

**Solid Waste Management
Privatization Procedural Manual**

**Residential
and Commercial
Waste Collection**



Solid Waste Technical Assistance



**Ministry of
State for
Environmental Affairs**



**Egyptian
Environmental
Policy Program**

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INTRODUCTION

DEVELOPING A CONTRACT MONITORING UNIT



Sanitary, efficient and cost-effective collection of solid waste is a prerequisite for the achievement of all other solid waste management objectives. This chapter is intended as a guide for those tasked with improving or implementing new residential and commercial waste collection systems.

Special emphasis has been placed on providing information needed to evaluate the existing system, identify potentially applicable alternatives, select the most appropriate alternatives based on selected design criteria, and create the technical documents required if the service is to be privately provided.

Planning for Residential and Commercial Solid Waste Collection can be broken down into 9 steps:

Step 1: Review Legal, Regulatory, and Policy Framework.

Step 2: Determine Demographics and Physical Characteristics of the Service Area.

Step 3: Determine Characteristics of the Waste Stream.

Step 4: Obtain Input from Residents and Businesses.

Step 5: Inventory and Assess Existing Conditions.

Step 6: Identify Options for Improving Collection Service.

Step 7: Compile Findings and Prepare Preliminary Assessment Report.

Step 8: Evaluate and Select Approved Collection System Improvement Options.

Step 9: Select Preferred Collection System.

STEP 1:

REVIEW LEGAL, POLICY, AND REGULATORY FRAMEWORK

APPLICABLE LAWS

While there are a number of national laws pertaining to solid waste management (Refer to Chapter 2), Public Cleaning¹ provides the best guidance for developing waste collection systems that comply with current national regulations. Pertinent articles that need to be taken into account in collection system evaluation and planning for improvement are shown in Figure 8.1.

Finally, Article 39 of the executive regulation of Environmental Law

Decision-makers concerned with improving the collection of residential and commercial solid waste must be aware of the legal, policy and regulatory framework within which all of their policy and technical decisions must be made. A review of this framework to ensure that deficiencies in the current system are identified, and that the new system will be designed to attain compliance should be conducted in Step 1.

Egypt's overall current solid waste regulatory and policy framework is discussed in Chapter 2. Specific aspects of these laws and regulations, and sources of policy information that are directly applicable to solid waste collection are identified in more detail below.

4/1994 states that waste collection Contractors are required to constantly observe the cleanliness of containers and waste collection vehicles. The article also states that waste collection containers must be tightly covered to prevent the emission of bad odors or insect breeding. Garbage should be collected at suitable intervals according to the conditions in each area, provided that the quantity of waste in any of these containers does not exceed capacity.

In addition to these laws, those responsible for making decisions relating to improving waste collection services should familiarize themselves with the articles pertaining directly and indirectly to waste collection in other laws listed in Appendix B of Chapter 2.



¹ Egyptian Law Number 89/1998 and its implementing regulation, Ministry of Housing Decree Number 134/1968

FIGURE 8.1: GUIDING ARTICLES FROM LAW NUMBER 38/1967

Article 1: It is forbidden to place waste in any location not identified by the Local Assembly.

Article 2: All types of waste must be placed in containers to be emptied according to the conditions and specifications set forth in the executive regulation of this law.

Article 6: Collectors of waste must have a license from the Local Assembly.

From the Implementing Decree No. 134/1967

Article 1: Defines solid waste covered by the law.

Article 2: Defines garbage collector.

Article 4: Defines Contractor as any entity assigned by the agency responsible for waste collection that collects and transports waste from places defined in Article 1.

Article 5: Allows the agency responsible for public cleanliness to collect and transport waste from places defined in Article 1 by specifying locations for placing waste, or by requiring that those places put waste in specified containers and use the Contractor hired by the responsible agency.

Article 6: Requires that waste containers be manufactured from a solid material, have no holes, two handles and capacity suitable for the quantity of waste to be stored. Also allows the responsible agency to define container specifications including washing, storage, and placement conditions for collection.

Article 7: Requires Contractor compliance with all specifications established in this Decree and by the responsible agency.

Article 8: Assigns oversight responsibility for Contractor employees and means of transportation to the responsible agency.

Article 9: Allows the Local Assembly to define the maximum number of licenses to be provided to Contractors and to establish rules that assure continuance of the Contractors.

Article 10: Allows the Local Assembly to protect the health of waste collectors by requiring uniforms and implementation of other protective measures.

Article 11: Allows the Local Assembly to set times for waste collection based on local conditions.

Article 12: Requires that waste collectors use containers that prevent spillage of waste during collection and allows the Local Assembly to establish additional specifications to maintain worker and operational cleanliness.

Article 14: Requires that: vehicles used for collection be in good working condition; are leak-proof, covered, and internally lined with a material acceptable to the responsible agency; Contractors inform the Local Assembly of the number and location of collection vehicles; and health regulations regarding truck washing are followed.

GOVERNORATE DECREES AND ORDINANCES

The next step in building a good foundation upon which to base decisions regarding improved waste collection services is to identify applicable local Governorate Decrees and Ordinances. Most Governorates will have promulgated Decrees and Ordinances in their effort to implement or regulate waste collection systems through Departments of Cleanliness and Beautification that are in compliance with Public Cleaning Law Number. 38/1967

EEAA POLICY

Those responsible for recommending waste collection improvements should also have knowledge of Egyptian Environmental Affairs Agency (EEAA) policy regarding the subject. EEAA policy is summarized in the Solid Waste Management Strategy referenced in Chapter 2.

Additional background information useful in the planning and implementation of improved waste collection systems within the existing regulatory and policy framework is available from the following sources:

- Ministry and Governorate Contacts.
- Peers in other Governorates.
- Non-governmental organizations (NGOs).
- Previous Studies and Reports.
- Donor country solid waste technical assistance programs.



STEP 2:

DETERMINE DEMOGRAPHICS AND PHYSICAL CHARACTERISTICS OF THE SERVICE AREA

The next step in the waste collection system improvement process is the beginning of a comprehensive assessment of all existing waste collection system components, practices, performance, and costs. This assessment will allow the identification of any service deficiencies, and when compared to service expectations identified via the process described in Chapter 2, provide the baseline against which potentially feasible service improvements can be measured.

Much of the assessment process is described in detail in Chapter 2, Solid Waste Management Planning, and most of the information you will need to complete this step should be already be available if the steps prescribed in Chapter 2 have been completed.

As discussed in Chapter 2, comprehensive knowledge of the demographics and physical infrastructure of your planning area is essential when attempting to identify the most appropriate systems and technologies for waste collection.

Critical information needed to effectively plan includes the following:

- Population and population densities.
 - Family size, age, education and income demographics.
 - Number of residential structures.
 - Number of residential dwelling units and housing densities.
 - Number of commercial establishments by type (restaurants, markets, etc.).
 - Number of government/institutional buildings by type (school, hospital, etc.).
 - Kilometers, width and condition of streets and roads, including primary, secondary, and unimproved roads.
 - Size of planning area in square kilometers (km²).
 - Traffic patterns and transportation infrastructure.
- Land use patterns.



The physical characteristics not only will influence the choice of collection and transportation technology, but also the collection routes and opportunities for recycling (separation technology, quantities to be collected per type of vehicle). For example it will make a difference if residents live in high-rise apartment buildings with limited space for waste storage or in villas with a garden and personnel that will take care of the waste separation and storage. Maps showing roads, building densities etc. are essential to obtain this kind of information.

Demographic information concerning the residents also provides the basis for estimating the types and amounts of solid waste and potentially recyclable material generated.

STEP 3:

DETERMINE CHARACTERISTICS OF THE WASTE STREAM

RURAL WASTE CHARACTERISTICS

In rural areas purchasing power is low and life styles are conservative. Organic household waste is often segregated at the source, with food and farm wastes fed to animals or used as soil conditioner. Animal waste, paper, cardboard and rags are burned in traditional mud ovens. There is very little glass since rural residents buy few goods packaged in glass containers and soft drinks come in returnable bottles. Plastic and scrap metal are sold to peddlers that visit virtually every rural area; often serving as the only waste collection system available. As a result, very little is discarded, and whatever might be discarded is picked over by animals and scavengers.

Waste characteristics vary according to the extent of urbanization, the income level of the area, and the degree of its industrialization and commercialism. In Step 3, it is especially important that the planner learn who is generating what type of waste, in what quantities and where.

Households, commercial establishments, institutions such as schools, hospitals and government offices all generate different quantities and types of waste, as described in more detail in Chapter 2. In addition to knowledge of the sources of various types of waste, planning for improved collection requires knowledge of the following waste characteristics:

- Quantity.
- Composition.
- Density

QUANTITY

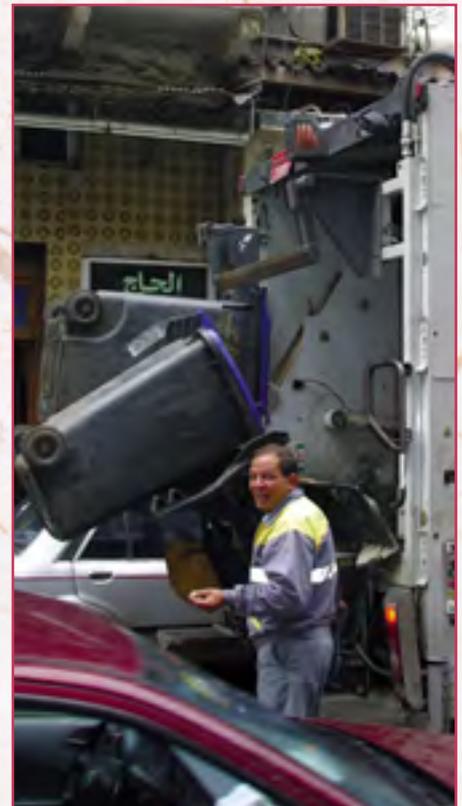
The amounts of residential solid waste generated vary with family size, type of dwelling, family income, and ages of family members. The amount of waste generated also varies with consumption and eating habits. Moreover, waste generation varies from one season to another. Thus it is imperative that planners conduct local research to obtain estimates of waste generation levels upon which selection of the appropriate number, size, and type of collection vehicles may be based.

