service Quality Standards/Prohibitions, Infractions, Sanctions and Sanctioning Procedure (service quality inspectors, operations supervisors, cleansing and ornate committees of communal boards).
5. "Cumple tu papel" ("Perform your task") program workshop (S.O.C.I.O staff, Cleansing and Ornate Committees of communal boards and at a neighborhood level, school principals).
6. Workshop on the Marketing Program of DIMAUD services (Public Relations and Marketing personnel, Commercialization Department, Operations Department, Administration and Finance Department).

Material and Equipment

1. Procedure manual of the 800ASEO service (three new telephone lines, telephone accessories, furniture).
2. Public Opinion Surveys Manual
3. Guidelines on the organization of Cleansing and Ornate Committees.
4. Cleansing Code
5. Material produced and donated by JICA
6. Marketing Program Project

Internal Relations

With the General Management Office; Sweeping, Ordinary Collection, Special ICI Collection, Transfer and Final Disposal, Cadastre, Billing and Collecting units. Municipality of Panama: Communications Office

External Relations

Public and private entities associated to the public relations activities; mass media; Cleansing and Ornate Committees of Communal Boards and at a neighborhood level;

b.3. EXECUTING UNIT OF THE MASTER PLAN, General Management Office

This is a new administrative unit that will gather a select group of professionals and technicians of the entity, with the purpose of developing the required activities to achieve the objectives of the Master Plan.

These professionals belong to the entity's structure and will perform their work full time and exclusively dedication to this Executing Unit.

Structure

A chieftainship; Planning and Development Area, Administration and Finance area; Operations area; Commercialization Area; Customer Attention area.

An external technical assistance area is deemed as necessary to cooperate with the local professional staff to achieve the activities foreseen for the Executing Unit.

The Planning administrative unit is part of the entity's permanent structure. Functionally speaking, it is placed in the Executing Unit and will execute the routinely functions, and also will coordinate the implementation of the products stemming from the activities of the Executing Unit in the functions of the entity's diverse administrative units.

Responsibility

- To achieve the objectives of the Master Plan within the Study on Solid Waste Management Plan for Municipality of Panama in the Republic of Panama.
- To comply with the duties assigned to the Unit
- To execute the activities programmed for each one of the duties.
- To assist and support the entity's diverse administrative units in their everyday activities.

Duty Assignment

Chieftainship

1. Directs and coordinates the labor of the units' professionals.
2. Verifies that the works respond to the objectives of the Master Plan, to the tasks assigned and to the diverse activities to be developed.
3. Consults, coordinates and informs the top management of the entity.
4. Conducts the development of the works with the help of external counseling.

Technical External Assistance

1. Consolidates the structuring of the Executing Unit
2. Trains the professional staff of the Executing Unit
3. Advises and participates in the development of the activities assigned to the Executing Unit.
4. Advises the chieftainships of the diverse administrative units in the implementation of the products stemming from the activities of the Executing Unit.

Planning and Development

1. Permanently analyzes the entity's organization and the methods employed for the compliance of its functions.
2. Establishes the performance parameters based on coverage, productivity and effectiveness levels of the service, in order to measure its quality and obtain a favorable cost-benefit ratio.
3. Prepares and/or evaluates the manuals, standards, procedures, training and policy outline material.
4. Conducts the permanent programs on the generation of solid wastes (type, composition, generation per person, per ICI customer type, sweeping and cleaning of public roads and areas, minimization – reduction - reuse – recycling
5. Programs the coverage expansion of the service, taking into account city growth and variations in the generation of solid wastes.
6. Determines the need to acquire collection vehicles and mobilization of staff.
7. Forestalls the need to acquire land to build transfer stations, sweeping stations, sanitary landfills, offices, warehouses, shops.

Activities

1) Planning and Development

- 1.1 Prepares and conducts a workshop to inform on the new Cleansing Code.
- 1.2 Prepares and conducts a workshop to inform on the entity's new functional and organizational structure.
- 1.3 Prepare conducts the workshops to train the personnel on the methodology and functional procedures, in the utilization of new instruments and tools, teamwork and information flow.
- 2.1 Establishes the general performance, operational, economic-financial, commercial, quality, cost and work accident standards, on the basis of the results obtained in the pilot project and the Study.
- 2.2 Assesses and updates the performance parameters with the Management Control administrative unit.
- 3.1 Conducts the preparation and/or evaluation of materials and design, operation and procedure standards, training material and policy guidelines, with the participation of professionals from the Executing Unit and officials from the entity's administrative units, which are described next.

FOR THE OPERATIONS AREA

- 3.1.1 Procedure to determine the generation and composition of solid wastes
- 3.1.2 Handling of the information by using the digital chart of the district, to be provided by the Comptrollership General's Office of the Republic (includes the Global Positioning System/GIS)
- 3.1.3 Data recording and processing of collection
- 3.1.4 Control and supervision in collection
- 3.1.5 Collection staff training
- 3.1.6 Time and motion survey
- 3.1.7 Control and supervision of the vehicles
- 3.1.8 Maintenance of vehicles
- 3.1.9 Design and improvement of collection and haulage routes
- 3.1.10 Foundations for laying out the special collection service for ICI customers.
- 3.1.11 Data recording and processing of manual and mechanical sweeping
- 3.1.12 Control and supervision in manual and mechanical sweeping
- 3.1.13 Staff training in manual and mechanical sweeping
- 3.1.14 Handling of the pedestrian container system
- 3.1.15 Design and improvement of manual and mechanical sweeping routes and cleaning of public areas
- 3.1.16 Landscape project of Cerro Patacón sanitary landfill, by detailing the final use of the land
- 3.1.17 Engineering project of the sanitary landfill
- 3.1.18 Entrance and unloading control at the sanitary landfill
- 3.1.19 Topographical control of the landfill progress by means of the digital chart donated by JICA
- 3.1.20 Control and supervision of the operations contracted at Cerro Patacón sanitary landfill (as per the terms of the subscribed contract)
- 3.1.21 Control in the use of covering material
- 3.1.22 Control in the extraction of materials (scavengers)
- 3.1.23 Operation and maintenance of the collection and leachate treatment (sampling and analysis of effluents of the treatment system)
- 3.1.24 Maintenance and control of the biogas management system (temperature, flow and methane concentration)
- 3.1.25 Control in the contamination of underground water through the monitoring of neighboring wells
- 3.1.26 Maintenance of infrastructure (roads, canals, water supply, collection and treatment of wastewaters, wells, power, communications, buildings, collection vehicle wash)
- 3.1.27 Organization and procedures for the security staff

FOR THE ADMINISTRATION AND FINANCE AREA

- 3.1.28 Purchasing procedure that expedites the acquisition of pieces, spare parts, materials and equipment, with the purpose of augmenting availability of the collection vehicles.
- 3.1.29 He strategic inventory of pieces, spares parts and materials (stock room) can be determined
- 3.1.30 Inventory control (with computers)
- 3.1.31 Control and updating of the entity's property (with computers)
- 3.1.32 Procedures for the assessment and depreciation of assets
- 3.1.33 Designing of an accounting system in parallel with the existing one, which will allow the recording of expenses per functional activity (administrative, financial, commercial and operational) (such as the COSEPRE)
- 3.1.34 Budgetary control
- 3.1.35 Analysis, projections and financial reports

- 3.1.36 Updating and arrangement of the staff roll per actually filled in
- 3.1.37 Updated recording of the entity's servants (personal computerized card)
- 3.1.38 Classification of positions and salary and incentive policy
- 3.1.39 Recruiting policy
- 3.1.40 Policy on the compensatory time
- 3.1.41 Training throughout the levels to enhance capabilities and skills (drivers, collection workers, sweepers, mechanics, support staff)
- 3.1.42 Occupational health program (prevention of working accidents and professional diseases)
- 3.1.43 Degree of medical, odontological and psychosocial attention at Carrasquilla medical center.
- 3.1.44 Strengthening and equipping of the above clinic
- 3.1.45 Relations and joint programs with the Seguro Social (Social Security) fund
- 3.1.46 Prevention of psychosocial risks and enhancement of self-esteem
- 3.1.47 Management and organization of the Cleansing and Ornate official day in the district of Panama, with the participation of the organized community (Cleansing and Ornate Committees)
- 3.1.48 Diagnosis, assessment, conclusions and strategy to implement an IT (information technology) system for the entity.
- 3.1.49 Maintenance manual of the entity's buildings, facilities, equipment and furniture
- 3.1.50 Procedures to receive, register, deliver, archive and send mail
- 3.1.51 Rules and control on the use of the entity's vehicles
- 3.1.52 Selection, preparation and use of performance indicators
- 3.1.53 Calculation, evaluation, recording, forwarding and feedback on the information of performance indicators
- 3.1.54 Structure and contents of the reports on the management performance
- 3.1.55 Organization and maintenance of the management information flow

FOR THE COMMERCIALIZATION AREA

- 3.1.56 Household customer database
- 3.1.57 Analysis on the willingness to pay and the affordability to pay by lower income residential customers
- 3.1.58 Analysis and structuring of the household customer rate system, as per Law No. 41 dated August 1999 (with the participation from legal Counseling)
- 3.1.59 ICI customer database
- 3.1.60 Procedures for the geographical location of ICI customers on the digitalized chart of the Comptrollership General's Office of the Republic (includes the Global Positioning System/GIS)
- 3.1.61 Procedure to determine volumetric generation per ICI customer
- 3.1.62 Minimum volume range per ICI customer to be collected by the Special Collection Service vehicles
- 3.1.63 Features of the solid wastes to be managed by the Special Collection Service to ICI customers
- 3.1.64 Analysis of the volumetric rate for ICI customers (with participation from Legal Counseling)
- 3.1.65 Contract model for the Special Collection Service for ICI customers (with participation from Legal Counseling)
- 3.1.66 Pondering of the options to bill and collect the Special Collection Service for ICI customers
- 3.1.67 Requirements to be complied by private providers of the service to obtain the Operating Permit
- 3.1.68 Coverage and amount of the Environmental Liability to render private services.
- 3.1.69 Customer database of Cerro Patacón sanitary landfill
- 3.1.70 Analysis of the final disposal rate (with participation from Legal Counseling)
- 3.1.71 Customer database of special sweeping services

- 3.1.72 Analysis of the special sweeping rate (contract for each event)
- 3.1.73 Contract model for special sweeping (with participation from Legal Counseling)
- 3.1.74 Pondering of billing and collecting activities to the IDAAN and its related costs

