Memorandum

MIAMI-DADE COUNTY

Date: August 16, 2005

INLUC
Agenda Item No. 7(B)

To: Honorable Chairman Joe A. Martinez
and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: Feasibility Study to Improve Bulky Trash Collection

The following report is provided for Board consideration pursuant to Resolution R-181-05, which directed me to conduct a feasibility study with recommendations to significantly improve the curbside collection of bulky trash in the solid waste collection service area, include within the study the feasibility of implementing a level of curbside bulky trash collection which is consistent with or better than that provided by the incorporated municipalities, including possible bi-weekly zoned trash collection, the timing of implementation and cost of implementation.

Background

The County currently provides Service Area customers with three options for disposal of bulky trash as follows: (1) Self service drop-off at any of the Department of Solid Waste Management's (DSWM) 13 Trash and Recycling Centers (TRCs), (2) Twice per year scheduled service for up to 25 cubic yards per pick-up, and (3) Unlimited twice per week collection of containerized, bagged, or bundled trash that is collected at the same time garbage in collected. The costs for these services are included in the $399 annual solid waste collection fee along with regular twice per week garbage collection, once per week collection of recyclable materials, residential solid waste code enforcement and County-wide illegal dumping enforcement. The three bulky trash disposal options provide customers of the Service Area with the highest level of solid waste collection service in the County.

The change in the method of garbage collection from manual bagged, bundled, or containerized to automated cart service will eliminate the opportunity for the collection of bagged or bundled trash collection at the same time as garbage is collected. This can be overcome, in large part, by the use of additional automated cart containers, if requested by the customer, for the collection of trash on regular garbage collection days and other methodologies directed at maintaining and improving upon the very high level of service now provided. Therefore, DSWM will continue to collect trash twice per week when it is containerized in the automated carts(s).

Over time, the County has employed various collection methodologies designed to provide a high level of service while remaining cost effective. This has included zoned bulky trash collection that was abandoned over thirty years ago due to excessive costs and difficulty of execution in a rapidly expanding urban area, bulky waste go backs for items too large to fit in garbage collection vehicles, and the recently restored second scheduled bulky waste pick-up that had also been abandoned in an effort to reduce costs. The pilot project for change to automated cart service was also directed at maintaining a high level of service at a lower cost than manual collection. The Department's pilot project demonstrated significant project savings could be achieved using fully automated and semi-automated cart service. The Department is currently evaluating the utility of allowing non-customers to use some TRCs on a fee for service basis in an effort to reduce leakage into the TRCs, reduce the cost of TRC operations to Service Area customers, and reduce illegal dumping.

Feasibility Study

A study was conducted by the Department and its consultant to determine the feasibility of shifting to a pre-designated level of frequent, zoned, curbside bulky trash collection. The study examined various scenarios to determine the feasibility both from a practical as well as financial perspective.

The study did not consider the closing of any of the current Trash and Recycling Centers (TRCs) to offset the cost of frequent zoned trash collection because of the popularity and growing demand for this service, the historical difficulty of closing existing TRCs and the demand for additional TRCs. This is a popular and cost effective waste collection alternative. Other municipalities also provide this service or are planning to do so in the near future. The City of Miami has two new TRCs under construction and is seeking to develop a third one. The study instead considered the option of charging all users of the TRCs on a cubic yard basis as a method of offsetting the cost of frequent zoned collection of bulky waste.

The study found that the cost of providing zoned curbside collection of trash on a regular and frequent basis would require a fee increase under any scenario except monthly after elimination of both scheduled bulky waste pick up collections and charging all users of the TRCs for disposal. The consultant did not recommend weekly collection because of its prohibitive cost. Instead they recommended biweekly collection as a frequency that is reasonable and overcame the negative aspects of less frequent collection. Nevertheless, biweekly collection would require several years to implement, would expand the trash collection positions from 98 to 300 full time positions and expand the trash collection crews from 20 to 90 crews per day with one half of the crews using a crane and two trucks and one half using lightning loaders. This would also require the purchase of 50 new lightning loaders, 20 new cranes and 26 additional trash trucks.

The cost of this service could be partially offset by the elimination of the two scheduled bulky waste pick ups, charging all users of the TRCs, limiting the amount of bulky waste a household could set out, charging extra for additional collection service and other assumptions regarding the potential revenues from non-system TRC customers. It assumes reduced unauthorized use of TRCs, and reduced illegal dumping. Those savings would in turn be reduced by the cost of filling depressions caused by frequent collection and costs to repair damages to curbs and sidewalks.

Comparison of Trash Collection Alternatives

Several scenarios were reviewed that included various combinations of frequencies of zoned trash collection, scheduled (call in) pickup of bulky waste, and charging or not charging for use of the TRCs (see table attached). Frequencies longer than monthly (bimonthly, every three months and every four months) were reviewed but offer little or no advantages over the current system. Weekly zoned trash collection constitutes a higher level of service, but the benefits associated with collection at this frequency would be offset by the materially higher direct cost per residential unit of up to an extra $103 per household over the current rate. In addition to the twice per week collection of trash along with garbage, the current service includes two (2) bulky waste pickups per year and the free use of TRCs by service area users, with the direct trash collection cost per residential unit of $64, included in the household waste fee of $399.