COMPOSITION

The composition of solid waste depends to a large extent on the affluence of the populace. Among other things, it is also influenced by eating and cooking habits (affluence, culture) and is subject to seasonal variations (agricultural production, religious feasts, presence of tourists). These differences in composition mean that different waste management systems may be required for the various sources of waste, e.g. type and size of collection vehicles. Identification of differences is also required to identify those waste streams for reuse and recycling and to consider the applicability of small-scale collection and recycling services. The composition also partly determines the suitability of the waste for certain types of treatment. For example, the high organic content of residential waste in Egypt may improve the potential for waste diversion via composting.

DENSITY

The density of various residential and commercial waste streams should be determined in kilograms (kg) per cubic meter (m^3). A high proportion of paper, and plastics in affluent housing or office building areas will yield a waste stream that has a low density. A high proportion of dust, ashes, or organic residues in the waste will result in a high density. Knowledge of the waste density is needed to ensure that the collection vehicles selected by the service provider have adequate carrying capacity.



STEP 4:

OBTAIN INPUT FROM SERVICE USERS

It is essential to be aware of and understand the attitudes and behavior of citizens and other stakeholders that will be users of, or at least impacted by, the selected waste collection system. Involving all, important stakeholders in the process of developing the questions and issues to be covered in the assessment of the existing system will add to the quality of the information gathered and foster greater engagement. In Step 5, the planner should at a minimum, seek the following knowledge from citizens and any other collection system customers:

- Opinions of existing services and service provider performance.
- Their ability and willingness to co-operate in the planning and implementation of improved service through self-help organizations.
- Their ability and willingness to pay for the service.
- The preferred level of service.
- The method of payment and payment cycle.
- The expectations they have for the type of service and its frequency.
- Their attitudes and behavior in participating in experiments or pilot projects, particularly relating to material separation, reuse, recycling, and waste minimization efforts.

STEP 5:

INVENTORY AND ASSESS EXISTING CONDITIONS

As described in Chapter 2, examination of all elements of the waste management system in the planning area is essential when considering change in waste collection. Each step in the management of solid waste is interrelated, and identifying the most cost effective system requires knowledge of existing generation, collection, transportation, processing and disposal practices. It includes identifying who is doing what in the current formal and informal waste management systems.

In Step 5, each element of the existing waste management system should be evaluated using performance criteria including, but not limited to the following:

- Compliance with national laws and local ordinances.
- Cost effectiveness (cost/benefit).
- Health/safety.
- Environmental compatibility.
- Effectiveness (achievement of the desired outcome).
- Public acceptance.
- Efficiency (ratio of productive output of labor and material resources compared to input).

The relative importance assigned to each of these evaluation criteria will vary depending on the characteristics of the planning area and expectations of the service users.

Figure 8.2 presents a list of elements of the solid waste system that should be evaluated with respect to the performance criteria selected by the planning team.



FIGURE 8.2: COMPONENTS TO BE EVALUATED

<p>Storage/ handling practices</p>	<ul style="list-style-type: none"> • Types of containers used (bags, rigid containers, etc.) • Cost • Environmental and health and safety impacts • Impediments to best practices
<p>All collection service providers (Governorate, private firms, NGO's)</p>	<ul style="list-style-type: none"> • Funding adequacy and sources • Management • Staffing and labor adequacy • Equipment purchase, operation and maintenance adequacy • Operational practices and problems • Impediments to efficient/high quality service
<p>Collection service methods (costs, description and amounts collected through each)</p>	<ul style="list-style-type: none"> • Door-to-Door • Building-to-Building • Waste pooling sites (number, types and conditions of containers, average spacing, etc.)
<p>Uncollected (accumulated)waste</p>	<ul style="list-style-type: none"> • Amounts • Sources • Environmental, economic, and health and safety impacts • Impediments to provision and use of universal collection service
<p>Waste diversion systems</p>	<ul style="list-style-type: none"> • Informal sector scavenging (amounts and impacts) • Commercial recycling • Formal reuse and recycling systems
<p>Existing disposal facilities</p>	<ul style="list-style-type: none"> • Expected life • Operational impacts on collection equipment • Cost • Impediments to best disposal practices
<p>Education and public awareness programs</p>	<ul style="list-style-type: none"> • Have they been used • Were they successful • Have the right answers been targeted • How are the service area demographics best reached

STEP 6:

IDENTIFY OPTIONS FOR IMPROVING COLLECTION SERVICE

The next step in the planning process is the preliminary identification of potentially applicable alternatives based on the service goals established through the process defined in Chapter 2, and service deficiencies identified in Steps 4 and 5. This step involves making preliminary strategic decisions that take into account earlier policy decisions regarding compliance with laws and regulations, service recipients to be included, geographical boundaries and funding.

In Step 6, potential improvement options for the following basic system elements will be identified.

- Point of collection.
- Materials to be collected.
- Storage container type.
- Method of collection.
- Frequency of collection.

The preliminary selection can be facilitated by applying “design goals” identical to the performance evaluation criteria used in Step 5:

- Compliance with laws and ordinances.
- Cost effectiveness (cost/benefit).
- Health and Safety.
- Environmental compatibility.
- Effectiveness (achievement of the desired outcome).
- Public acceptance.
- Efficiency (ratio of productive output of labor and material resources. compared to input).

The relative importance of these design goals will vary depending on the planning area characteristics, expectations of the service users, and objectives of government officials. Cost effectiveness will be a priority in every case. Planners are strongly encouraged to calculate reasonable estimates of cost effectiveness for various combinations of strategic element options that appear to be potentially viable by applying the financial management and full cost accounting techniques described in detail in Chapter 3.

Brief descriptions of the options for each strategic element of collection follow. Examples of results from applying the above design goals to each of the system elements are provided in the more detailed discussion of strategic collection elements presented in Step 8. They should serve as a basis for identifying various combinations of strategic elements that form system improvement scenarios with potential to meet the majority of design goals.



POINT OF COLLECTION OPTIONS

The first strategic decision concerns where will the waste be collected from; i.e. the point of collection. In general, there are three options for the point of collection:

- Door-to-Door: At the door of each dwelling unit or commercial business.
- Building-to-Building: Outside and adjacent to the building along a street or alleyway.

- Waste Pooling Sites: A centralized collection point typically located on public property no more than a specified distance from any waste generator.

TYPE OF COLLECTION MATERIAL OPTIONS

The second strategic decision concerns identification of which materials to include in the waste collection system. All of the types of waste generated

by residents and businesses may not be easily accommodated in the conventional waste collection system. Some of these wastes may require separate collection systems. These “special” wastes include:

- Bulky wastes: Large items of solid waste such as furniture, appliances and auto parts, which because of their bulk/size require special collection and management.
- Construction and demolition wastes (C&D): Solid waste materials resulting from the construction, remodeling, repair, or demolition of buildings, sidewalks and similar structures that is not containerized, is too heavy, or is not fit for placement in collection vehicles used for Municipal Solid Waste (MSW).
- Yard wastes: Vegetative organic waste such as leaves, tree trimmings, palm fronds and small plants generated from yards and gardens of residents and businesses that may have beneficial use as compost and thus may require separate collection.

The residential and commercial waste collection system designer must make decisions addressing if and how this material will be integrated into the collection system

METHOD OF COLLECTION OPTIONS

All available methods to collect residential and commercial solid waste from any point of collection fall into the following three categories:

- Manual collection: Laborers carry waste from the point of collection to the collection vehicle, where they manually unload the waste into the collection vehicle without the benefit

There is often a direct relationship between other strategic collection elements and the method of collection. For example, if the point of collection is at the door of dwelling units located in an apartment building, then the method of collection must be manual. In turn, there is a relationship between the container type and method of collection. For example, rollout carts require semi-automated collection.

of any mechanical loading equipment. Use of manual collection functionally limits individual storage container capacity and weight (full) to no more than 200 liters and 20 kg.

- Semi-automated collection: Requires the use of specialized waste storage containers that may be manually moved (typically rolled) to the collection vehicle (or the collection vehicle to the container if too large to move) for mechanical (hydraulic) dumping. Storage containers may range from 150 liters to 10 cubic meters in capacity.
- Automated collection: Eliminates the need for any manual labor through the use of specially designed collection vehicles that are equipped with hydraulic/mechanical systems to move and dump the storage container without the vehicle operator getting out of the vehicle. Containers may range from 150 liters to 8 cubic meters in capacity.

STORAGE CONTAINER TYPE OPTIONS

Several types of containers may be suitable for storage of waste, but in some cases the selection is dictated by the method or point of collection. Any of the following containers may be suitable for storage of residential and commercial waste:

- Plastic Bags: Suitable for storing waste inside at the point of generation, but should only be used

outside if the point of collection is at the door.

- Metal or Plastic Rigid Containers: Only rigid plastic or metal containers manufactured specifically to hold waste and that have tight fitting lids should be used if the point of collection is outside the building.
- Rollout Carts: One specialized type of rigid container is a “rollout cart” A rollout cart is a specially designed plastic waste container with two wheels that can be rolled from the storage location to the collection vehicle and dumped mechanically, thus requiring a semi or fully automated method of collection.
- Bins: Waste pooling sites may be required in cases where street widths or surface conditions preclude the use of conventional collection vehicles. The only functionally and environmentally acceptable type of storage container to use for waste pooling sites is a plastic or metal “bin” that can be mechanically (hydraulically) lifted and emptied into the collection vehicle.

COLLECTION FREQUENCY OPTIONS

The final strategic decision to be made is how often residential and commercial waste should be collected. The selection of the appropriate collection frequency must take into account the storage capacity requirements of, and storage space available to, waste generators, as well as the design goals. The following

collection frequencies might be considered for various circumstances in Egypt:

- **Twice Weekly:** Residential and commercial waste should be collected at least twice weekly in Egypt. Once weekly collection is not frequent enough to limit the reproduction of flies, as flies lay eggs that hatch and grow to full adult flies within 7 days. In addition,

organic matter in residential waste degrades rapidly in ambient temperatures in Egypt, thus increasing its attractiveness to rodents and other pests.