CUSTOMER ATTENTION AREA

- 3.1.75 Strategies for the development of a permanent environmental education and community participation program (teaching centers, large generators of solid wastes, cleansing and ornate committees within the district)
- 3.1.76 Layout of didactic material for environmental education and community participation programs, with participation from the private sector
- 3.1.77 Creation of the minimization policy of solid wastes, with the participation from the private sector
- 3.1.78 Training programs for coaches on environmental education and community participation
- 3.1.79 New strategy for the organized community participation in cleaning operations
- 3.1.80 Procedures for the conduction of opinion surveys (on-the-spot and mobile)
- 3.1.81 Training manual for the service quality inspectors
- 3.1.82 Procedure manual for the enforcement of fines due to public infractions

Next, the specific objectives to be accomplished at the four functional operative areas are shown, in order to meet the DIMAUD's MISSION

2) Administration and Finance Area

Purchasing

- 1. The activities in this department are carried out as per the new purchase procedure, and support is provided to the maintenance administrative unit to raise the vehicle availability to 85% per year

Stock room

- 1. The stock room has the pieces, spare parts, materials and equipment for immediate delivery to the maintenance unit

Accounting and Finance

- 1. The accounting system parallel to the official system is implemented, and it will record the expenses per functional activity: administrative, financial, commercial and operational; it will also allow the preparation of performance indicators
- 2. The financial projections document is prepared per the investment needs of the Master Plan

Human Resources

The entity's staff roll is updated according to the positions actually filled in

- 2. A computerized registry of the data of each worker and their working record sheet is available
- 3. Classification of positions is established
- 4. The salary and incentive, recruitment and compensatory time policies have been created
- 5. The entity's occupational health program has been implemented, in coordination with the General Office of Occupational Health from the Social Security Fund
- 6. The operative staff has upgraded their skills and capabilities (drivers, collection workers, sweepers, mechanics, support personnel) by means of the training programs, thus increasing their personal productivity and reducing the working accidents and professional diseases

7. The policy for the preventive control of working diseases, attention to working accidents, psychosocial diseases, compensation to non-worked days and expansion and improvement in the attention of Carrasquilla medical center has been created, along with the Social Security Fund
8. The coverage and compensations of the professional insurance policy have been negotiated and upgraded
9. A retirement program in advance has been negotiated for those older-age workers and with physical disabilities as a result of working accidents and diseases, along with the Social Security Fund, that do not meet the required number of contributions to achieve retirement. The emotional and physical distress undergone by the cleansing worker has been taken into consideration
10. The entity's worker has a better self-esteem and the organizational environment has improved
11. Every (day/month), the Cleansing Worker Day is celebrated in the district of Panama, with a broad participation and collaboration from the public

Information Technology (IT)

1. The entity's IT network is functioning

Management Control

1. The General Management Office and the selected administrative units receive the reports on the performance of the service (performance indicators)
2. Information on the performance flows through the IT network
3. The management Control evaluates the performance, prepares reports, receives comments, provides feedback to the system with the suggestions to upgrade the entity's performance
4. The performance indicators and their acceptable ranges appear in table T1

3) Operations Area

Ordinary Collection

1. Performance of the ordinary collection has been improved to the acceptable ranges suggested by the CEPIS. Routes were improved by considering the performance arising from the pilot collection project and by using the new Route Improvement Procedure Manual
2. The cost per ton collected and transported to Cerro Patacón sanitary landfill is found within the acceptable range suggested by the CEPIS (efficient model company)

Special Collection Service for ICI Customers

1. Institutional, commercial and industrial customers keep their loyalty towards the DIMAUD by being satisfied with the provision of the special collection service
2. Customer will declare their concord with the enforcement of the volumetric rate as they deem it as fair, since they are billed according to what they actually discharge
3. The use of containers has eased the enforcement of the rate and the incidence of working accidents among the special collection workers has dropped
4. The cost per ton collected, transported and disposed of at Cerro Patacón sanitary landfill is found within the range expected

Maintenance

1. The maintenance administrative unit has been upgraded and strengthened, which turns out into an annual availability of collection vehicles of 85%
2. The existing physical facilities have been redesigned and adapted; the preventive and corrective maintenance equipment has been repaired

3. The vehicles undergo daily inspections prior to their departure; they receive preventive maintenance such as lubrication, greasing of the framework, greasing of the compaction device and checkup of operational controls (engine, transmission, brakes, electrical and hydraulic equipment), in accordance with the manufacturer's manual
4. The personnel improved their expertise and skills after receiving the training courses
5. The maintenance, collection and stock room units work in a coordinated and harmonic manner

Manual and mechanical sweeping

1. The manual and mechanical sweeping areas and routes have been outlined
2. The manual sweeping performance has been improved to the acceptable ranges suggested by the CEPIS.
3. The cost per kilometer swept is found within the acceptable range by the CEPIS
4. The mechanical sweeping is working at selected avenues
5. The amount of solid wastes swept per kilometer has dropped with the installation of pedestrian bins and at bus stops (urban furniture), as well as with the collaboration and education of passers-by
6. The Social Security Fund and the DIMAUD have agreed to create a procedure to allow retirement in advance of the older-aged and physically disabled workers

Transfer

This activity will be subject to the outcome of the corresponding feasibility study.

Final disposal

1. The entity records the entire information regarding the entrance of vehicles and the type and amount of wastes to be unloaded. This information will be transmitted via the entity's IT network
2. Only the solid wastes contemplated in the Cleansing Code will be received and disposed of
3. The operations will be carried out in accordance with the engineering design derived from the final use of the land, once it has been landfilled
4. The National Environment Authority has negotiated with the Municipality of Panama the use of a hill for the extraction of covering material. The municipality of Panama has presented the landscape project and the works program to create an ecological park at the landfilled property, which will also be incorporated to the Camino de Cruces park
5. The dumping of effluents from the leachate treatment facility meets regulations currently in force. During summer, such effluents are utilized for sprinkling irrigation of the ecological park, and re-injected again in the cells to unleash biogas production
6. The biogas treatment facility is generating 6 MW.
7. Stage I of the sanitary landfill has been reconditioned and is being visited by the public
8. No scavengers present at the sanitary landfill after the implementation of the social action program in cooperation with other governmental entities, private activities and NGOs
9. The new contract for the operation of Cerro Patacón sanitary landfill will last for six years. The contractor will strictly meet the terms of reference

4) Commercialization area

1. An updated and complete customer database is available of both residential and ICI customers, as well as of customers of Cerro Patacón sanitary landfill and special sweeping
2. ICI customers have been geographically located on the entity's digitalized chart
3. The Municipal Council approved the new rate system as set forth in the Cleansing Code and in Law dated August 1999. The cleansing rate for household customers responds to justice and fairness criteria. The rates for ICI customers is volumetric-wise. The rate for final disposal at Cerro Patacón sanitary landfill is based on the weight and type of solid wastes discharged.
4. The Special Collection Service has a particular acceptance by ICI customers (refer to Annex 2)
5. ICI customers are directly billed and collected by the Special Collection Service. Billing and collecting for residential customers will be conducted via the IDAAN
6. Private suppliers of ICI collection services have the operation permit issued by the Municipality, according to the Cleansing Code
7. Billing and collecting increases significantly and is associated with a better quality of the services provided and to customer attention

5) Customer Attention area

1. The 800ASEO service (Call Center) has its new office, with six telephone lines with the capacity to place make 400 daily calls to customers. It works as a support for several activities: attention to claims, marketing of services, communications linkage with the Cleansing and Ornate Committees, encouragement of community participation in cleaning operations, upgrading of the customers' database, opinion surveys, both on-the-spot and mobile.
2. A Cleansing and Ornate Committee at a Communal Board level has been organized within all the corregimientos. The Regional Network of Cleansing and Ornate has also been organized and is linked by means of the communications system of the 800ASEO service
3. The S.O.C.I.O administrative unit (community relations) participates in the duty of minimizing wastes. It supports the "Cumple tu papel"("perform your task") newspaper recycling program, promoting participation from teaching centers, both public and private, by means of consciousness talks with the help of the material provided by JICA. Likewise, it coordinates the collection of paper that is transported for free by the DIMAUD. Most of the district's teaching centers are participating in this program
4. The marketing program for the services being provided by the DIMAUD is being developed along with the Commercialization Department, specially towards ICI customers
5. Public mass media, public entities and private associations, higher teaching centers, professional colleges and other entities that shape opinions receive DIMAUD's newsletter and press releases for special events. The entity's webpage is visited by an important number of cybernauts, and by means of e-mails public opinions on the provision of the service and important suggestions to improve it are received
6. The duly trained service quality inspectors check on the quality of the service supplied by the entity in accordance with the provisions of the Cleansing Code, and inform the Customer Attention unit on the deficiencies found to act accordingly. Public infractions are sanctioned as per the Cleansing Code by following the preset procedures

Training

The staff of the Executing Unit is trained by means of External Technical Assistance

Material and equipment

1. Six (6) computers

Internal Relations

With the General Management Office; with all the entity's department chieftainships and administrative units
Municipality of Panama: Organization and Methods Unit

External Relations

MINSA, MIVI, MEF, MEDUC, ANAM, ARI, ACP, CGP

II. Department of Administration and Finance

Structure

Chieftainship; Accounting and Finance, Human Resources, IT, Administrative Systems and Management Control Units

Responsibilities

- Provision of human, material and financial resources
- Recording, handling and control of accounting and financial operations
- Human Resources management
- Operation and maintenance of the IT network
- Control over the use of the entity's goods
- Conservation of physical infrastructure
- Permanent surveillance over goods and property and protection of the staff
- Management Control of the entity's operations

Duty Assignments

Conduct the department's management

Internal Relations

With the General Management Office; all the departments' chieftainships, Customer Attention units and the Executing Unit

External Relations

MEF, MINGOB, CGR, Social Security Fund

II.1. ACCOUNTING AND FINANCE UNIT, Department of Administration and Finance

Structure

Chieftainship, Budget, Accounting, Finance and State Property sections

Responsibility

- To prepare, record and control the entity's financial, accounting and patrimonial activities

Duty Assignment

Chieftainship

1. To lead and coordinate the sections' activities
2. To prepare the draft budget and submit it to the General Management Office
3. To verify that the expenses applications have a budgetary content
4. To control the official accounting system for cost accounting
5. To control the cash flow
6. To review the financial statement reports
7. To supervise the status of state property
8. To prepare the accounting and financial documentation for fiscal control purposes

Budget section

1. Budget control (revenues, expenses and investments)

Accounting section

1. Accounting registry as per the procedures and practices set forth for local governments
2. An accounting system in parallel to the official system that records the expenditures per functional activity (cost accounting), in order to facilitate the preparation of performance indicators