The costs of provision of zoned collection of bulky waste would increase direct costs, with the amount of increase depending on the frequency selected. Any scenario where the current customers would be required to pay to use the TRCs would be a reduction in service to the approximately 50% of the service area customers who utilize the TRCs at least once per year.

Recommendation

I do not recommend any change in the frequency of trash collection at this time under any of the scenarios examined in the feasibility study. The Solid Waste Management Department and our employees have done an incredible job of increasing productivity while continuing to serve a much greater number of customers at the same costs as they did ten years ago. Since 1992 the productivity of the individual waste collector has risen by 61.5% for garbage and 91.8% for trash. During this same period the total headcount for the Department has been reduced by 18.4% overall.

The Department is now engaged in the significant productivity improvement of implementing automated cart service over the next four years. Any other large scale change in service delivery such as biweekly trash collection would also require several years to implement, require an enormous increase in staff and equipment as well as fee increases. It would further burden the Department when it is engaged in the difficult challenge of implementing the automated service. The Department continues to be one of the highest rated services that we provide. Therefore, I do not recommend any further changes in trash collection service at this time.

Assistant County Manager

Zoned Trash Pick Up Limited to Maximum of Two Cubic Yards Per Pick Up

	Monthly			Biweekly			Weekly		
Scenario: Zoned Trash Collection	Direct Collection Cost per Residential Unit	Net Cost per Residential Unit	Household Waste Fee w/New Service	Direct Collection Cost per Residential Unit	Net Cost per Residential Unit	Household Waste Fee w/New Service	Direct Collection Cost per Residential Unit	Net Cost per Residential Unit	Household Waste Fee w/New Service
With no bulky waste pickups and all users pay for use of the TRCs	$63	*	$398	$88	$24	$423	$121	$57	$456
With no bulky waste pickups and the current free use of TRCs by service area users	$94	$30	$429	$118	$54	$453	$142	$78	$477
With one(1) bulky waste pickup per year and the current free use of TRCs by service area users	$117	$53	$452	$139	$76	$475	$166	$102	$501
With two (2) bulky waste pickups per year and the current free use of TRCs by service area users	$119	$56	$455	$141	$77	$476	$167	$103	$502

* This represents an increase of $44 per year to the 50% of customers that use TRCs at least once per year and a minimum cost to more frequent users.

Scheduled Zone Trash Collection Feasibility Analysis

Prepared for

MIAMI DADE SOLID WASTE MANAGEMENT

Miami-Dade Department of Solid Waste Management

Prepared by

Planning and Economics Group, Inc.

May 14, 2005

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Scheduled Zone Trash Collection Feasibility Analysis

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May 14, 2005

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Executive Summary

Introduction and Background

This analysis was conducted in response to a resolution by Commissioner Jose "Pepe" Diaz and approved by the Infrastructure and Land Use Committee of the Board of County Commissioners. The resolution instructed the County Manager to "conduct a feasibility analysis, including recommendations to the Board of County Commissioners, as part of the upcoming fiscal year 2005-2006 proposed operating budget, to significantly improve the curbside collection of bulky trash in the Department of Solid Waste Management's waste collection service area. . . . The study shall include timing of implementation and the cost of implementation."

This report presents the results of the feasibility analysis. It addresses a series of alternative scheduled zone trash collection alternatives, the advantages and disadvantages, their costs, how they compare to trash collection programs of incorporated municipalities in Miami-Dade County, and the cost and household fee implications associated with implementing each alternative. The analysis also identified improvements that should be made to the existing trash collection system.

Trash collection alternatives

Several different trash collection processes are applied by solid waste utilities across the United States and South Florida. The two most widely used systems are scheduled zone trash collection - using routes run on a predetermined schedule, and trash drop-off centers. A third procedure, used in Miami-Dade County, is call-in trash pickup, which is much less prevalent.

Associated with each process are various types of equipment and crew configurations. Trash collection systems are also characterized by trash preparation requirements such as size limitations, the types of materials that are accepted, the limit on setout time in advance of trash pickup, limit on amount of setout or drop off, charge for excess trash or special pickup, and collection frequency,

Trash collection alternatives suitable for the Department of Solid Waste Management

The current trash collection service has provided an adequate level of service and the Department has received few complaints concerning the cost of the service. Residents are accustomed to the service, and with certain modifications, it is possible that the service could remain viable for several more years. The changes needed most urgently relate to limiting the amount of trash delivered to trash and recycling centers by non-residents and limiting the no-charge heavy use of the facilities by a few residents

Scheduled zone trash collection, especially at more frequent intervals, offers some advantages over the current system. Scheduled zone trash collection alternatives

potentially suitable for the Department of Solid Waste Management include several scheduled zone trash collection alternatives, including the following:

- Bi-weekly or twice per month trash collection with pay-per-use trash and recycling centers

- Monthly, bi-monthly, or less frequent trash collection with trash and recycling centers remaining available to residents at no charge

While weekly trash collection constitutes excellent service, the benefits associated with collection at this frequency would be offset by materially higher costs than warranted, especially in the Department of Solid Waste Management's vast and, in some parts dispersed, service area.