- **Three Times Weekly:** Collecting residential and commercial waste three times per week is adequate to eliminate most of the potential problems experienced with twice weekly collection.

- **Six Times Weekly:** Collection may also be offered 6 days per week, with Friday being the day off. While this level of service is convenient for generators, it is costly.

- **Daily Collection:** If the users can afford it, daily waste collection is likely to be preferable to collection six times per week.

STEP 7:

COMPILE FINDINGS IN A PRELIMINARY ASSESSMENT REPORT

In Step 7, the findings from completion of the previous steps in this chapter should be compiled and summarized in a Preliminary Assessment Report to solicit input from all stakeholders and governmental officials. The process of developing this document will illuminate any fundamental systemic problems, and will facilitate identifying those collection system options with the potential to rectify them. The document should summarize the findings from the assessment, identify obstacles and constraints to desired service performance levels, recognize opportunities, and list potentially applicable options for improving collection system strategic elements for both residential and commercial wastes.

The findings should also include clear descriptions of any problems, gaps, and impediments to improvement that have been identified. If the assessment reveals either a need or desire for improvement, potential options should be introduced that appear worthy of further analysis following review and feedback from customer groups and government officials.



STEP 8:

EVALUATE AND SELECT APPROVED COLLECTION SYSTEM IMPROVEMENT OPTIONS

Rural Considerations
In view of the lower per capita incomes, housing densities, and waste generation rates, the practical applicability of collection at the door or at each building is limited. Collection of waste from centralized pooling sites would appear to meet the needs and expectations of the majority of rural and semi-rural village dwellers. However, to motivate and facilitate usage, centralized collection points must be adequate in number and proximate in location to all targeted users.

EVALUATE POINT OF COLLECTION OPTIONS

The first strategic decision to be made is to decide where the waste will be collected from; i.e. the point of collection. In this step, the planner should select one or more of the collection options below for the service area.

- **At the Door:** Collection at the door is the preferred option if there is a feasible way to fund the high cost over the long term. Since waste is "captured" at the point of generation, it largely eliminates the ubiquitous problems of litter and accumulated waste piles that result from indiscriminate storage and disposal practices. Provided with such an easy system

The next step in the planning process is the comprehensive evaluation of the potentially viable alternatives identified in the previous step. Step 8 involves making final decisions concerning strategic collection elements that take into account policy decisions and service objectives made earlier in the Political Phase of the planning process. As in Step 6, strategic decisions need to be made regarding the following collection system elements in order to design the alternative collection system improvement scenarios:

- Point of collection.
- Materials to be collected.
- Storage container type.
- Method of collection.
- Frequency of collection.

Also as in Step 6, the decision making process can be facilitated by applying system design goals. These include, but are not necessarily limited to the following:

- Compliance with laws and ordinances.
- Cost effectiveness and affordability.
- Health and safety.
- Environmental compatibility.
- Effectiveness.
- Public acceptance.
- Efficiency.

The relative importance assigned to each of these design goals will vary depending on the input received from Governorate officials and expectations of the service users. In every case it is highly likely that cost effectiveness and affordability will be a priority. Accurate evaluation of this design goal of cost effectiveness will require the application of full cost accounting principals and financial management tools described in detail in Chapter 3. Example results from subjecting each of the strategic element options to the design goals are provided in the discussion of each below.

to properly dispose of their wastes, there is little motivation or need for residents or small businesses to continue unacceptable practices engendered by lack of collection service options. Waste generators may simply place their waste in plastic bags or small plastic or metal rigid containers outside the door of their residence for collection at the appointed time.

- **At the Building:** Collection from containers placed outside and adjacent to buildings is also an acceptable point of collection option if an adequate number of appropriately sized waste containers and service frequency is provided. Use of plastic bags and conventional waste storage containers (trash cans) should be avoided if possible. The most suitable container to use is a "rollout cart", especially designed

for the purpose (see Types of Storage Containers). A rollout cart provides adequate capacity, has lids that protect the waste from weather and pest related problems and facilitates cost-effective collection.

- **Waste Pooling Sites:** While the most cost effective, collection of waste from centralized waste pooling sites is fraught with other significant problems that make it difficult to achieve other design goals. The system depends on generators carrying their own waste to the collection point, often judged by targeted users to be "too far away", and therefore not used. The result is waste being deposited indiscriminately at points more convenient for the generator, resulting in negative impacts on water, air, land, and public health. Unless there

are no funding mechanisms available to support other options, or building density prevents access for waste collection vehicles, waste-pooling sites should be the option of last resort.

Summarized results of subjecting the point of collection options to the design goals are provided in Figure 8.3.

SELECT POINTS OF COLLECTION

Selection of the most appropriate point of collection can be facilitated by first

dividing up the service area into sub-areas based on housing density/street width, and then applying the design goals listed in Figure 8.3. While it is best to strive for a universally applicable point of collection, it may not be practical if some options are precluded by inadequate street widths. For example, if the planning area includes dense housing areas with narrow unpaved streets that preclude the use of conventional collection vehicles, neither building-to-building nor waste pooling site service will be applicable, since they require conventional collection trucks with mechanical dumping systems.

Service at the door would be appropriate here. If so, the designer needs to develop a good estimate of the kilometers of road, road widths, and pavement types, and number of dwelling units to inform Bidders.

The result of this exercise will be assigned points of collection for all dwelling units and businesses in the planning area, maps of the planning area that illustrate the results, and a summary table of reasonable estimates of the number of dwelling units and businesses that fall within each.

FIGURE 8.3: COMPATABILITY OF POINT OF COLLECTION OPTIONS WITH DESIGN GOALS

Design Goal	Point of Collection Option		
	At the Door	Adjacent to the Building	Waste Pooling Site
Compliance with Laws and Ordinances	Best method for meeting waste containerization requirements in national laws.	Capable of complying with waste storage and containerization requirements.	Limited ability to be in compliance with waste handling and storage laws.
Cost Effectiveness	Most costly and most benefit.	Moderate cost.	Least cost, but also least benefit.
Safety	Most injuries to labor due to carrying and climbing stairs with a load.	Manual labor and injury risk reduced, especially with use of rollout carts.	More dangerous to service users and service crews than collecting at buildings.
Environmental Soundness	Most environmentally sound; controls waste at the source; no waste leaves buildings.	Environmentally sound, but may have some litter around containers outside if service frequency not adequate.	Potential for waste overflow, littering, insects, birds, rodents and communicable disease.
Effectiveness	Effective if residents follow rules; must put waste outside door within restricted hours.	Very effective if rollout carts used; waste can be set out at resident convenience.	Not very effective; residents complain about having to walk, aesthetics, pests and odors.
Public Acceptance	Very high; most convenient.	Moderate convenience.	Low acceptability; inconvenient for most residents.
Efficiency	Not efficient from productivity standpoint; requires most labor and equipment resources.	Very efficient, reduces labor and truck requirements.	Low cost, but does not often produce desired results.

EVALUATE MATERIAL COLLECTION OPTIONS

All of the types of waste generated by residents and businesses may not be easily accommodated in the conventional waste collection system. Some of these wastes may require separate collection systems. (For a description of these special wastes, refer to Step 6.)

The designer of the residential and commercial waste collection system must decide if and how each of these special materials will be integrated into the collection system. Again, the decision will depend largely on the service goals of service users and government officials. Inclusion of any of these special wastes may significantly increase collection system costs. However, excluding their integration into the residential and commercial collection system design without making alternative provisions for their collection and disposal means that meeting the objectives of the solid waste management system will be unlikely. Thus, while these special wastes do not meet some of the design goals, they should all be seriously considered for inclusion in the waste collection system due to the consequences associated with their omission.

SELECT MATERIALS TO BE COLLECTED

The materials to be collected should be the same for the entire planning area. This will facilitate service user education via mass media and eliminate confusion that would be associated with collecting different materials in different areas. As indicated in the previous discussion, it is preferable to include bulky waste, construction and demolition, and yard waste in the system if the users have both the willingness and the ability to pay. Thus, a decision to include these special wastes will have to be based upon reasonable estimates of total quantities generated from various sources

in the planning area in order to estimate the total service cost. If these materials are to be included, these estimates should be summarized in tabular form and included in the Request for Tender (RFT) background information.

Rural Considerations

The need for integrating collection of special waste streams into rural waste collection systems is not as compelling as in urban areas. As discussed in the earlier section describing the characteristics of rural waste, any organic materials that are generated are likely to be used as fuel, animal feed or soil conditioner. Moreover, the small quantities of bulky discards are likely to be recovered for reuse by the relatively prevalent number of peddlers and scavengers that work in rural areas.

EVALUATE METHOD OF COLLECTION OPTIONS

There are three basic methods to collect residential and commercial solid waste from any point of collection. Refer to Step 6 for a complete description of the available methods.

There is often a direct relationship between the decisions concerning other strategic collection elements and the method of collection. For example, if the point of collection is at the door of dwelling units located in an apartment building, then the method of collection must be manual. In turn, there is a relationship between the storage container type and method of collection. Rollout carts require semi-automated collection.

On the other hand, if the decision for point of collection is made first, and it is adjacent to a building, one could conceivably choose between manual, semi-automated, or automated collection. However, due to the numerous impediments such as parked cars, trees, sign posts, overhead utility lines, curbs, and the restricted widths of many streets, automated collection is unlikely to be practical in most urban areas in Egypt. Finally, if the point of collection is a state-of-the-art waste pooling site, using large covered metal or plastic bins for waste storage, the choice should be limited to semi-automated or automated collection. Under no circumstances should manual labor be considered for emptying the contents of large waste storage containers with more than 200 liters capacity.

Advantages and disadvantages relating to the achievement of system design goals associated with each method of collection have been summarized in Figure 8.4.