Finance section

1. Report of financial statements
2. Financial forecasts as per the investment needs contained in the Master Plan.
3. Projected cash flows

State Property section

1. Updates inventory of the entity's state property
2. Control and updating of the entity's goods; re-appraisal and depreciation of assets; request of elimination of property before the MEF; flow of incoming and outgoing goods, in coordination with the stock room section

Training

1. Workshop on the Parallel Accounting System Associated with Cost Accounting (Accounting and Budget headcount)

Material and equipment

1. COSEPRE system

Internal Relations

With all the entity's administrative unitsMunicipality of Panama: Administrative Management Office, Financial Management Office

External Relations

MEF, CGR

II.4. PURCHASING UNIT, Department of Administration and Finance

Structure

Chieftainship

Responsibility

- Timely acquisition of goods and services

Duty Assignment

Chieftainship

1. Specifications in coordination with the requesting administrative unit,, and found availability with the budget section
2. Request and evaluation of quotations
3. Control of purchase orders
4. To program and hold public acts

Training

1. Workshop on the Purchasing and Stock Room Procedure (purchasing, stock room, sweeping, collection and maintenance staff)

Material and equipment

1. Purchasing and stock room manual

Internal Relations

With all the entity's administrative unitsMunicipality of Panama: Administrative Management Office, Financial Management Office

External Relations

Comptrollership General's Office of the Republic (CGR), supplying enterprises

II.3. STORE ROOM UNIT, Department of Administration and Finance

Structure

Chieftainship

Responsibility

- To receive, store and provide materials, tools and spare parts

Duty Assignments

Chieftainship

1. Prepares the annual needs program in coordination with the entity's chieftainships of the administrative units
2. Reception and storage of goods acquired.
3. Stock control and timely notice to the purchasing department to keep strategic stock

Training

1. Workshop on the Purchasing and Stock Room Procedure (Purchasing, Stock Room, Sweeping, Collection and Maintenance staff)

Material and equipment

1. Purchasing and Stock Room manual

Internal Relations

With all the entity's administrative units Municipality of Panama: Administrative Management Office, Financial Management Office

External Relations

MEF, Comptrollership General's Office of the Republic (CGR)

II.4. HUMAN RESOURCES UNIT, Department of Administration and Finance

Structure

Chieftainship, Operational Training, Occupational Health, Personnel Actions, Staff Roll and Social Work sections

Responsibility

- Human Resources management

Duty Assignments

Chieftainship

1. To lead and coordinate the sections' activities
2. To improve the workers' skills, capabilities and knowledge
3. To control the incidence of working accidents and professional diseases
4. To follow up the occupational health program
5. To control and approve the rotation of the staff's actions
6. To verify and approve the salary payment lists
7. To ensure the workers' social and working welfare and the organization's environment
8. To oversee the operations staff training and their relations and behavior with the customers and public in general

Operational Training Section

1. Training throughout the levels to improve the skills and capabilities

2. Upgrading of middle management and chieftainship knowledge
3. Training of the operational staff in their relations and behavior with the customers and public in general

Occupational Health section

1. To provide an integral attention in preventive and curative health, a hygienic and safe working environment to protect the worker
2. To develop occupational health programs; to oversee medical attention; to provide prevention programs; attention to laboratories and medication; control and elimination of working and psychosocial risks

Personnel Actions section

1. To formalize the workers' actions and keep registries updated
2. Formalities for appointments, holidays, permits, layoffs, assistance, licenses, punctuality, absences, contracts, professional risks, sickness, work letters, compensatory time, resignation

Staff Roll section

1. To prepare the salary payment lists
2. Salary payment lists, recording of checks reimbursable to National Treasury, control of wages, claims, discount for unjustified absences and tardiness, sworn statements of the number of workers

Social Work section

1. To contribute to social and working welfare of the workers by attending their problems and needs
2. To plan, supervise and assess the social assistance programs; attend social and economic needs at an individual, group, family and therapeutic level; preventive, educational and recreational psychosocial programs; guidance for alimony, family planning and ceasing of work; to encourage attitude, behavior and mentality changes and self-esteem enhancement; elaborate diagnosis; enhance social programs

Training

1. Operational training workshops for the workers (workers in general)
2. Occupational health course (DIMAUD/Social Security) (occupational health personnel and middle management and chieftainship staff of the Operations Department)
3. Occupational health/Social Security workshops (workers in general)
4. Workshop on Staff Registry (Personnel Actions and Staff Roll headcount)
5. Workshop on the Classification of Positions and Normalization of the Staff Roll (Department chieftainships and unit chiefs)
6. Workshops on Joint Actions between the DIMAUD and Social Security (Department chieftainships, unit chiefs and Social Security personnel)
7. Workshop on the Attention to Psychosocial Problems and Self-Esteem Enhancement (Social Work and Social Security headcount)

Material and equipment

1. Two (2) computers
2. Coaching handbook for Manual and Mechanical Sweeping Personnel
3. Training Manual of the Ordinary and Special Collection personnel
4. Training Manual of the Transfer and Final Disposal personnel
5. Training Manual of the Maintenance Staff

Internal Relations

With all the entity's administrative units, Municipality of Panama: Administrative Management Office, Social Management Office

External Relations

MINSA, MINTRA, CGR, Social Security Fund, INAFORH, APLAFA, ANSEC

II.5. INFORMATION TECHNOLOGY UNIT, Department of Administration and Finance

Structure

Chieftainship

Responsibility

- Operation and maintenance of the IT network

Duty Assignments

Chieftainship

1. To oversee the safety and functioning of automated information
2. To plan the needs; provide counseling; handle information; provide coaching

Training

1. Workshop on the Diagnosis, Evaluation and Strategies to Implement an IT System (Department chiefs, unit chieftainships)
2. Network management course (IT Systems and Cadastre staff)
3. Database Management Course (IT Systems, Cadastre, Human Resources, Collection, Sweeping, Transfer and Final Disposal headcount)
4. Geographical Information Systems Course (IT Systems and Cadastre personnel)

Material and equipment

1. Document on the diagnosis, evaluation and strategies to implement an IT System
2. Manual of the Course on Network Management
3. Database Course Manual
4. Geographical Information Systems Manual

Internal Relations

With all the administrative units (network functioning, technical assistance), Municipality of Panama: Information System

II.6. ADMINISTRATIVE SERVICES, Department of Administration and Finance

Structure

Chieftainship, Security and general Services sections

Responsibility

- Security, administrative support and maintenance in general

Duty Assignments

Chieftainship

1. To lead the sections' activities
2. To verify that the security system ensures the personal protection of the workers and the entity's property
3. To ensure that the unit's support services ease the entity's administrative works
4. To maintain the facilities in their best functioning capacity
5. To control and approve the use of support vehicles of the entity

Security section

1. Permanent surveillance of the entity's goods and property
2. Protection to the staff

General Services section

1. Archive and mail: receive, record, distribute, deliver and maintain mail filing and documentation and reproduction of documents
2. Maintenance of infrastructure: preventive maintenance and repairs to the facilities, furniture and equipment; cleansing and cleanliness
3. Control in the use of the entity's support vehicles (with the exception of collection vehicles)

Training

1. workshop on Personnel Safety and the Entity's Goods (Department chiefs and unit chieftainships)
2. Workshop on the maintenance to Facilities (General Services personnel)

Material and equipment

1. DIMAUD's Security System Manual
2. Maintenance Manual of the Facilities

Internal Relations

In Services with all the administrative units; In Safety with the sweeping, collection, transfer and final disposal units; and with the State Property section, Municipality of Panama: Services Management Office

External Relations

With public service companies (IDAAN, EDEMET-EDECHI, CABLE & WIRELESS). MINGOB, National Police, Fire Department.

II.7. MANAGEMENT CONTROL UNIT, Department of Administration and

Finance

This is a new administrative unit with the purpose of controlling and assessing the entity's management and performance

Structure

Chieftainship; Performance Indicators and Management Evaluation sections, and Information Flow

Responsibility

- To control and evaluate the entity's operations

Duty Assignments

Chieftainship

1. To lead and coordinate the sections' activities
2. To verify the quality of the information submitted by the administrative units
3. To supervise the obtaining of performance indicators
4. To lead the management assessment
5. To ensure the information flow

Performance Indicators and Management Evaluation

1. To receive the basic information to obtain performance indicators
2. To calculate, assess and record the indicator results on a daily basis
3. To prepare and present the status reports at a monthly meeting of top managerial levels
4. To adjust the performance indicators in coordination with the chieftainships of the administrative units

Information flow

1. To distribute the indicator information among the hierarchical levels of the selected administrative units
2. To gather the opinion and suggestions of hierarchical levels
3. To provide feedback for the managerial information system

Training

- (ア) Workshop on the management of Performance Indicators (Department chiefs, units chieftainships, other staff associated to preparing the performance information, IT Systems staff)
- (イ) Workshop on the Maintenance of the Information Flow (Management Control and IT Systems personnel)

Material and equipment

1. Performance Indicator Management Handbook

Internal Relations

With the selected administrative units

III. OPERATIONS DEPARTMENT

Structure

This is a new department that integrates the provision of sweeping, ordinary collection, special ICI collection, transfer, final disposal and maintenance operational services.

It creates an enhanced synergy of the operations, improves the integral quality of cleanliness, cuts down total costs and creates a positive organizational environment.

Chieftainship: Must be necessarily in charge of an Engineering professor with experience in the conduction of solid waste management services.

Sweeping and cleaning, ordinary collection, special ICI collection, transfer and final disposal and maintenance units

Responsibility

- To provide the integrated services being rendered by the DIMAUD to its customers and the community in the district of Panama

Duty Assignment

Chieftainship

1. To lead the provision of the services with the procedures of an efficient model company: sweeping and cleaning of public roads and areas, ordinary collection, special ICI collection, transfer and final disposal and maintenance
2. To maintain coordination and completeness among the department units for the provision of the services
3. To verify and assess the unit's performance and prepare the indicators
4. To control quality and cost of the services provided
5. To make annual projections on the human resources needs (drivers, collection workers, mechanics, supervisors) and materials (vehicles, pieces and spare parts, fuel, lubricants, tires, etc.) and inform of these on time to the Administration and Finance Department
6. To coordinate the coverage expansion and enhancement and the quality of the services along with the Planning and Development Unit
7. To ensure the compliance with the entity's objectives and goals

Training

1. Course on the Management of Solid Wastes (professional and technical staff of the Operations Department)
2. Workshop on the Integration and Completeness of the Sweeping, Collection, Transfer, Final Disposal and Maintenance Services (professional and technical staff of the Operations Department)
3. Workshop on Costs Estimates of the Operational Services Supplied (professional and technical staff of the Operations Department and Administration and Finance Department)
4. Workshop on the Quality of the Service (professional and technical staff of the Operations, Administration and Finance and Commercialization Departments)

Material and equipment

1. Course Manual on Solid Waste Management
2. Cost Estimate Manual of the Operational Services Supplied

Internal Relations

With the General Management Office; department chieftainships, Municipality of Panama:
General Secretaryship

External Relations

MINSA, ANAM, MOP

III.1. SWEEPING UNIT, Operations Department

Structure

Chieftainship; Sweeping and Manual Cleaning sections, morning and night shift, Mechanical Sweeping, and Special Cleaning Services Hired

Responsibility

- To maintain cleanliness of public roads and areas

Duty Assignment

Chieftainship

1. To lead the provision of the sweeping and manual cleaning services in morning and night shifts, mechanical sweeping and special cleaning services hired
2. To maintain completeness among the operations of the unit sections
3. To coordinate the installation of pedestrian bins regarded within the Urban Furniture program
4. To maintain operational coordination with the Ordinary Collection, Special ICI Collection, Stock Room and Customer Attention units
5. To control the performance of the operations in accordance with the preset indicators
6. To verify the quality of the service

Manual Sweeping section, morning and night shift

1. To verify that the personnel has their uniforms, working material (bags, brooms), tools, protection equipment and their working cart in working conditions
2. To conduct cleaning and sweeping of public roads and areas assigned to them
 - 2.1 Morning shift sweeping section
 - 2.2 Night shift sweeping section
3. Supervision of duties

Mechanical sweeping section

1. To verify that the personnel is furnished with their corresponding uniforms, material (bags, brooms), tools, special protection equipment and their cart in working conditions
2. To conduct mechanical sweeping on the selected avenues
3. Supervision of the duties

4. To ensure availability of mechanical sweepers in coordination with the Maintenance Unit

Special Cleaning Services Hired section

1. To attend the cleaning services hired with the entity for special events and public performances, as well as private parking areas

Training

1. Course on the Design and Improvement of Manual and Mechanical Sweeping Routes (professional and technical sweeping staff)
2. Workshop on the Enhancement of Manual and Mechanical Sweeping Service (professional and technical sweeping headcount)

Material and equipment

1. Design and Improvement of Manual and Mechanical Sweeping Routes Handbook

Internal Relations

Collection units, Human Resources

III.2. COLLECTION UNIT, Operations Department

Structure

Chieftainship; Zone A Morning and Night shift Ordinary Collection, Zone B Morning and Night shift Ordinary Collection, Special Household Service, Immediate Attention and Cleaning Operations

Responsibility

- Collection and haulage of solid wastes

Duty Assignments

Chieftainship

1. To lead the provision of morning and night ordinary collection, immediate attention to the complaints reported by means of the 800ASEO service, as well as to provide support to the cleaning operations
2. To maintain completeness among the unit's section operations
3. To maintain operational coordination with the Sweeping and Cleaning, Special ICI Collection, Transfer and Final Disposal and Customer Attention units
4. To control the operations' performance in accordance with the preset indicators
5. To verify the quality of the service

Zone A Morning and Night shift Ordinary Collection section

1. To provide the ordinary morning and night shift collection service at the following corregimientos: Ancón, Bethania, Curundú, Chorrillo, San Felipe, Bella Vista, Calidonia and Santa Ana
2. Supervision of the duties
3. To ensure the availability of the collection vehicles in coordination with the Maintenance Unit and the cleaning tools

4. To verify that the personnel has their uniforms, the required protection material and equipment and the appropriate presence

Zone B Morning and Night shift Ordinary Collection section

1. To provide the ordinary morning and night shift collection service at the following corregimientos: Juan Díaz, Pedregal, Tocúmen, Pacora, San Martín, Las Cumbres, Chilibre, Río Abajo, Pueblo Nuevo, San Francisco and Parque Lefevre
2. Supervision of the duties
3. To ensure the availability of the collection vehicles in coordination with the Maintenance Unit and the cleaning tools
4. To verify that the personnel has their uniforms, the required protection material and equipment and the appropriate presence

Special Household Service section

1. To provide the residential customers with a special service required by the management of solid wastes not being contemplated in the ordinary service, as set forth in the Cleansing Code
2. To forward the data requesting the special household service to the Commercialization Department for the respective quotation
3. The service will be rendered after receiving the order from the Commercialization Department
4. So supervise the duties and the quality of the service being rendered
5. To inform the Commercialization Department of the provision of the service

Immediate Attention section

1. To attend and solve the claims on deficiencies of the collection service reported via the 800ASEO service
2. To coordinate its operational activities with those of the ordinary collection sections
3. To maintain a close contact with the 800ASEO service

Cleaning Operations section

1. To coordinate the programmed cleaning operations with the Customer Attention unit (S.O.C.I.O section), in order to achieve community participation
2. To support and participate in the cleaning operations, in coordination with the Ordinary Collection, Sweeping and Cleaning, Transfer and Final Disposal units

Training

1. Course on Design and Improvement of Ordinary and Special Collection Routes
2. 2. Workshop on the Improvement of the Collection Service (professional and technical Collection personnel)

Material and equipment

1. Course Handbook on Design and Improvement of Ordinary and Special Collection Routes

Internal Relations

Sweeping, Special ICI Collection, Transfer and Final Disposal, Maintenance, Human Resources and Cadastre units

III.3. Institutional Commercial Industry (ICI) COLLECTION UNIT, Operation

Department

Structure

Chieftainship; Collection and Supervision sections

Responsibility

- Special collection to ICI customers and haulage

Duty Assignments

Chieftainship

1. To lead the provision of the special ICI collection service
2. To maintain coordination with Sweeping and Cleaning, Ordinary Collection, Transfer and Final Disposal, Customer Attention units and with the Commercialization Department
3. To effectively coordinate with the Generation Estimate section of the Cadastre unit from the Commercialization Department
4. To control the operations' performance in accordance with the preset indicators
5. To verify the quality of the service

Collection

1. To render the special collection to institutional, commercial and industrial customers (ICI)
2. To ensure the availability of the collection vehicles in coordination with the Maintenance unit, as well as the cleaning tools
3. To ensure the availability of containers for these customers in coordination with the Stock Room unit and the Commercialization Department
4. To verify that the staff is furnished with their uniforms, the required protection material and equipment and the appropriate presence

Supervision

1. To verify that the programmed routes have been attended and that the service has been effectively provided to every customer of each route
2. To verify the quality of the service
3. To attend complaints, suggestions and concerns of the customers while en route
4. To present a daily report to the unit chieftainship

Training

1. Workshop on the Design of Special ICI Collection Routes (professional and technical staff of this unit and of the Ordinary Collection unit)

Material and equipment

1. Two (2) computers

Internal Relations

With the Sweeping, Ordinary Collection, Transfer and Final Disposal, Maintenance, Human Resources and Cadastre units

III.4. TRANSFER AND FINAL DISPOSAL UNIT, Operations Department

Structure

Chieftainship; Transfer and Final Disposal sections

Responsibility

- To run the transfer station(s) and Cerro Patacón sanitary landfill

Duty Assignments

Chieftainship

1. To lead the provision of the transfer and final disposal services
2. To maintain coordination with unit's section operations
3. To maintain coordination with the Ordinary Collection, Special ICI Collection and Maintenance units
4. To control the operations' performance in accordance with preset indicators
5. To supervise the strict compliance with the operating contract of the sanitary landfill
6. To comply with the engineering project activities of the sanitary landfill
7. To verify the quality of the services

Transfer section

1. To render the transfer service of solid wastes to Cerro Patacón sanitary landfill
2. To maintain operational coordination with the Ordinary Collection, Special ICI Collection and Final Disposal units
3. To control the operations' performance in accordance with preset indicators
4. To verify the quality of the service

Final Disposal section

1. To provide the final disposal service at Cerro Patacón sanitary landfill in accordance with the engineering project and with the preset technical procedures and standards
2. To supervise the contractor's operational performance, so that they adjust to what has been agreed in the contract and in the technical specifications

Training

1. Workshop on the Location of Transfer Stations (transfer and final disposal staff)
2. Workshop on the Management of Cerro Patacón Sanitary Landfill (transfer and final disposal, ordinary collection and Special ICI collection personnel)

Material and equipment

1. Draft Landscape Design of Cerro Patacón Sanitary Landfill
2. Engineering Project of Cerro Patacón Sanitary Landfill
3. Procedure Manual for Solid Waste Control Entering Cerro Patacón Sanitary Landfill, as per the Cleansing Code
4. Procedure Manual for the Operation of Cerro Patacón Sanitary Landfill

Internal Relations

Ordinary Collection, Special ICI Collection, Maintenance, Human Resources, Cadastre, Billing and Collecting units

III.5. MAINTENANCE UNIT, Operations Department

Structure

Chieftainship; Preventive Maintenance, Automobile Mechanics and Other Maintenance Services sections

Responsibility

- To ensure the availability of collection vehicles and backup equipment

Duty Assignments

Chieftainship

1. To program the works as per the needs of the Ordinary Collection and Special ICI Collection units
2. To lead and control the duties scheduled
3. To maintain operational coordination with the Stock Room, Ordinary Collection, Special ICI Collection, Sweeping and Cleaning and Transfer and Final Disposal units
4. To control the use of the equipment, materials, pieces, spare parts, tires, fuel and lubricants
5. To verify the quality of the service

Preventive Maintenance section

1. To provide preventive maintenance to vehicles, according to the scheduled timetable recommended by the manufacturer and to the established procedures (lubrication, greasing, lights, brakes, steering gear, suspension, tires, electrical system, hydraulic system)
2. To conserve vehicles in the best working and visual conditions
3. To request and make sure that all the means to comply with the duties are available on time

Automobile Mechanics section

1. To verify the damages and breakdowns reported by the drivers
2. To repair mechanical failures
3. To request and make sure that all the means to comply with the duties are available on time

Other Maintenance Services section

1. To maintain vehicles in optimal working conditions
2. To make pieces with a milling device, rectifications, welding, electricity jobs, regrooving and change of tires, change of batteries, greasing, tinsmith and paint
3. To build containers for the storage of solid wastes and other elements for collection, sweeping and cleaning

Training

1. Maintenance Course on Collection Vehicles (Maintenance, Ordinary Collection and Special ICI Collection staff, with participation from technicians of the vehicle selling company)

Material and equipment

1. Course Handbook on the Maintenance of Collection Vehicles

Internal Relations

With Sweeping, Ordinary Collection, Social ICI Collection, Transfer and Final Disposal, Human Resources, Purchasing and Stock Room units