SELECT METHODS OF COLLECTION

The point of collection selected will largely dictate the method of collection. For example, if service is provided at the door then waste will have to be collected manually. On the other hand, if service is provided outside each building, or at waste pooling sites, the collection method should be semi-automated. While building-to-building service could be provided manually, system designers should make every effort to encourage the use of rollout carts that allow semi-automated collection rather than smaller conventional trashcans that would have to be serviced manually.

FIGURE 8.4: COMPATIBILITY OF COLLECTION METHOD OPTIONS WITH DESIGN GOALS

Design Goal	Method of Collection		
	Manual	Semi-Automated	Automated
Cost Effectiveness	Very costly; especially in multi-story buildings.	Cost effective; far less labor required; mechanical dumping lowers cost.	Cost effective under right conditions; not widely applicable in urban areas.
Health/Safety	Highest risk of injury to labor due to lifting and carrying required.	Reduced manual labor; elimination of lifting reduces back and other injury risk.	No lifting or exposure to waste; almost no risk of injury.
Environmental Soundness	Somewhat environmentally sound; control waste at the source; higher truck requirement means more fuel use.	Environmentally sound; alternative results in accumulated waste and environmental problems.	Environmentally sound; minimal use of energy resources.
Effectiveness	Effective, but at high financial and personnel expense.	Very effective; produces the desired positive effect of controlling waste at the source.	Very effective under the right conditions; separate collection system required for bulky waste.
Public Acceptance	Very high; most convenient.	Likely to be very high; key to maintaining cleanliness of streets and sidewalks.	Likely high, but not applicable as explained in the text.
Efficiency	Inefficient use of publically funded labor; requires significant labor and equipment resources.	Very efficient; mechanical dumping allows high productivity.	Very efficient under the appropriate local conditions as explained in the text.

Rural Considerations

As previously discussed, waste pooling sites are likely to be selected as the preferred point of collection for the circumstances in most rural areas. In such cases, the one to 6 cubic meter waste bins or “dumpsters” will require the use of semi-automated collection vehicles; i.e. trucks equipped with hydraulic winches or cylinders to lift and empty waste bin contents.

EVALUATE STORAGE CONTAINER TYPE OPTIONS

Several types of containers may be suitable for storage of waste, but in some cases the selection is dictated by the method or point of collection. Refer to Step 6 for a complete description of storage container options.

Figure 8.5 provides a summary of the results of evaluating the compatibility of each type of storage container with collection service design goals.

SELECT TYPES OF STORAGE CONTAINERS

All waste materials specified for collection must be placed in proper containers. Asking Contractors to collect any loose waste will significantly increase service costs. The types of storage containers to be used will depend largely upon the point of collection. The storage containers to be used should be designated as “suitable containers” and containers that qualify should be clearly identified in the RFT. The use and precise definition of suitable containers is essential in order to allow bidders to develop their lowest possible service costs.

For at-the-door service, the Contractor will not need to procure and deliver any waste storage containers. Specifications for “suitable containers”, in this case plastic bags and rigid plastic and metal containers, will have to be developed and described in the RFT (see Minimum Technical Requirements in Appendix A) so that Bidders will be assured that all waste will be in conventionally acceptable containers.

If at-the-building or waste pooling service is selected, the procurement of rollout carts and bins required should be included in the services to be provided by the Contractor. The Contractor’s responsibilities regarding procurement, distribution, maintenance, sanitation, repair and replacement of these containers should be clearly specified in the Minimum Technical Requirements.



FIGURE 8.5: COMPATIBILITY OF TYPES OF STORAGE CONTAINERS WITH DESIGN GOALS

Design Goal	Type of Storage Container			Bin
	Manual	Semi-Automated	Automated	
Cost Effectiveness	Most cost effective; available at no cost; makes manual collection easy.	Moderate cost for container; makes collection more difficult for manual labor.	Cost effective under right conditions; carts last 10 years; reduce collection costs.	Cost effective as collection work is minimized; bins last 10 years.
Health/Safety	Risk of injury to collectors from sharps in bags.	Potential for back injury if container is overloaded; repetitive lifting reduces worker longevity.	No lifting or exposure to waste; minimal risk of injury to user or service provider.	Potential health and safety risk to users and collection workers.
Environmental Soundness	Uses more natural resources; potential source of litter.	Environmentally sound; container use reduces litter potential and reuse saves resources.	Environmentally sound: cart life saves resources; proper use eliminates litter.	Not environmentally sound: large potential for overflow and negative impacts on the environment.
Effectiveness	Effective; easy for user and collector to handle.	Very effective; produces the desired positive effect of controlling waste at the source.	Very effective: convenient, controls waste and reduces environmental impacts.	Moderately effective, but does not always achieve desired impact of improving waste management.
Public Acceptance	Very high; most convenient.	Not high acceptance: public in Egypt is used to using plastic bags.	Very high in limited application in Egypt; likely to be well received.	Poor; public has experienced negative impacts; odors, inconvenient, unsightly, pests.
Efficiency	Very efficient for user and collector.	Somewhat efficient; moderately effective at a moderate cost.	High efficiency; efficient to use and mechanical dumping increases collection productivity.	Somewhat efficient: moderate cost and only moderately effective.

Rural Considerations

As in urban areas, the most appropriate type of waste storage container will be dictated largely by the collection point and method. In the majority of cases where waste pooling sites are selected as the point of collection, the only acceptable choice is the use of specialized metal or plastic waste bins. In such cases service users should be encouraged to accumulate and deliver their waste in plastic bags to reduce potential littering and access to pests once the bags are placed in the waste bins.

Rural Considerations

Collection frequency in rural areas will be largely dictated by the number and size of waste storage containers placed in service. In view of the lower percentage of organics in the waste, there is no compelling reason to service waste storage containers more than twice weekly. The planning team should make every effort to estimate storage capacity needs that will accommodate twice weekly collection without compromising aesthetic and environmental design goals that would occur if containers were to overflow.

EVALUATE COLLECTION FREQUENCY ALTERNATIVES

The final strategic decision to be made is how often residential and commercial waste should be collected. The selection of the appropriate collection frequency must take into account storage capacity requirements and available storage space, as well as the selected design goals. Step 6 details some collection frequency options. Figure 8.6 compares the service frequency options with design goals.

SELECT COLLECTION FREQUENCY

Summarizing the earlier discussion regarding collection frequency, residential and commercial waste should be collected as often as residents and businesses can afford, as total service cost will correlate highly with frequency. The cost recovery model described in Chapter 3 should be used to calculate the required service rates for each user category for each collection frequency option being considered.

DEVELOP PRELIMINARY COST ESTIMATES

Once the decisions for all the strategic collection system elements have been

made for all parts of the service area, the next step is to apply full cost accounting techniques to each potentially applicable design scenario using the model described in Chapter 3. This step must consist of developing preliminary system cost estimates for both government and private provision of improved collection services.

Use of the model requires the designer to develop a great deal of data for input. To use the model for the purpose of calculating a preliminary cost estimate for various scenarios (combinations of strategic elements) please see Chapter 3.

SUMMARIZE RESULTS

The estimated cost and the assessment of the compatibility of each scenario with the design goals should be summarized in spreadsheet form to facilitate comparison of all viable improvement options analyzed by the planning team. The spreadsheet should be incorporated into a brief narrative report to solicit feedback from all stakeholders and serve as the basis for final decision-making by the appropriate Governorate officials. Several copies should be produced and widely disseminated among all interested parties.



STEP 9:

SELECT PREFERRED COLLECTION SYSTEM

Once the cost of each of the potentially viable collection system improvement scenarios has been calculated the final decision making process can begin. The final decision making process consists of the following tasks:

- Calculate rates/tariffs and evaluate cost recovery methods.
- Solicit final stakeholder input.
- Governorate officials select preferred collection system.

CALCULATE RATES/TARIFFS AND EVALUATE COST RECOVERY METHODS

Before selecting the preferred waste collection system the Governorate needs to know if and how it will be able to pay for it. The planning team should use methods described in Chapter 3 to evaluate cost-related issues that apply to each of the scenarios under consideration. These include the following:

- Conducting a “willingness to pay” survey.
- Developing tariff models.
- Examining “variable rate” options.
- Determining the method of fee collection.

The results will be proposed fee schedules and identification of the pros and cons associated with each of the practical means for collecting fees from service users.

SOLICIT FINAL STAKEHOLDER INPUT

Once the planning team has calculated how much each of the collection system improvement options will cost each user group category, these groups will be better able to make informed

decisions concerning the system that they prefer. It is essential that a period of time be allowed for widespread dissemination to and feedback from the public at large. Governorate officials might find it useful to host public meetings devoted to discussion of the preferred waste collection and accompanying fee recovery systems.

GOVERNORATE OFFICIALS SELECT PREFERRED COLLECTION SYSTEM

Internal deliberation on the input received from the planning team and the general public can now take place among all of the appropriate Governorate officials. An informed decision can now be made which will have the highest probability of achieving waste collection system improvement design goals, while being affordable to the majority of families and businesses in the Governorate. In the unlikely event that officials select to change one or more of the strategic elements of a system scenario, the scenario should be resubjected to the appropriate Steps before receiving final approval.

The remaining task is to translate all this information into a Request for Tender format. Instructions on how to prepare this information for the RFT can be found in Appendix A of this chapter.



FIGURE 8.6: COMPATIBILITY OF SERVICE FREQUENCY OPTIONS WITH DESIGN GOALS

Design Goal	Collection Frequency			
	Twice Weekly	Three Times Weekly	Six Times Weekly	Daily
Compliance with Laws and Ordinances	Potential compliance problems with health and waste storage laws, more storage needed.	Moderate level of compliance as some users exceed storage capacity.	High compliance expected as storage not a problem.	Maximum compliance likely to be achieved.
Cost Effectiveness	Most cost effective.	Less labor, but more storage capacity (containers) needed.	Costly.	Cost similar to six times per week.
Health/Safety	Longer storage time increases public and worker health risks.	No obvious health/safety risks.	Minimal health risks.	Minimal health risks.
Environmental Soundness	Uses least natural resources; more illegal dumping and litter likely.	Environmentally sound, less resource use than for more frequent collection.	Excessive use of fuel and other natural resources.	Excessive use of fuel and other natural resources.
Effectiveness	May not be effective if residents forget collection days. May result in litter.	Effectiveness is limited as difficult to schedule and for residents to remember. May result in litter.	Not effective: collector must collect twice as much waste on first day of week.	Most effective as waste can be set out for collection and be removed every day.
Public Acceptance	Low; residents may be reluctant to store waste if no outside storage.	Not user friendly schedule; may cause confusion.	Acceptable, but residents might want daily collection instead.	Excellent due to convenience and high level of service.
Efficiency	Very efficient for collectors, but not residents.	Somewhat efficient; moderately effective at a moderate cost.	Not efficient as excessive resources required to collect small amounts of waste.	Not efficient as excessive resources required to collect small amounts of waste.