IV. COMMERCIALIZATION DEPARTMENT

Structure

Chieftainship; Cadastre, Billing and Collecting sections

Responsibility

- To ensure that the revenues for the services rendered are collected

Duty Assignments

Chieftainship

1. To lead and control the duties of the units
2. To define the marketing, billing and collecting policies along with the General Management Office
3. To keep the customer database updated in coordination with the IDAAN
4. To conduct billing according to the official rates and to the actual services provided
5. To collect the bills issued and delivered
6. To keep operational coordination with Department of Administration and Finance (Accounting and Finance and Management Control units), Operations Department (Sweeping and Cleaning, Ordinary Collection, Special ICI Collection, Transfer and Final Disposal units) and the Customer Attention Unit (Public Relations and Marketing and Service Quality sections and the 800ASEO service)
7. To verify the quality of the service

Training

1. Workshop on the Definition of Marketing, Billing and Collecting Policies (personnel from the Commercialization, Administration and Finance and Operations Department and Customer Attention unit)

Material and equipment

1. Marketing, Billing and Collecting Policies Document

Internal Relations

With the General Management Office; department chieftainships

External Relations

MEF, MINSA, ANAM, CGR, IDAAN, private company associations All household and ICI customers

IV.1. CADASTRE UNIT, Commercialization Department

Structure

Chieftainship; Customer Database and Generation Estimate sections

Responsibility

- To keep the customers' database updated

Duty Assignment

Chieftainship

1. To lead the unit duties
2. To verify that the customer data are updated
3. To forward the information on the variations found at the customers' database to the IDAAN
4. To verify that the classification of residential customers and their respective billing are adequate
5. To verify that the volume of solid wastes from ICI customers is correct
6. To keep operational coordination with the Special ICI Collection Unit

Customer Database section

1. To keep the customers' database updated

Generation Estimate section

1. To classify household customer according to current rate system in force
2. To calculate the volume generated per each ICI customer through a direct evaluation, in order to choose the type of container
3. To provide assistance to customers on generation issues
4. To forward this information to the Billing unit

Internal Relations

Ordinary Collection, Special ICI Collection, Transfer and Final Disposal Municipality of Panama: Administrative Management Office (Patents)

External Relations

MINSA, MEF, CGR. All household and ICI customers

IV.2. BILLING UNIT, Commercialization Department

Structure

Chieftainship; Billing section

Responsibility

- To issue and deliver the bills for the services provided

Duties

Chieftainship

1. To lead the section's job
2. To verify that the billing process is conducted as per the rates currently in force and to the actual services rendered
3. To send the billing to the IDAAN on a monthly basis
4. To make sure that the billing process is conducted expeditiously and on time to the customer
5. To verify the quality of the service

Billing section

1. To issue the bills for the following services on time:
 - 1.1 Ordinary collection service
 - 1.2 Special residential service
 - 1.3 Special ICI collection service
 - 1.4 Sweeping and cleaning by means of a contract
 - 1.5 Transfer service
 - 1.6 Final disposal service
2. To deliver the bills of the services rendered on time

Internal Relations

Sweeping, Ordinary Collection, Special ICI Collection, Transfer and Final Disposal units,
Municipality of Panama: Financial Management Office

External Relations

All household, eventual and ICI customers

IV.3. COLLECTING UNIT, Commercialization Department

Structure

Chieftainship; Collecting and Claims sections

Responsibilities

- To charge the customers for the services rendered

Duty Assignments

Chieftainship

1. To lead the sections' job
2. To verify that collecting is carried out within reasonable timetables
3. To control the results of the collecting endowed to third parties with the IDAAN
4. To control the credit statements
5. To maintain registries of delay in payment
6. To follow up the claim process
7. To oversee the quality of the service

Collecting section

1. To carry out the collecting process for the services provided
2. To verify the results of the collecting process along with the IDAAN
3. To prepare credit statements
4. To keep registries of delay in payment updated

Claims section

1. To attend customer complaints on the billing process
2. To conduct investigations and report the outcome to the customer

Internal Relations

1. Transfer and Final Disposal Unit
2. Municipality of Panama: Financial Management Office

External Relations

All household, eventual, ICI customers

c. Human Resource Development

During the Study, various human resource developments have been carried out through joint formulation of the M/P, implementation of the Pilot Projects, periodical counterpart meetings, technical transfer seminars, etc.

Besides the activities above, the trainings necessary for each department and unit are provided in the previous section through consultation with the Panamanian side.

d. Management Development

The entity's management is controlled and evaluated through the use of performance indicators. The purpose is to have a decision-making tool that allows for a continuous improvement. These indicators are obtained by consolidating the information derived from the execution of activities of selected units and the costs incurred. Those are categorized as follows.

- Indicator flow of operational indicators
- Information flow of financial indicators

- Information flow of cost indicators
- Information flow of accident indicators while at work
- Information flow of commercial indicators
- Information flow of service quality indicators

The procedure to be utilized is the following:

1. The operational units selected and the Accounting and Finance unit (expenses) prepare the information on the corresponding performance and such is sent to the Management Control Unit (Input Flow)
2. The Management Control Unit consolidates this data and generates the performance indicators and assesses them versus the preset recommendable ranges and elaborates the report.
3. The Management Control Unit forwards the performance indicators to the selected units (Output Flow)
4. This information system feedbacks with the remarks and suggestions from the units.

The Input and Output information flow in the organic structure appears in Figure 10-15 and Figure 10-16.

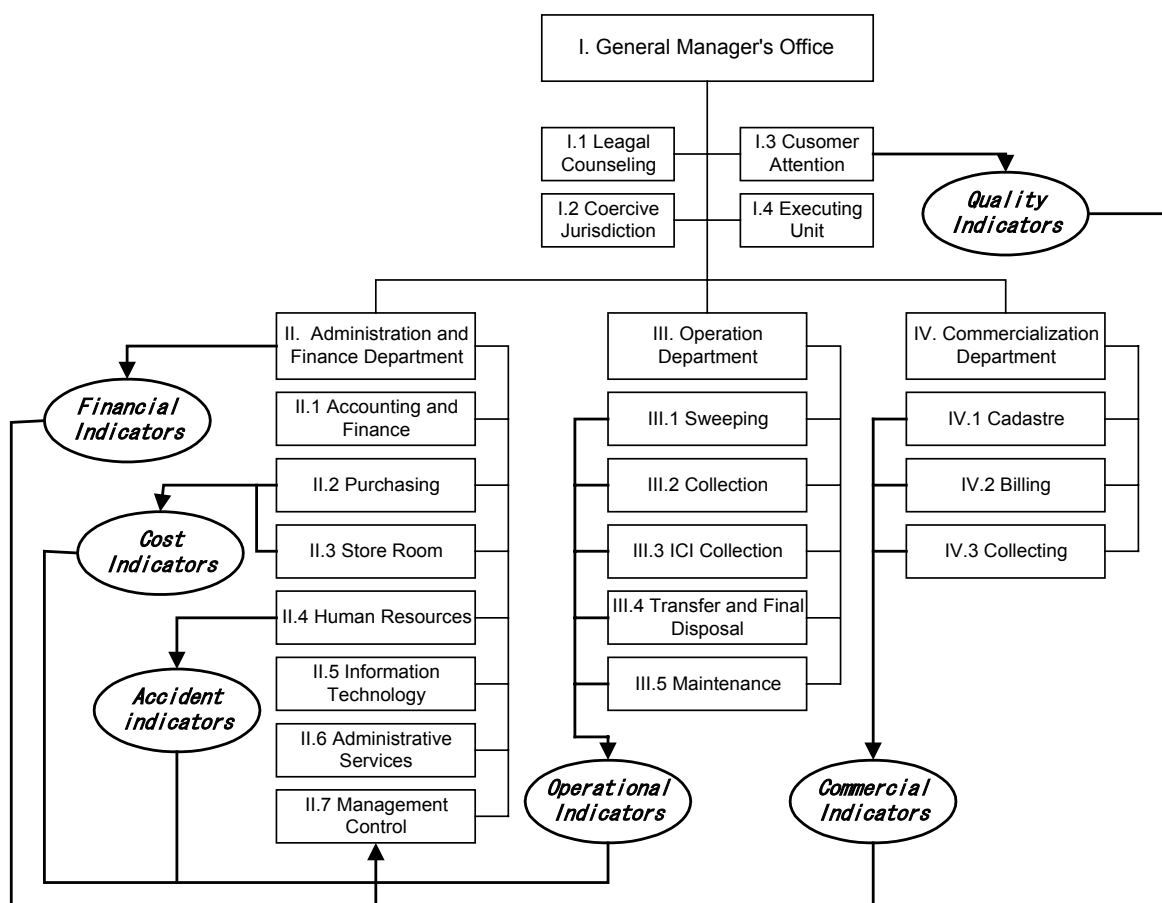


Figure 10-15: Information Flow in DIMAUD (Input Flow)