APPENDIX A: TECHNICAL DOCUMENTS **FOR THE REQUEST FOR TENDER**

Once the final waste collection system design has been selected, the planning team must prepare the technical documents to include in the Request for Tender (RFT) that specify exactly what services are desired, what the Minimum Technical Requirements are, what the Performance Standards will be, and how performance will be measured. These technical documents include:

- Background Information.
- Service Specifications.
- Minimum Technical Requirements.
- Performance Standards.
- Measuring Compliance with Performance Standards.

BACKGROUND INFORMATION

All relevant information obtained or created in the collection system design process should be summarized in unambiguous tabular form and included in the introduction and background section to the Service Specifications in the RFT.

SERVICE SPECIFICATIONS

The first task in preparing the technical documents for the RFT is developing Service Specifications. The primary objective of Service Specifications is providing Bidders with a clear understanding of what services you want the Contractor to provide. It tells the potential Contractor what, where and when. Service Specifications for residential and commercial waste collection should specify the types of service to be provided and address the following basic elements of service:

- Types of waste to be collected.
- Point of collection.
- Service frequency.
- Type of waste storage container to be serviced.

The four basic types of types of service have been largely described earlier in the discussion of "points of collection". Important words or terms should be defined in the definitions section of the RFT.

Examples of Service Specifications

Door-to-Door (DTD) Collection Service:

The daily collection of MSW placed by occupants of individual Dwelling Units in Suitable Containers and Bulky Wastes placed within 1 meter of the Container, and transfer of these wastes to the (Designated Facility) by the Contractor.

Building-to-Building (BTB) Waste Collection Service:

The collection of MSW placed by occupants of Buildings in Rollout Carts, and Bulky Wastes placed within 1 meter of the Rollout Cart, and delivery of these wastes to the (Designated Facility) by the Contractor. The service also includes procurement, distribution, sanitation and maintenance of all rollout Carts required.

Waste Pooling Site (WPS) Collection Service:

The collection of MSW placed in Bins with a minimum size of 1 cubic meter and a maximum size of 6 cubic meters, at sites to be designated by the Governorate in the WPS Service Sectors, and transfer to the (Designated Processing or Disposal Facilities.) The service also includes procurement, distribution, sanitation and maintenance of Bins.

Large Commercial Generator (LCG) Waste Collection Service:

The collection of MSW placed in Rollout Carts or Bins and Bulky Wastes placed within 1 meter of a cart or bin, by Large Commercial Generators, and transfer of these wastes to the (Designated Disposal Facility) by the Contractor. The service also includes procurement, distribution, sanitation and maintenance of all Rollout Carts and Bins required.

MINIMUM TECHNICAL REQUIREMENTS

The purpose of the Minimum Technical Standards or Requirements is to set conditions relating to "how" the Contractor shall perform the specified services. In other words, Minimum Technical Requirements establish guidelines that will ensure that the Contractor provides the services in a manner that is compatible with each of the design goals.

Minimal Technical Requirements should be established for the elements of residential and commercial waste collection services described below.

As illustrated by the following example for collection vehicle appearance, Minimum Technical requirements should clearly, but simply, state what you expect:

"Collection Vehicle Appearance: Collection vehicles shall be repainted at least once every three (3) years."

WORK PLANS

DRAFT WORK PLAN

As part of the Tender Offer, each Bidder should be required to submit a Draft Work Plan (DWP) that illustrates his or her understanding of the service requirements and describes exactly how he or she intends to perform them. The minimal technical requirement for the DWP should require that Bidders address the following:

- Location of collection vehicle parking areas and maintenance garages.
- Maps of proposed collection routes.
- Proposed route time schedules.
- Schedule for accepting and rehabilitating existing facilities.
- Job descriptions and the number of personnel to be deployed in each position.
- Plan for recruiting and training labor, equipment operators, and supervisory personnel.
- Plan for distribution, sanitation, and maintenance of rollout carts and bins.
- Description of driver training and testing program.
- Lists of equipment indicating type, make, size, and age.
- Manufacturers' literature for all waste collection equipment proposed for usage indicating if equipment is currently available, and if not, when it will be available.
- Plans for contract administration and field supervision.
- Descriptions of record keeping and reporting systems for all information and data required to be submitted.
- Proposed procedures for communicating with the Governorate's contract administration organization and all categories of customers.
- Plan for staffing, equipping, and maintaining a customer service office.
- Planning and implementation of public information program.
- Proposed waste collection vehicle sanitation and preventative maintenance program and schedule.
- Description of how the Contractor will comply with each of the Service Specifications and Minimum Technical Requirements.

PREPARATION WORK PLAN

The selected Contractor will need a preparation period of between 90 and 120 days between contract signing and implementation to mobilize all resources required to perform the service. To ensure the Governorate that mobilization is occurring at an acceptable pace, the Contractor should be required to submit a work plan that describes the plan for performing all preparation period activities. This plan is called the Preparation Work Plan (PWP) and should be submitted no later than 30 days following the contract signing date. The PWP should provide schedules for the initiation and completion of all preparation period activities including, but not necessarily limited to, the following:

- Recruiting and training labor and supervisory personnel.
- Procurement of supplies and equipment.
- Rehabilitation of existing facilities.
- Construction of new facilities.
- Implementation of project management structure.
- Implementation of information database and record keeping systems.
- Final collection route design and scheduling.
- Delivery of waste containers were required.
- Development and dissemination of public information materials.

FINAL WORK PLAN

The Contractor should be required to submit a Final Work Plan (FWP) within 45 days of the Contract Signing Date. The FWP should address each of the activities as prescribed for the DWP and incorporate refinements and modifications discussed and agreed upon between the contracting agency and the Contractor prior to execution of the Contract. The FWP should include the PWP.

WASTE COLLECTION VEHICLES

To ensure that the Contractor utilizes waste collection vehicles that meet the contracting agency's technical, economic, service quality, health, safety, environmental and aesthetic performance criteria, the RFT should include Minimum Technical Requirements for the following:

Dedicated Fleet Inventory: The contracting agency will want to have a record of all of the vehicles that the Contractor intends to employ in the collection of residential and commercial wastes. This will provide assurance that the number and type of vehicles is adequate, and for the agency to have on record in case of complaints from citizens and businesses concerning vehicle operation. No later than 30 days prior to service commencement, and annually thereafter, the Contractor should provide a list of the equipment to be used specifying the year, make, model, identification number and Gross Vehicle Weight (GVW) of each waste collection vehicle.

Waste Collection Vehicle Body Requirements: The Contractor should be required to only utilize vehicles with bodies that were manufactured for the purpose of consolidating and storing solid waste. Thus, the area of the waste collection vehicle body used for the compaction and storage of MSW or Bulky Wastes should be watertight and prohibit spillage of any solids or liquid waste materials, oil, grease or other substances onto the ground or exterior body of the vehicle. In the event that any such solid waste, oil, grease, or other substances is dropped or spilled during the Contractor's operations, he or she should be required to clean it up immediately.

Collection Vehicle Loading: Overloaded waste collection vehicles increase maintenance costs, pose a threat to public safety and contribute unnecessarily to the deterioration of streets and roads. To prevent the Contractor from overloading vehicles, the Minimum Technical Requirement should not allow loading in excess of the manufacturer's GVW rating or in excess of the maximum weight specified by the Egyptian Roads and Bridges Authority.

Appearance: It is important for the Contractor to maintain the appearance of the waste collection vehicles. Clean, freshly painted vehicles send a message to the public that waste and waste handling should not be perceived as something that is dirty and demeaning, but rather a public service that is essential to a clean environment and a higher quality of life. The Contractor should be required to paint all waste collection vehicles at least once every 5 years.

Use of Hydraulic Compaction: In general the Contractor should be required to use waste collection vehicles with hydraulic compaction especially for transporting waste distances greater than 1 kilometer. Hydraulic compaction is the key to achieving high collection productivity by keeping trucks on the collection route for as long as possible before getting full. This reduces the number of trucks required and minimizes negative impacts on traffic. It also provides a means of controlling the waste and keeping it from spilling or being blown from the truck as it moves along the route. However, under certain conditions, such as in areas with roads too narrow for conventional trucks, use of vehicles without hydraulic compaction may be acceptable. In these cases the use of small collection vehicles with open dump bodies that can mechanically dump their loads into a compaction vehicle for subsequent transportation to the disposal facility makes sense. To allow for such use, the Minimum Technical Requirement should state that waste may be collected using vehicles without hydraulic compaction provided that:

- All wastes must be enclosed and covered when the distance between collection points exceeds 100 meters or the speed of the vehicle exceeds 30 km/hr.
- Such vehicles are equipped with a mechanical dumping mechanism.
- All wastes are transferred to vehicles with hydraulic compaction if the distance between the end point of the vehicle's collection route and the disposal facility exceeds 5 km.

Maintenance: Very few types of vehicles have more moving parts and are subjected to more punishment than a waste collection vehicle. Egyptian experience has demonstrated that inadequate maintenance of waste collection vehicles has been a root cause of failure of government-provided waste collection service. Even new vehicles require continuous preventative maintenance in order to function in a safe and operable condition over the expected useful life of the vehicle. While it certainly is in the interest of the Contractor to maintain the equipment, it is also in the interest of the contracting party and the ratepayers that it represents to do everything in its power to minimize any risk of service interruption caused by failure of the Contractor to give vehicle maintenance the critical attention that it deserves. To that end, the Contractor should be required to submit accurate records of repair in a monthly operations budget, documenting maintenance of all waste collection vehicles in a safe and operable condition, to minimize the threat to worker and public health and safety, and to reduce vehicle impact on the surrounding environment.

Sanitation: In addition to maintaining the appearance and mechanical functions, the Contractor should be required to regularly wash and sanitize the waste collection vehicles to minimize odors and insect propagation, and to protect worker and public health. To that end, the Contractor should be required to wash the interior of the waste carrying area of all vehicles used for the purpose of collecting and transporting any waste with water and a disinfectant and deodorizing cleaning agent. This should be performed at a minimum of twice weekly, and/or according to the schedule submitted as part of the Final Work Plan. In addition, the Contractor should be required to wash all exterior surfaces of the waste collection vehicle chassis and body with water and a degreasing cleaning agent a minimum of one time per week.

Safety/Daily Vehicle Inspection: As an additional means of reducing the risk of Contractor use of waste collection vehicles that are unsafe or not fully functional, the Contractor should be required to inspect vehicles daily before they leave the yard. In addition, the Contractor should be required to take out of service any vehicle that does not pass inspection and. daily inspection reports should be made available to the contract administration agency upon request.

Operator Requirements: The contracting agency is the guardian of the safety of the general public. It has the responsibility and authority to minimize the risk that waste collection vehicle drivers might pose to public safety. To that end, establishment of minimum requirements regarding the licensing and driving skills of the

Contractor's waste collection vehicle operators are warranted. The requirement should ensure that the Contractor use only personnel specifically trained in the safe and efficient operation of waste collection vehicles. In addition, all vehicle operators should be required to have all required permits and licenses. The Contractor should be required to provide documentation of compliance with this requirement no later than 10 days prior to commencement of collection operations and evidence that all waste collection vehicle operators have been provided vehicle operation and safety training and have passed a written examination and driving test.

Marking and Identification: Waste collection vehicles used by the Contractor should have appropriate signage and markings to facilitate identification by customers, traffic police and employees at transfer, processing, and disposal facilities. It is recommended that all vehicles used in either the supervision or provision of waste collection service have highly visible (greater than 10 cm) lettering on each side of the vehicle body indicating the name and customer service telephone number of the Contractor, identification of the contracting agency, and vehicle identification numbers (numbered consecutively). The Contractor's business name should not contain the name of the contracting agency or implying ownership by it. In addition, all waste carrying vehicles should have the carrying capacity, in cubic meters and GVW, of the vehicle identified in numbers at least 12 centimeters in height displayed in the upper front corner of the left and right sides of the body.

Registration, Licenses and Insurance: The Contractor should be required to use collection vehicles registered, inspected, insured, and in compliance with all local ordinances and national laws pertaining to motor vehicle ownership and operation. This will reduce the risk of the Contractor having improperly equipped vehicles on the road that could be a threat to public safety and general welfare. It will also ensure that the Contractor has insurance to cover any property damage or injury to any motor vehicle operator or pedestrian.

Ancillary Equipment: Minimum Technical Requirements should include an article addressing the need to equip every waste collection vehicle with safety and emergency response accessories. It should require at a minimum that each waste collection vehicle be equipped with the following:

- A fire extinguisher.
- A first aid kit.
- A shovel and broom for the removal of any waste spilled on streets or sidewalks.
- An audible backup warning device that activates each time the vehicle backs up.
- Two-way communication with Contractor's collection supervisor and Contractor's dispatch/maintenance office.
- Flares, flags, and wheel chock blocks for use when breakdowns occur on public streets.

Collection Vehicle Garage and Parking: A Minimum Technical Requirement is needed to ensure that waste collection vehicle maintenance and parking facilities do meet environmental standards and do not create potential health or safety hazards. The Contractor should be required to provide written notification to the contract administrator as to the parking location of all waste collection vehicles 30 days prior to the first day of service and annually thereafter. No Contractor vehicles should be stored on any public street or other public property. Also, if waste collection vehicles are kept within contract service area boundaries overnight, they should be emptied of all waste, parked and be maintained on private property within a building or fenced yard when not in use.

Reserve Equipment: To minimize the risk of interruption or delays in service delivery the Contractor needs to have an adequate level of waste collection equipment in reserve at all times. To achieve this goal the contracting agency should require that the Contractor have available at all times, reserve equipment which can be put in service within 2 hours of any breakdown so that no interruption in regularly scheduled waste collection service occurs. Such reserve equipment should be required to correspond in size and capacity to the equipment normally used by the Contractor to perform the Waste Collection Service.

WASTE STORAGE CONTAINERS

If the Contractor is to provide the waste storage containers, it is logical to include the provision of the waste storage containers as part of the Service Specification. These will likely be rollout carts for building-to-building

service and bins for waste pooling sites. In those cases, the system designer will want to ensure that the Contractor procures and supplies waste storage containers that meet the contracting agency's economic, technical, health, safety, environmental, and aesthetic performance criteria. To achieve system objectives, the RFT should include Minimum Technical Requirements that address the following waste storage container concerns:

Body Material and Construction: The Contractor should provide waste storage containers that are made from materials that are functional, durable and weather resistant. Rollout carts should be rotationally molded from first quality plastic resin certified to contain ultraviolet stabilization compounds and meeting a minimum Environmental Stress Cracking Resistance (ESCR) rating exceeding 1,000 hours. Bins for waste pooling sites should be manufactured from plastic or steel.

Finish Surfaces: For rollout carts, the contracting agency should require that interior surfaces be smooth with a semi-or high-gloss finish to minimize accumulation of residue on interior cart walls. Exterior surfaces should be suitable for hot stamping appropriate information and instructions for users on the lid and body and be free of sharp edges and corners, protrusions, or other structures that could pose a nuisance or hazard to users. Bins that the Contractor is required to provide for waste pooling sites or large commercial generators should have a rust-inhibitive, corrosion resistant coating.

Color: A color should be specified that is aesthetically acceptable to the contracting agency. The most commonly selected colors for rollout carts and bins in major cities around the world are green and blue, often associated with environmental awareness campaigns.

Volumetric Capacity: The purpose of the Minimum Technical Requirement for volumetric capacity is to ensure that the Contractor provides adequate waste storage capacity. It should be specified in terms of the minimum volume requirement (in liters/day) per dwelling unit. A minimum of 8 liters per dwelling unit per day should be required. However, it is advisable to conduct research in the planning area as described in Chapter 2 to obtain the most reliable estimate of waste storage capacity needs, and then set a standard that allows for peak periods of waste generation. Standard rollout carts are available with 120, 240, and 360-liter capacities. Bins typically are available in 1-meter increments between 1 and 10 cubic meters. However, bins with capacities greater than 6 cubic meters are difficult for residents to use due to the excessive loading height and should be avoided unless absolutely necessary.

Minimum Load Rating: Since it will not be possible to prevent some residential and commercial generators from occasionally filling containers with heavy materials such as cement or rocks, the system designer should require that the Contractor provide containers that will accommodate such materials without being damaged. The minimum load ratings for rollout carts should be 50 kg, 100 kg, and 150 kg for 120, 240 and 360-liter carts respectively. The minimum load rating for bins should be set at 300 kg for each cubic meter of capacity.

Standards of Design: To assure that the Contractor supplies containers that have been designed according to industry standards, the Minimum Technical Requirement for containers should specify that containers meet all relevant sections of American National Standards Institute (ANSI) Z245.30 –1999 and Z245.60 –1999, or equivalent. These are available on the Internet. Rollout carts should be designed such that all waste flows freely out of the cart when dumped by a semi-automated bar-locking lifting mechanism (ANSI Type B, or equivalent). Bins should be designed such that all waste flows freely out of the cart when mechanically lifted and dumped into a collection vehicle.

Compatibility: Each type of waste storage container specified must be compatible with the type of collection vehicle that the Contractor intends to use. Rollout carts should be compatible with commercially available ANSI Type B, or equivalent, hydraulically operated semi-automated lifting mechanisms with a dumping cycle time of no more than 8 seconds. Bins should be required to be compatible with commercially available side, rear or front-loading waste collection vehicle lifting mechanisms.

Lids: Waste storage container lids are essential to ensure that waste stays in the container and that rain, pests and other animals are kept out. At the same time, lids should be lightweight in order to facilitate opening and closing by a variety of users. Rollout cart lids should be manufactured from the same material as the body of the cart; rotate at least 270 degrees with no interference; be watertight when closed, be snug fitting, and overlap the cart rim. The lid should also be configured to ensure that it will not warp, bend, slump, or distort to such an extent that it no longer fits the cart body properly or becomes otherwise unusable. Bin lids should be lightweight plastic or aluminum, watertight and self-draining, prevent rain entry when closed, be attached securely, but able to be rotated 270 degrees for dumping.

Handles: Handles should be required on all waste storage containers to facilitate their movement either by users or the Contractors' collection crews. Rollout cart handles should be at least 2.5 cm in diameter and equal the width of the cart. Handle mounts should be either an integrally molded part of the cart body or, if bolt-on handles are used, they should be designed such as to prevent them from working loose over the active life of the cart. Metal bins should be equipped with metal handles at least 2.5 cm in diameter and 12 cm in length on the rear and both sides of the bin.

Lifting and Emptying: All rollout carts and bins supplied by the Contractor should be equipped with attachment points that facilitate safe lifting and complete emptying of all contents. Rollout carts should be equipped with attachment points that make it compatible with standard semi-automated bar locking lifters. The upper lift point should be integrally molded into the body of the cart. The lower bar should be 2.5 cm galvanized steel, rotate freely a full 360 degrees on its own axis, and be designed to withstand over 10 years of lifter attachment.

Casters, Wheels and Axles: In addition to handles, waste storage containers smaller than 3 cubic meters must be equipped with casters or wheels to improve their movement by users or service crews. Wheels and axles are used on rollout carts and casters are used on small bins.