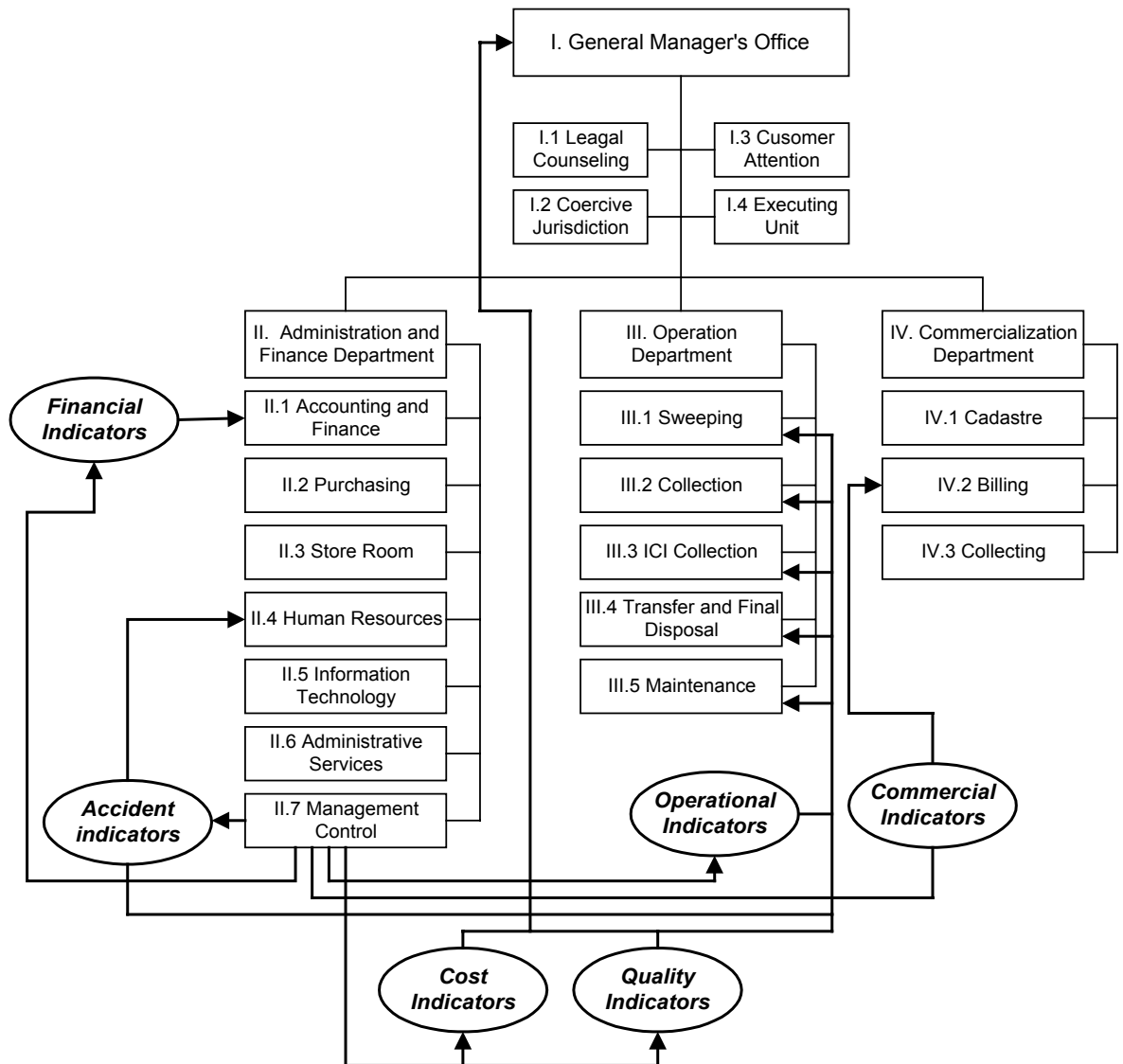


Figure 10-16: Information Flow in DIMAUD (Output Flow)

e. Financial Development

In order to carry out sound and sustainable operation of SWM, securing an adequate financial base and controlling income and expenditure are crucial. This issue is described in the section of “Financial System.”

10.2.5 Financial and Accounting System

In order to implement sound and sustainable operation of SWM, two issues from a financial view point are important and those should be always kept in mind at the top management level and sections concerned. Those two issues are i) financial source securing and budgeting (finance) and ii) to control flow of income and expenditure (accounting).

a. Finance

Budgeting is a kind of results of decision-making. Therefore, this section focuses on measures to secure financial sources. The M/P recommends the following.

- Special Collection Service for Institution, Commerce and Industry (ICI)
- Waste Collection Efficiency Improvement
- Fee Collection Improvement by the Commercial Department
- Simplifying ICI Tariff

a.1. Special Collection Service for Institution, Commerce and Industry (ICI)

Background

The economic activities which are being conducted in the Panama District involve 1/3 of the Economically Active Population (EAP) and represent 60% of the Gross Domestic Product (GDP) in the country. This situation leads to the generation of large quantities of solid wastes of all kind.

In addition to the population who are permanent residents, thousand of persons come in to the District to take care of their occupations or do diverse types of errands. Their activities contribute to increase the waste generation originated by institutions, commerce, and industries (ICI).

Currently, an average of 965 ton/day are being collected from the Panama District. Then, 515 ton/day is considered as ICIs' waste out of the 965 ton/day. Table 10-32 and (1) include common wastes, (2) Large Bulky Waste, (3) Small Bulky Waste, (4) Construction Waste

Table 10-33 presents the current waste amount in transport actors.

Table 10-32: Present Collected Solid Waste Amount from Panama District (Over All)

unit: ton/day

Type	DIMAUD	Direct Transport				Total	% of total
		Junta Comunal	Institution	Private Collector	Private Company		
Domestic	373.9	10.1	7.2	0.2	34.0	425.4	44.0
Commercial	160.5			24.7	56.1	241.3	25.0
Industrial	133.8					133.8	13.9
Market	23.4					23.4	2.0
Street Sweeping	8.4					8.4	1.0
Hospital (1)	20.1					20.1	2.0
Chatarra (2)	0.7	0.1	0.2		1.9	2.9	0.3
Despojos (3)	8.8					8.8	1.0
Caliche (4)	1.1	10.1	5.5	22.7	57.0	96.4	10.0
Sewerage				4.7		4.7	0.5
Total	730.7	20.3	12.8	52.2	148.9	965.0	100.00
% total	75.7	2.1	1.3	5.4	15.4	100.00	

(1) include common wastes, (2) Large Bulky Waste, (3) Small Bulky Waste, (4) Construction Waste

Table 10-33: Present Collected Solid Waste Amount from Panama District (ICI)

unit: ton/day

Type	DIMAUD	Junta Communal	Institution	Private Collector	Private Company	Total	% of total
Institutional							
Government	(1)	-	-			-	
Hospital	20.1	-	-			20.1	3.9
Commercial							
Commerce	160.5	-	-	24.7	56.1	241.3	46.9
Markets	23.4	-	-	-	-	23.4	4.5
Industrial							
Manufacturing	133.8	-	-	-	-	133.8	26.0
Construction	1.1	10.1	-	22.7	57.0	96.4	18.7
Total	338.9	10.1	5.5	47.4	113.1	515.0	-
% of total	65.8	2.0	1.0	9.2	22.0	-	100.0

(1) Billing by DIMAUD to the government entities is through a set amount per entity.

ICI Market

Currently, DIMAUD serves approximately about 70% of the ICI market. This figure includes government entities which are billed a set amount (around 5% of the total ICI waste).

Several private companies haul their wastes by their own means (22% of the total) Around 50% correspond to waste derived from construction activities (57.0 tons/day). Under this situation, DIMAUD could offer them special services and be able to expand its market to an additional 10% of the total. This could conduct to establish a program to recover construction materials as it has been established in other countries.

Consequently, DIMAUD will be able to attend 70% of the ICI market based on volume generation and would preserve the current fee of U\$ 14.30 per cubic yard.

Strategy to Establish a new Special Collection Service for ICI Waste

In order to provide this new and needed service, the following activities have been proposed:

1. Updating the ICI clients database

The General Controller of the Republic has a database which consists of a Directory of Companies (year 2002). This directory should be compared with clients' database of DIMAUD in order to have an improved and updated database.

2. Geographical location of ICI clients

The General Controller of the Republic has provided to the Panama Municipality a digitalized copy of the District which is updated until October 2002.

This map has limits of the District, corregimientos and barrios, streets, household structures, institutions, commerce, industries and others, such as, hydrographic data.

With this information, it is possible to identify geographically ICI clients, areas, and collection routes for the new service. Additionally, the map can be used to improve the digitalized systems of other services provided by DIMAUD, such as, ordinary collection, street sweeping and commercial activities.

3. Definition of Solid Waste Volume by Client

To initiate immediately a sampling program of solid waste generation based on volume. Generation categories can be established in accordance to their economic activities and project them to the totality of the District. This information is extremely important and the WACS conducted by the JICA Study Team could be taken as reference.

With this information, collection routes can be established and the cost of the service can be evaluated.

4. Design of Areas and Collection Routes

It is recommended that this service begins in Bethania Corregimiento. By using the digitalized map, location of ICI clients and information related to the waste generation by the clients, the design of the areas of service and collection route can initiate.

DIMAUD should proceed with the acquisition of a defined number of standard containers which are suitable for this type of service; subsequently, they could be distributed to the clients on a rental basis. Bethania experience could lead to suggest adjustments which should be conducted in order to expand this service to the rest of the District.

Operation manuals and proceedings can be elaborated simultaneously.

5. Promoting the new service

DIMAUD will design a marketing program for the new service. This program begins with an important advantage: most of the clients are already being serviced by DIMAUD itself. Consequently, this program is not about accessing a new market and making a breakthrough with the clients; the message would be that a new service is being offered with a better quality.

6. Characteristics which will differentiate the new service.

In order to attain the change and loyalty of the clients, it is required that:

- The quality and organization of the service should be equal to that one provided by an efficient model company.
- An independent structure from the ordinary collection service should be preserved.
- The personnel, vehicles and support equipment should of exclusive used of the special service.
- Specialized training of the operative and administrative personnel should be provided.
- Collection frequency and schedule should be followed strictly.
- Personalized attention should be paid to the client.
- The service should be provided through a contract.

a.2. Waste Collection Efficiency Improvement

The collection Improvement Pilot Project estimated cost reduction in this activity at 21%. On the other hand, the 2001 financial report indicated collection service to comprise 46% of DIMAUD cost. Then, 21% of 46%, or 9.66% of const reduction as a whole can be attained through expansion of the manner employed in the pilot project to other areas.

a.3. Fee Collection Improvement by the Commercial Department

The purpose is to expand the income base by exploiting the potential open to DIMAUD through own collection, or a specialized billing/collection firm. Then, DIMAUD can be more financially independent of the IDAAN collection. The target customers are

industrial-commercial, which are fewer in number but the source of large potential income, not fully exploited at present.

As industrial-commercial customers are fewer in number, it will be relatively easier to prepare an updated customer list or database as the essential initial step. Implementation can proceed gradually, as database becomes available.

Preparation of industrial-commercial database is planned for 2003 and 2004, using different sources as census, patent or public utilities customer list. Accordingly, implementation is planned for 2004 and 2005, depending on database completion.

Service users may pay at 8 DIMAUD offices or in banks, if banks can be convinced to provide the collection service despite the small number of customers. If collection agreements can be reached with the Treasury Office of the Municipality and Corregimientos, collection rate undoubtedly will improve.

Goal of collection improvement is set at 15% of DIMAUD income in 2004, and at least 30% of income after 2005.

a.4. Simplifying ICI Tariff

The present tariff structure is composed of 11 residential categories with 8 fixed tariffs; 113 types of economic activities with 26 tariffs; and 8 categories of unit-based tariffs. DIMAUD considers that the tariff rates for residential customers are relatively simple and have been accepted by service users.

However, the classification by economic activity is too complex and difficult to apply. Accordingly, the purpose is to introduce the volume-based tariff structure for ICI. Charges per volume should be estimated on the basis of cost of service. In addition, POS results will be checked to explore the possibility of setting the volume-based tariff at a level that can function as cross-subsidy for the 25,000 hardly-paying DIMAUD customers in marginal areas.