Rollout carts must have two wheels. Each wheel should have a minimum diameter of 20 cm, a tread width of at least 4 cm, have a locking device to secure them to the cart axle, and be manufactured from natural rubber or polymeric compound. Each wheel should be rated for the maximum load rating of the rollout cart and should not deform plastically when subjected to the rated load of the cart. Wheel retainers should be plastic coated steel. Axles should be a minimum of 1.5 cm diameter galvanized steel and pass through the rollout cart body outside of the area for waste storage. No bolts or rivets should be used for mounting axles.

There should be four casters with a minimum of two that are mounted to swivel 360 degrees. Two casters should have locking mechanisms to prevent movement except by the service crew. Swivel mounted casters should have grease fittings. Each caster must be capable of supporting loads of 300 kg for each cubic meter of bin volumetric capacity. No casters should be required on bins with capacities greater than 3 cubic meters.

Identification and Marking: All waste storage containers should have identification numbers and other markings to reduce potential theft, facilitate Contractor inventory control and aid contract monitoring. Markings also should include easily read and understandable information regarding usage.

Rollout cart lids should have a suitable area for affixing an appropriate label for education and/or other information. The Governorate logo, a serial number (sequentially numbered), the production batch number and date, the maximum load weight rating (in kg) and the rollout cart type (per clause 4.2.1f of ANSI Z245.330-99) should also be hot-stamped on the lid.

Bins should have a smooth, seamless decal area on the front of a size not less than 15 cm by 25 cm for affixing the Governorate logo and the Contractor's customer service telephone number. In addition, each bin should have labels illustrating materials to be contained; prominently in both Arabic and English letters a minimum of 8 cm in height.

Warranty: To minimize service interruption, inconvenience to service users, and total system costs the system designer should specify that the Contractor supply waste storage containers that have the longest practicable useful life.

Rollout cart useful life should be a minimum of 10 years for all parts of the cart. The warranty should not be prorated over the cart life, and should specifically provide for no-charge replacement of any component parts that fail in materials or workmanship for a period of 10 years after placed in service. Any failure under warranty should require replacement with a newly manufactured cart, which should be defined to be the body of the cart, wheels, lid handles and other ancillary features and fasteners.

Bin useful life should be a minimum of 10 years. As for the rollout carts, the warranty should not be prorated over the bin life, and should specifically provide for no-charge replacement of any component parts that fail in materials or workmanship for a period of 10 years after placed in service. Any failure under warranty should require replacement with a newly manufactured bin, which should be defined to be the body of the bin, casters, lids, handles and any other ancillary features and fasteners.

"Nestability": It is in the interest of the contracting agency to specify that waste storage containers be "nestable"; i.e. can be stacked inside each other to a specified extent, in order to reduce shipping, storage and distribution costs. Most rollout carts and bins are nestable. The Rollout carts should be designed such that each fully assembled cart will nest inside any other of the same design to a minimum of six fully assembled carts. This will substantially reduce shipping costs and the number of trucks and personnel required to deliver carts to the service area.

Distribution Plan: The contracting agency needs assurance from the Contractor that waste storage containers will be delivered to service users in a timely and cost effective manner. To accomplish this goal the Contractor should be required to submit a distribution plan with his or her Tender Offer for any containers that he or she is to provide. The requirement should specify the time period in which all containers are to be delivered, allowing a reasonable amount of time for delivery, but not too far in advance of the date that collection service is scheduled to start.

Maintenance: To ensure the preservation and long life of waste storage containers and to minimize customer inconvenience, the contracting agency should require that the Contractor monitor, control, sanitize and otherwise maintain them over the life of the contract. Bins should be washed at least once every 3 months and rollout carts should be washed at least twice annually or according to the schedule and plan submitted by the Contractor with his or her Tender Offer.

Replacement: Some waste storage containers will need to be replaced from time to time over the contract period due to irreparable damage or theft. The Contractor should be required to replace within a specified time period, and at his or her own expense, any container that has been removed from its designated location or that is not fully functional and cannot be repaired. Replacement should be required within 2 days of notification from the governing agency.

Ownership: To provide added incentive to maintain waste storage containers at the highest practicable level, and to reduce potential liability to the governing body, ownership should remain with the Contractor. The governing body should be given the option to purchase the waste storage containers at the end of the contract period at a price to be specified in the service contract.

SERVICE USERS

Users of residential and commercial waste collection must comply with certain requirements relating to the storage and set out of their waste for collection. When the point of collection is at the door of each dwelling unit the occupant will be required to provide their own waste storage container. To allow Bidders to structure bids that are cost effective, the Bidders need to be aware of the responsibilities and requirements of the service users. The following issues relating to service user requirements should be addressed in the Minimum Technical Requirements section of the RFT.

Waste Storage Container Specifications: Specifications for waste storage containers to be purchased and used by residents and businesses are necessary to protect public health and the environment, and to facilitate the work of the Contractor. Container specifications that define a "suitable container" should address the following:

- Container material.
- Capacity.
- Maximum loaded weight.
- Lids.
- Handles.

Plastic bags are acceptable for occupants of dwelling units to use if the point of collection is at the door of the dwelling unit. If plastic bags are allowed, users should be required to close or tie them securely at the top prior to set out. Bag size should be limited to 80 liters and the full weight should not exceed 15 kg.

Use of rigid plastic or metal containers in conjunction with plastic bags is acceptable, and is in fact a preferred practice to minimize nuisance problems with animals or other pests. Container size should be limited to 120 liters and loaded weight to 25 kg. Rigid containers should have sloping sides, tightly fitting covers with graspable handles, and two handles to facilitate handling by the collector.

Acceptable Wastes: The types of "acceptable wastes" that residents and businesses are allowed to place in the waste storage container must also be clearly specified. Acceptable waste should be limited to MSW. MSW includes garbage, refuse, and other discarded materials including, but not limited to, solids, semi-solids, sludge, liquids, and contained gaseous waste materials. It does not include bulky waste, yard wastes, hazardous wastes, radioactive wastes, medical wastes, or construction and demolition wastes.

Setout Requirements: Requirements addressing when and where waste storage containers may be placed outside for collection should also be specified so that the Contractor will be able to develop the most cost effective service plan. If the point of collection is outside the building or a waste-pooling site, the waste storage container is always at the collection point and waste generators may be allowed to place waste in them at any time. If the point of collection is at the door of individual dwelling units, occupants should be required to place containers within 1 meter of the door and no earlier than 12 hours, and no later than 1 hour, before the scheduled collection time.

Abuse of Containers: Specifications are needed to assure service users with protection of both the container and its cover from abuse from the Contractor or the public in general. The contractor should be required to replace any rigid plastic or metal container that is damaged or rendered functionally unusable by any employee. In addition, local ordinances should include penalties for theft of, or damage to, privately owned containers by any private citizen.

WASTE COLLECTION PERSONNEL

To ensure that the Contractor trains and deploys waste collection personnel in a manner that meets all of the contracting agency's economic, technical, health, safety, environmental and aesthetic performance criteria, the RFT should contain Minimum Technical Requirements that address each of the personnel related concerns described below.

Competence and Skills: It is in the interest of the contracting agency and the public to ensure that the Contractor employs personnel that are competent and skilled for their particular job position. This can be conveyed to the Contractor through a Minimum Technical Requirement that requires the Contractor (including any subcontractors) to only utilize management and administration staff, field supervisors, drivers, and laborers that have met certain training requirements appropriate for their respective trades.

Field Supervision: To facilitate Governorate communication with the Contractor and to ensure adequate management of all waste collection personnel in the field it is essential that a minimum ratio of supervisors to

work crews be specified. The Contractor should be required to provide the names of all field supervisors in writing to the contract administrator. Finally, the field supervisor should be required to be present in his assigned area of responsibility at all times that crews are working, and have radio communication with the Contractor's office and all waste collection vehicles under his or her supervision.

Uniforms and Safety Equipment: Requiring the Contractor to provide uniforms and safety equipment for waste collection personnel has the multiple purposes of protecting worker health and safety, minimizing direct contact with waste, ensuring worker cleanliness, and providing a means of projecting a positive image of the service to the public. Thus the Contractor should be required to provide all employees with a specified number of uniforms, hats, gloves, work boots, reflective vests, and other protective clothing adequate to maintain their appearance, health, and safety. All uniforms and safety equipment should be subject to review and approval by the contracting agency.

Demeanor: The field personnel employed by the Contractor will have considerable contact with those who use and provide the funding for the service. Long-term support for the service will be far more dependent upon the demeanor of the field personnel than on the performance of the Contractor's upper management. Therefore, it is essential that the contracting agency convey the importance of worker demeanor and public diplomacy to the Contractor through a Minimum Technical Requirement that requires that workers be trained by the Contractor in maintaining positive interaction with residents, business owners, and Governorate representatives.

Driver Training and Licenses: Waste collection vehicles are large, heavy, and can pose a serious threat to public safety if not operated by a well-trained and experienced driver. To minimize the risk to the public all drivers of waste collection vehicles should be required to carry valid Egyptian licenses appropriate for the class of vehicle that they are driving. In addition, the Contractor should be required to certify that all drivers have been provided training appropriate to equip them with the skills needed to safely operate collection vehicles under the local conditions.

COLLECTION PRACTICES

The Minimum Technical Requirement should include a section addressing collection practices to ensure that the Contractor conducts all collection activities in compliance with the Service Specifications and in a manner that does not negatively impact the general public. The section on collection practices should specify the Minimum Technical Requirement listed below.

Public Safety and Convenience: To minimize safety hazards, inconvenience and annoyance of the general citizenry it is important for the Contractor to conduct his or her work without disturbing the public. To achieve this objective the Contractor should be required to take all practicable steps to minimize obstruction to pedestrians and motor vehicle operators during the performance of all aspects of the Waste Collection Service.

Access to Private Property: With the exception of providing collection services at dwelling unit doors, the Contractor's employees should not be allowed to trespass or litter, cross property to adjoining premises, or meddle or tamper with property that does or should not concern them.