The plan is to define the volume-based tariff structure for ICI in 2002. Then, 2003 will be set aside for public information campaign of the new tariff structure. Implementation is planned for 2004 and 2005, depending on database completion.

The goal of tariff simplification, in combination with ICI database preparation and direct collection by DIMAUD, is to secure 15% of DIMAUD income in 2004, and at least 30% of income after 2005.

b. Accounting

b.1. Introduction of COSEPRE Accounting System

The purpose of introducing the COSEPRE (Costos de Servicios Prestados) designed by CEPIS is two-fold: to facilitate generation of real cost by technical component (collection, transport, final disposal), and to facilitate generation of data needed to calculate quantified performance indicators.

Because the present accounting system of DIMAUD is required as the government accounting, the COSEPRE accounting system might have to be implemented as a parallel accounting. This implies the need for additional computing equipment and other resources.

The plan is to conduct preliminary test in 2002, and if everything goes well, implementation is planned for 2003.

b.2. Introduction of Quantified Performance Indicators

Solid waste disposal services are sometimes provided with limitations, thereby permitting fulfillment of the most urgent activities on a day by day basis, without provisions to ensure service viability over the long run. Under these circumstances, the outcome may be deterioration of the service quality, cost increases, and inability to set aside reserves to meet long-term obligations. Then, management efforts are directed toward crisis management, rather than service management.

Income from service charges of solid waste disposal should ideally be reserved for specifically financing the solid waste disposal services. This concept is a crucial element in improving the autonomy of DIMAUD. Improvements in the operation and in the financial management of solid waste disposal can produce important savings, while maintaining or improving the quality of service. And improved finances may permit DIMAUD to have the institutional autonomy and generate internal reserves needed to sustain operations over the long run.

Management of solid wastes as an integrated whole requires providing the service at a price that users can find reasonable and satisfactory for the service level, while generating enough income to provide the service over the long run. The cost of solid waste disposal services should be reasonable for the society as a whole and for individual users. The quality and coverage of the service can be improved with a combination of lower costs (do more for less) and an increase in income. Quality service at lower costs can be attained by computing quantified indicators, which should be constantly monitored and improved. These

performance indicators, in turn, depend on the existence of appropriate operation and financial data, which implies the need for a suitable accounting system.

There is consensus about the need to monitor and improve MSWM with the use of quantified indicators, which summarize operation and financial performance.

The purpose of introducing quantified performance indicators is to set up a tool for permanent monitoring and improvement. The expected end result is cost reduction through improvements in the operation and in the financial management.

The quantified performance indicators will be the responsibility of a “Management Control Office”, in close cooperation with the other offices. The “Management Control Office” will receive the input data from different DIMAUD offices, calculate the indicators and promptly distribute the results to the top management and the concerned offices that provided the input data. The types of input data will vary according to the specific task of each office, and can include physical quantities, cost data, billing/collection data, absentee and accident data.

The plan is to conduct preliminary test in 2002, and if everything goes well, implementation is planned for 2003.

Table 10-34: Suggested Quantified Indicators

Type of Indicator	Quantified Indicator
General	Number of DIMAUD employees/1000 population
	Number of sweeper/1000 population
	Kg waste generated/person/day
	Population/collection vehicles
	Number of collection worker/1000 population
Operation	Km/sweeper/day
	Sq. meter/sweeper/day
	Number of bags/sweeper/day
	Number of bags/km
	Number of brooms/km
	Km/hours of wages paid
Collection	Ton/hour collection
	Ton/vehicle/day
	Ton/trip
	Ton/worker/day
	Worker/vehicle/day
	Ton collected/hours of wages paid
Maintenance	Vehicles in working condition
	Fuel efficiency
	Tire efficiency
	Vehicles availability
Final Disposal	Ton monthly waste/hours monthly machinery
Liquidity	Current ratio
	Quick ratio
Management	Cost/income ratio
	Receivables turnover ratio
Commercial	Billing/collection ratio
Cost	Cost/km sweeping
	Cost/ton collected
	Cost/ton final disposal
Absentee	Absent days x 100/ workable days

Source: Indicadores para el Gerenciamiento del Servicio de Limpieza Publica, OPS/CEPIS/PUB/01.72, Lima, 2001

10.2.6 Social System (Environment Education and Community Participation)

The environmental education is an important component in SWM. An inappropriate SWM in densely populated area has serious impacts on health of the inhabitants. Therefore, the public should be informed of the potential risks and diseases caused by direct contact with waste and inappropriate procedures of waste handling.

Another important reason for providing environmental education is to let the community be aware of their individual responsibility regarding health improvement and proper waste management.

An informed citizen is more likely to take initiatives in waste minimization, recycling programs; and change in the consumption patterns and they are more likely to pass their knowledge and experiences to all society and future generations. That is to say, the introduction of the sanitary/environmental education and the public participation would open the way to achieve a final goal of this study: to establish a sound Solid Waste Management.

General objective of social aspect consists to promote within Panama District citizenship an environmental culture so that each resident assumes his/her corresponding responsibility as a solid waste generator.

Specific objectives of social aspects are:

- To educate the waste generators on appropriate solid waste management practices and the negative impact on health and the environment derived from the inadequate management of SW.
- To promote the environmental education program in schools, with an emphasis on adequate SWM along all school levels.
- To promote the solid waste separation at source and the reuse of separated materials.
- To encourage waste minimization by reducing packages and packing at industries.
- To inform permanently the community of projects, proposals, or changes on the cleansing service provided by the Municipality.
- To train and update personnel working for the cleansing service of DIMAUD and private companies linked to the service.
- To encourage community participation in SWM and to promote closer links with DIMAUD.
- To establish an Executing Unit with members of Community Relations, Public Relations and the Office for Immediate Response.

10.3 Phased Implementation Plan

The following table presents recommendable timing when the proposed improvement measures will be carried out.

Table 10-35: Phased Implementation

Contents of the master Plan	Implementation Schedule				Remarks
	Urgent 2002	Short 03-05	Mid 06-10	Long 11-15	
Increase the waste collection service coverage					
Improvement/Establishment of Technical System					
Improvement Storage and discharge system					
Planning					
Implementation					
Collection System					
Basic Database Establishment and Maintenance					
Planning					
Implementation					
Improvement of Collection Efficiency					
Planning					
Implementation					
Introduction of separate collection					
Planning & preparation					
Implementation					
Transfer transport system					
Planning					
Implementation					
Final Disposal					
Improvement of Current Landfill Operation					
Planning					
Implementation					
Ensuring final disposal capacity by 2015					
Planning					
Implementation					
Waste Minimization and Resource Conservation					
Education Program for Encouraging Waste Minimization and Recycling					
Planning					
Implementation					
Material Recovery					
Planning					
Implementation					
Improvement of Implementation System					
Improvement of DIMAUD's Management					
Establishment of Management Indicators					
Planning					
Implementation					
Establishment of Management Information System					
Planning					
Implementation					
Human Resource Development					
Planning					
Implementation					
Improvement of tariff system					
Planning					
Implementation					

Contents of the master Plan	Implementation Schedule				Remarks
	Urgent	Short	Mid	Long	
	2002	03-05	06-10	11-15	
Cooperation with Corregimientos					
Planning					
Implementation					
Efficient Use of the Private Sector					
Planning					
Implementation					
Improvement of legal and institutional system					
Municipal Regulations on SWM					
Planning					
Implementation					
Establishment of Committee regarding MSWM					
Planning					
Implementation					
Establishment of Policy on Waste Minimization and Resource Conservation					
Planning					
Implementation					

10.4 Project Cost Estimation

10.4.1 Basic Conditions

This Section presents key design data, unit costs and other basic condition for project cost estimates.

The price and foreign exchange rates are based on them in May 2002.

a. Exchange Rates

US\$ 1.00 = 1.00 Balboa = JP¥125

b. Service Life

Collection Vehicle : 5 years

Equipment other than collection vehicle : 7 years

Transfer station and MRF* : 20 years

* Integrated service life of the facilities including buildings, machines and so on necessary.

10.4.2 Collection System

The cost of collection system is calculated based on; 1) the life of the collection vehicles is 5 years, 2) all the vehicles purchased before 1997 will be renewed in 2002, and 3) the introduction of separate collection requires additional vehicles. The cost includes purchase, operation and maintenance.

The following two tables show transition of the number of vehicles which will have been purchased by 2015 under the condition of mixed collection and the condition of separate collection executed from 2007 following the M/P.

Table 10-36 : Collection Vehicle Purchase Plan for Mixed Collection

Year	Required number	Existing vehicle	Total existing vehicle	Scrap and replace of existing vehicle			Additionally required vehicle				Total	
				Scrap	Replace	Number of working vehicle	New purchase	Scrap	Replace	Number of working vehicle	Number of Purchase	Number of working vehicle
1994		5	5									
1995		1	6									
1996		3	9									
1997		3	12									
1998		15	27									
1999		26	53									
2000		2	55									
2001		1	56									
2002	65			12	12	56	9			9	21	65
2003	67			15	15	56	11			11	26	67
2004	70			26	26	56	14			14	40	70
2005	72			2	2	56	16			16	18	72
2006	76			1	1	56	20			20	21	76
2007	78			12	12	56	22	9	9	22	34	78
2008	80			15	15	56	24	11	11	24	39	80
2009	82			26	26	56	26	14	14	26	52	82
2010	85			2	2	56	29	16	16	29	31	85
2011	87			1	1	56	31	20	20	31	32	87
2012	89			12	12	56	33	22	22	33	45	89
2013	92			15	15	56	36	24	24	36	51	92
2014	94			26	26	56	38	26	26	38	64	94
2015	97			2	2	56	41	29	29	41	43	97
Total				167	167		350	171	171	350	517	

Table 10-37 : Collection Vehicle Purchase Plan for Separate Collection

Year	Required number	Existing vehicle	Total existing vehicle	Scrap and replace of existing vehicle			Additionally required vehicle				Total	
				Scrap	Replace	Number of working vehicle	New purchase	Scrap	Replace	Number of working vehicle	Number of Purchase	Number of working vehicle
1994		5	5									
1995		1	6									
1996		3	9									
1997		3	12									
1998		15	27									
1999		26	53									
2000		2	55									
2001		1	56									

Year	Required number	Existing vehicle	Total existing vehicle	Scrap and replace of existing vehicle			Additionally required vehicle				Total	
				Scrap	Replace	Number of working vehicle	New purchase	Scrap	Replace	Number of working vehicle	Number of Purchase	Number of working vehicle
2002	65			12	12	56	9			9	21	65
2003	67			15	15	56	11			11	26	67
2004	70			26	26	56	14			14	40	70
2005	72			2	2	56	16			16	18	72
2006	76			1	1	56	20			20	21	76
2007	79			12	12	56	23	9	9	23	35	79
2008	82			15	15	56	26	11	11	26	41	82
2009	85			26	26	56	29	14	14	29	55	85
2010	87			2	2	56	31	16	16	31	33	87
2011	91			1	1	56	35	20	20	35	36	91
2012	93			12	12	56	37	23	23	37	49	93
2013	96			15	15	56	40	26	26	40	55	96
2014	100			26	26	56	44	29	29	44	70	100
2015	103			2	2	56	47	31	31	47	49	103
Total				167	167		382	179	179	382	549	

Finally the cost of collection system is estimated using the calculation results shown above under the following conditions.