Property Damage: Maneuvering large collection vehicles in heavy traffic and the negotiation of narrow roads create significant risk of damage to public and private property. To minimize this risk, the Contractor should be held responsible for all costs associated with the repair and replacement of damaged property of any kind that can be ascribed to the actions of its equipment, employees or agents. Moreover, collection crews should be required to immediately report any incident that might have caused damage to third party property to the field supervisor, who shall in turn inform the customer and contracting agency within 8 hours of such occurrence.

Noise: The noise associated with lifting, dumping, and compacting wastes from semi-automated waste storage containers can be unnecessarily loud and annoying if collection vehicle operators do not make a conscious effort to minimize it. The Contractor should be required to minimize noise from collection equipment and the

activities of waste collection personnel by taking suitable measures such as opening and closing waste container lids carefully, and only compacting wastes at a frequency necessary to achieve high compaction and efficient collection productivity.

Street Usage Rights: The Contractor should be granted the right to use the streets for the purpose of providing waste collection services specified in the contract, but should not be granted exclusive use of such streets. The Contractor must observe all local ordinances relating to obstructing streets, keeping passageways open and protecting same, and obey all laws and ordinances controlling or limiting those engaged in waste collection service provision. When the Contractor's vehicle blocks the passage of other vehicles, the Contractor's vehicle should be required to pull aside at the first opportunity and allow waiting vehicles to pass.

Waste Spillage: Waste spilled and not picked up by the Contractor's collection crews sends a negative message to the public regarding the Governorate's commitment to improving solid waste management through privatization. While the Contractor should not be responsible for cleaning up MSW around any of the waste containers where such MSW is caused by the carelessness of the customer, the Contractor must be held responsible for removing any spillage of MSW that occurs due to the action of the Contractor's collection equipment and/or personnel.

Conditions for Not Providing Service: In those instances where dwelling unit occupants or commercial business owners do not comply with service user requirements, the Contractor should not be obligated to provide service. However, in every such case, the Contractor should be required to leave a notification form specified by the contracting agency that informs the resident or business of the exact reason why service was not provided. In addition, the Contractor should be required to report all such instances of user non-compliance to the contracting agency.

Scavenging: Scavenging of materials from waste storage containers by collection crews reduces productivity, is dangerous, and projects a negative image of the job, the Contractor, and the service. Require the Contractor to forbid any employee from placing any MSW or Bulky Waste inside or on the outside of waste collection vehicles except in the waste storage area of the vehicle. Moreover, require the Contractor to prohibit collection crews from offloading any materials while on collection routes or during transfer of waste materials to designated facilities.

Public Diplomacy: Long-term public support of improved solid waste collection services will be greatly impacted by how the employees of the Contractor interact with service users. Therefore, the contracting agency should require that all waste collection personnel employed by the Contractor be provided training adequate to provide customers with factual information concerning solid waste collection service regulations and to deal with customers and the public in a courteous and non-contentious manner.

Fees and Gratuities: Fees that residents and commercial businesses pay through general tax revenues or surcharges on utility bills should be sufficient to cover any needed waste collection and disposal services. Service users should never have to pay the Contractor's employees for any service. Therefore, it is essential that the contracting agency require that the Contractor not permit any employee, agent or subcontractor to offer special service beyond the scope of the contract, or to request, solicit, demand, or accept, either directly or indirectly, any compensation or gratuity for services that fall within the scope of the contract.

CUSTOMER SERVICE AND COMPLAINT HANDLING

The Contractor should be required to offer a system that facilitates the receipt, recording and resolution of inquiries and complaints from all categories of service users. To optimize customer usage the system must be widely publicized and easy to use. To ensure the implementation of a system that meets these objectives the contracting agency should establish requirements for each of the following related issues:

Hours of Service: To maximize customer convenience the customer service office should be open during all hours that calls might be expected regarding the waste collection service. If the Contractor is providing service during night time hours, then the office should be staffed 24 hours on each day that service is provided. Fewer hours might be acceptable if all service is provided within one or two daytime shifts only. However, it is better to err on the side of too many rather too few hours in order to maintain customer support and satisfaction.

Staffing: The office should be staffed with a number of trained personnel adequate to ensure that customers are able to reach a qualified customer service representative within 2 minutes of calling.

Communications Equipment Requirements: The Contractor should be required to equip the customer service office with enough telephone lines to be able to answer all calls in less than 1 minute, even during peak hours. The office should be equipped to transmit complaints to field supervisors through the use of two-way radio or cellular telephone communications. The office should also be equipped with facsimile equipment to facilitate transmission of written communication with the organization responsible for contract administration.

Complaint Handling: The ability and commitment of the Contractor to expeditious resolution of all complaints is essential to maintaining the financial and behavioral support of service users. As a first step the Contractor should be required to record in a bound book all complaints, noting the name and address of each complainant, date and time of complaint, nature of complaint, and nature and date of resolution. The Contractor should also be required to compile a summary statistical table of the complaint record in a form satisfactory to the contracting agency, which should reserve the right to examine it at any time.

Complaint Resolution: The logistics and timelines associated with resolution of complaints need to be specified in the Minimum Technical Requirements. The Contractor should be required to respond to all customer complaints within, at most, 12 hours. If a complaint involves a failure to collect waste from any customer as required in the contract, the Contractor should collect the MSW or bulky waste in question within 12 hours of notification, provided it has been prepared for collection in accordance with the service user requirements.

Unresolved Complaints: Provisions also need to be prescribed in the event of reports from contracting agency monitors or customers that a complaint has not been resolved to the customer's satisfaction. In this case, the Contractor should submit a detailed report outlining the nature of the complaint and the resolution or actions taken to resolve the complaint. If, in the opinion of the contracting agency the proposed resolution or actions taken are insufficient to satisfactorily resolve the claim, it should require the Contractor to carry out a process to satisfactorily resolve the complaint.

REPORTING

Requiring the Contractor to prepare and submit monthly reports that address all aspects of waste collection operations is the best way to maintain complete and up to date working knowledge of Contractor activities and performance. On-going review and analysis of these reports provides an ideal mechanism for both the

Contractor and the contracting agency to identify trends and potential problem areas and expedite remedial measures that improve overall service.

Monthly reports must be timely to maximize their utility, and therefore should be submitted within 15 days of the end of the month being reported on. The information to be required in each monthly report and a summary annual report should include the following:

- Total number of waste collection vehicles put in service and personnel deployed each day, by waste collection service type and service area.
- Total number of man-hours and truck hours employed each day.
- Number of places (dwelling units, buildings, waste pooling sites, large commercial generators) MSW was collected from each day.
- Number of places that bulky wastes were collected from each day.
- Tons of MSW and bulky waste collected daily for each type of waste collection service.
- Monthly tonnage of MSW and bulky wastes diverted through material recovery or composting.
- Number of notices of non-collection left daily; with addresses and description of problem.
- Summary of customer service office staff hours worked daily.
- A complaint record enumerating customer complaints received daily.
- Description of resolution for each complaint.
- Disposition of all MSW and bulky waste collected; amounts collected, transferred, recovered and disposed.
- Updates to the database of BTB, WPS and LCG waste containers (rollout carts and bins) listing repairs, replacements and additions.
- Number of times each waste pooling site serviced.
- Lists of containers (rollout carts and bins) receiving maintenance or sanitation service.
- Accurate records of repairs which shall include, the vehicle identification number, the date/mileage, nature of repair, compliance with preventative maintenance schedules submitted as part of the Contractor's Final Work Plan and the signature of the maintenance supervisor that the repair has been properly performed.
- Summary report of daily vehicle inspections.
- An updated inventory of all vehicles used for all waste collection services including the make, type, year, license number and ownership.
- An updated list of names of all supervisory personnel assigned to each type of residential and commercial waste collection service.
- A description of problems encountered and proposals for increasing service efficiency and achievement of service objectives.
- A description of all cases of public and private property damage and personal injury that have occurred while providing waste collection services, including a copy of the accident or incident report filed with the company or with the appropriate authorities.
- A description of any violations of local ordinances.

PERFORMANCE STANDARDS

Performance Standards tell the Bidders what the minimal acceptable levels of performance are. There should be a quantifiable Performance Standard corresponding to each Service Specification and Minimum Technical Requirement to provide a legitimate means for the contracting agency to evaluate Contractor compliance through monitoring service performance and comparing it to the specified standard.

It is important that Performance Standards be written in a way that the Contractor can easily understand them and how they will be measured by the organization responsible for administering and monitoring the contract.

A Performance Standard for building-to-building collection reliability might read as follows:

"Service failures shall not exceed 0.01 percent of all building rollout carts scheduled for service that day."

A default Performance Standard may be used to cover all specifications and requirements where one hundred percent compliance with a Service Specification or Minimum Technical Requirement is expected. It can be written as follows:

"Unless otherwise stated, 100 percent compliance with each Service Specification and Minimum Technical Requirement is required."

MEASURING COMPLIANCE WITH PERFORMANCE STANDARDS

To be fair, the Contractor should be informed of how his compliance with each of the Service Specifications and Minimum Technical Requirement will be evaluated by the Contract Monitoring Unit (see Chapter 6). This will actually consist of a two-step process. The first will be monitoring of the Contractor to identify individual cases of apparent non-compliance with each Service Specification and Minimum Technical Requirement. The aggregated information is then used by the Contract Monitoring Unit to measure compliance with each Performance Standard. Thus the final step of the residential and commercial waste collection system final design requires the system designer to describe and apply this monitoring and measurement process to each of the Service Specifications and Performance Standards.

An example of the description of the monitoring process might read as follows:

"The Contract Monitoring Unit shall monitor Residential and Commercial Waste Collection Services. The Contract Monitoring Unit Administrator shall assign Monitors to observe and evaluate Contractor compliance with each of the Service Specifications and Minimal Technical Requirements contained in this Article."

An example of the description of the measurement of compliance with the Unit for the building-to-building Service Specification might read:

"The Contract Monitoring Unit Administrator shall measure daily compliance with the performance standard by dividing the total number of reported BTB Service Failures by the total number of Rollout Carts scheduled for collection that day."

In this case, Contract Monitoring Unit Administrator, BTB, Service Failure and Rollout Cart would have been clearly defined in a separate Definitions section of the RFT.

Solid Waste Technical Assistance