Table 10-38 : Condition of Cost Estimation

	Item	Cost
A	16 yd ³ compactor collection vehicle	U\$ 77,000 /nos.
B	Miscellaneous	10 % of "A"
C	Tax	5 % of "A + B"
D	Total cost	A + B + C
E	Annual maintenance cost	5 % of "D"

Table 10-39 : Results of Cost Estimation

unit : U\$1,000

Year	Mixed collection						Separate collection						Difference		
	Vehicle	Miscellaneous	Tax	Total	Maintenance cost	Total	Vehicle	Miscellaneous	Tax	Total	Maintenance cost	Total	Total	Initial	Maintenance
2007	2,618	262	144	3,024	605	3,629	2,695	270	148	3,113	623	3,736	107	89	18
2008	3,003	300	165	3,468	694	4,162	3,157	316	174	3,647	729	4,376	214	179	35
2009	4,004	400	220	4,624	925	5,549	4,235	424	233	4,892	978	5,870	321	268	53
2010	2,387	239	131	2,757	551	3,308	2,541	254	140	2,935	587	3,522	214	178	36
2011	2,464	246	136	2,846	569	3,415	2,772	277	152	3,201	640	3,841	426	355	71
2012	3,465	347	191	4,003	800	4,803	3,773	377	208	4,358	872	5,230	427	355	72
2013	3,927	393	216	4,536	907	5,443	4,235	424	233	4,892	978	5,870	427	356	71
2014	4,928	493	271	5,692	1,138	6,830	5,390	539	296	6,225	1,245	7,470	640	533	107
2015	3,311	331	182	3,824	765	4,589	3,773	377	208	4,358	872	5,230	641	534	107
Total	30,107	3,011	1,656	34,774	6,954	41,728	32,571	3,258	1,792	37,621	7,524	45,145	3,417	2,847	570

10.4.3 Transfer and Transport System

Table 10-40 shows overall costs necessary for the transfer and transport system for the East (Tocumen, Pacora and San Martin). Detailed costs are presented in the section of Feasibility Study.

Table 10-40: Overall Cost of Transfer / Transport System for the East

unit : US\$1,000

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2,015	Total
Transfer station															
Investment															
Land acquisition			346												346
Design & supervision		67	67			55									189
Capital cost			2,693			1,821									4,514
Investment total	0	67	3,106	0	0	1,876	0	0	0	0	0	0	0	0	5,049
O & M				211	211	211	270	270	270	270	270	270	270	270	2,793
Sub total	0	67	3,106	211	211	2,087	270	270	270	270	270	270	270	270	7,842
Transport															
Tractor (300-350hp)				356	89	89	89	0	0	89	356	178	89	178	1,513
O&M (w/o personnel)				66	82	99	115	115	115	132	132	148	148	165	1,317
Personnel				56	70	84	98	98	98	112	112	126	126	140	1,120
Trailer (85 yd3, 20 ton)				326	54	54	163	0	0	54	326	109	54	217	1,357
O&M (w/o personnel)				7	8	9	12	12	12	13	13	14	14	16	130
Sub total				811	303	335	477	225	225	400	939	575	431	716	5,437
Total	0	67	3,106	1,022	514	2,422	747	495	495	670	1,209	845	701	986	13,279

10.4.4 Material Recovery Facility

a. Outline of Facility

Outline of the MRF is shown below.

Table 10-41 : Outline of Facility

Item	Descriptions		
	Year	Capacity	Total Capacity
Installation plan	2007	25 ton/day	25 ton/day
	2009	40 ton/day	65 ton/day
	2011	60 ton/day	125 ton/day
	2013	60 ton/day	185 ton/day
	2015	37 ton/day	222 ton/day
Daily working time	7.0 hour/day		
Sorting item	paper, steel, aluminum, plastic, bottle and glass		
Sorting method	magnetic separation and hand picking		
Site area	Approximate 10,000 m ²		
Building area	Approximate 6,000 m ²		

b. Cost Estimation

Result of cost estimation is shown below.

Table 10-42 : Result of Cost Estimation

Year	Capacity	Cost (US\$ 1,000)				
		Construction	Equipment	Total	Tax	Total
2006	25 (ton/day)	150	600	750	38	788
2008	40 (ton/day)	240	960	1,200	60	1,260
2010	60 (ton/day)	360	1,440	1,800	90	1,890
2012	60 (ton/day)	360	1,440	1,800	90	1,890
2014	37 (ton/day)	162	648	810	41	851
	Total	1,272	5,088	6,360	319	6,679
Land acquisition cost		assuming MRF install in Cerro Patacon				0

10.4.5 Landfill

a. Improvement of Current Landfill

Cost for improvement of current landfill shows below.

Table 10-43: Unit Cost of Leachate Collection System per Hectare

Item	Description	Unit	Quantity	Unit cost (US\$)	Cost (US\$)
Main	dia 300mm	m	560	60.0	33,600
Branch	dia 200mm	m	560	20.0	11,200
Total					44,800

Table 10-44: Unit cost of Final Cover and Rain Water Channel

Item	Description	Unit	Quantity	Unit cost (US\$)	Cost (US\$)
Vegetation layer	600mm	m ²	10,500	3.0	31,500
Sand layer	300 mm	m ³	3,150	5.0	15,750
Synthetic liner	HDPE 1.5mm	m ²	10,500	12.0	126,000
Clay liner	600 mm	m ²	10,500	3.0	31,500
Gavel layer	150 mm	m ²	10,500	2.0	21,000
Rain water drainage		m ²	10,500	0.3	3,150
Total					228,900

Table 10-45: Total Unit Cost

Item	Description	Unit	Quantity	Unit cost (US\$)	Cost (US\$)
Total unit cost of Leachate collection and cover soil		US\$/ha			273,700

Table 10-46: Total Project Cost for Chatarra

Item	Description	Unit	Quantity	Unit cost (US\$)	Cost (US\$)
Chatarra		ha	5.0	273,700	1,368,500
Contingency		%	10.0		136,850
	Direct cost				1,505,350
Overhead		%	30.0		451,605
	Constriction cost				1,956,955
Tax		%	5.0		97,848
Total					2,054,803

Table 10-47: Total Project Cost for Etapa I

Item	Description	Unit	Quantity	Unit cost (US\$)	Cost (US\$)
Etapa I		ha	14.5	273,700	3,968,650
Contingency		%	10.0		396,865
	Direct cost				4,365,515
Overhead		%	30.0		1,309,655
	Construction cost				5,675,170
Tax		%	5.0		283,759
Total					5,958,929

Table 10-48: Overall Cost

Item	Cost (US\$)
Chatarra	2,054,803
Etapa I	5,958,929
Total	8,013,732

Table 10-49: Approximate Cost of Leachate Treatment Improvement

Description	Unit	Quantity	Unit cost (US\$)	Cost(US\$)
Leachate treatment facility (Case4)	m ³ /day	1,200	3,000	3,600,000

Table 10-50 shows overall costs of the current landfill improvement.

Table 10-50: Overall Cost of Current Landfill Improvement

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Unit: US\$1,000															
Investment															
Closure of Etapa 1	0	6,000	0	0	0	0	0	0	0	0	0	0	0	0	6,000
Closure chatarra	0	1,000	1,000	0	0	0	0	0	0	0	0	0	0	0	2,000
Etapa 2 phase 4*1	0	3,500	0	0	0	0	0	0	0	0	0	0	0	0	3,500
Improvement leachate treatment	0	0	1,800	1,800	0	0	0	0	0	0	0	0	0	0	3,600
Investment total	0	10,500	2,800	1,800	0	0	0	0	0	0	0	0	0	0	15,100
O & M															
Closure of Etapa 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Closure chatarra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Etapa 2 /phsae 3,4,5*1	0	2,742	2,848	2,966	1,531	0	0	0	0	0	0	0	0	0	10,087
Improvement leachate treatment *2	0	0	0	180	180	180	180	180	180	180	180	180	180	180	1,980
O&M total	0	2,742	2,848	3,146	1,711	180	180	180	180	180	180	180	180	180	12,067
Investment	0	10,500	2,800	1,800	0	0	0	0	0	0	0	0	0	0	15,100
O & M	0	2,742	2,848	3,146	1,711	180	180	180	180	180	180	180	180	180	12,067
Total	0	13,242	5,648	4,946	1,711	180	180	180	180	180	180	180	180	180	27,167

*1: information obtained from DIMAUD

*2: 5% of the investment cost

b. New Landfill

Table 10-51 shows overall costs of the new landfill (Etapa 3). Detailed costs are presented in the section of Feasibility Study.

Table 10-51: Overall Cost of Landfill (Etapa 3)

unit :US\$ 1,000

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Landfill site															
Investment															
Design & supervision			66	66	306	306	341	341	8	8					1,442
Construction				4,400		20,400		22,700		500					48,000
Investment total			66	4,466	306	20,706	341	23,041	8	508					49,422
O&M				2,811	2,811	2,811	2,811	2,811	2,811	2,811	3,469	3,469	3,469	3,469	33,553
Total	0	0	66	7,277	3,117	23,517	3,152	25,852	2,819	3,319	3,469	3,469	3,469	3,469	82,995
Leachate treatment															
Investment															
Design & supervision			75	75											150
Construction				5,000											5,000
Investment total			75	5,075											5,150
O&M				135	135	135	135	135	135	135	135	135	135	135	1,485
Total	0	0	75	5,210	135	135	135	135	135	135	135	135	135	135	6,635
Total															
Investment total	0	0	141	9,541	306	20,706	341	23,041	8	508	0	0	0	0	54,592
O & M total	0	0	0	2,946	2,946	2,946	2,946	2,946	2,946	2,946	3,604	3,604	3,604	3,604	35,038
Total	0	0	141	12,487	3,252	23,652	3,287	25,987	2,954	3,454	3,604	3,604	3,604	3,604	89,630