The basic characteristics of scheduled trash collection suitable in Miami-Dade County are discussed in the report. The components discussed include equipment and crew composition, trash preparation, acceptable materials, limit on setout in advance of trash pickup, limit on amount of setout, and collection frequency.

Estimated costs

Table ES-1 shows the estimated annual cost of the current trash collection system and scheduled zone trash collection at different frequencies. In comparing the costs of the current system and scheduled zone trash collection at different frequencies, several adjustments were made to reflect the configuration of the trash collection system that would prevail at the different collection frequencies:

- Elimination of call-in bulky trash collection with scheduled zone trash collection

- Savings in disposal of trash from non-residents with frequent trash collection

- Increased cost for filling depressions in swales due to continued operation of loaders

With these adjustments, Table ES-1 shows that biweekly and twice per month trash collection are both more costly than the current system. After inclusion of the savings noted above, biweekly trash collection would add an estimated $7.4 million per year to the overall cost of trash collection, or about $24 per year to the annual cost per residential unit. The estimated costs are based on a variety of factors and assumptions that are thought to be reasonable. To the extent that those factor and assumptions differ from those assumed, the results will be different.

Table ES-1
Current Trash Collection System and Scheduled Zone Trash Collection Alternatives
Comparison of Direct Costs

Number of residential units	305,761

Trash Collection System/ Cost Item	Annual cost		Annual Cost per Residential Unit	
	Total Cost	Additional Cost (Savings) Over Current Trash Collection System	Cost per Residential Unit	Additional Cost (Savings) per Residential Unit (Additional Cost) Over Current Trash Collection System
Current trash collection system				
T&R centers	$ 9,994,290		$ 33	
Bulky trash collection	$ 9,540,411		$ 31	
Total cost	$ 19,534,701		$ 64	
Scheduled Trash Collection - routes and costs using Lightning Loaders in one-half of service area and crane/loaders with trash trucks in one half of service area				
Weekly	$ 36,882,760	$ 17,348,060	$ 121	$ 57
Biweekly	$ 26,971,768	$ 7,437,067	$ 88	$ 24
Twice per month	$ 26,181,615	$ 6,646,915	$ 86	$ 22
Monthly	$ 28,834,557	$ 9,299,857	$ 94	$ 30
Bimonthly	$ 22,763,061	$ 3,228,360	$ 74	$ 11
Every three months	$ 19,908,964	$ 374,263	$ 65	$ 1
Every four months	$ 18,410,749	$ (1,123,951)	$ 60	$ (4)

Findings

This analysis concluded that the County may reasonably follow either of two courses of action in improving its trash collection system:

- Adopt a frequent scheduled zone trash collection system at a higher cost to residents
- Improve the current trash collection system primarily by reducing the leakage of trash into the system from non-residents and commercial waste generators

The selection of the preferred course of action depends mostly on whether the additional cost of the first alternative would offset its benefits.

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Frequent scheduled zone trash collection

Of the two alternatives for frequent trash collection considered, biweekly is superior to twice-per-month. First, service would be provided more frequently. Second, and of greater importance, service to each resident would always be on the same day of the week – a major simplification for residents and the Department alike. For this reason, the biweekly schedule is preferred.

With an estimated additional annual cost to each residential unit of $24, the additional cost to each household would be about five percent more than the current annual household fee of $399.

The principal drawbacks to biweekly scheduled zone trash collection relate to cost, financing, logistics, and implementation Once fully implemented, the principal disadvantage to frequent scheduled zone trash collection is that it comes at a higher cost than the current system.

Improvements to the current system

While not specifically requested by the resolution that prompted this feasibility analysis, the analysis necessarily included a detailed assessment of the current trash collection system. An advantage of the current trash collection system is that residents and the Department of Solid Waste Management are accustomed to the system, and change is disruptive.

One of the most serious, and expensive, weaknesses is the leakage of trash into the system from non-residents and commercial waste generators. This problem could be addressed through implementation of a coupon or electronic system allowing each resident only a limited number of trips to the trash and recycling centers, while allowing everyone unlimited access at a charge covering the cost of operating the centers and disposal of trash. Charges could be collected using either a coupon system or credit cards.

In addition to reducing the leakage of trash into the system, allowing access at a charge would reduce the incidence of illegal dumping by persons currently excluded from using the trash and recycling centers. With few exceptions, residents of the County, residing outside the direct service area can dispose of trash only at the landfills and regional transfer stations, which can be quite inconvenient and hazardous. Allowing non-residents and commercial waste generators into the trash and recycling centers would permit them to dispose of trash legally and conveniently. Those individuals disinclined to illegally dump but who also prefer not to drive long distances to dispose of trash legally, would find this access to be a real benefit.

Making these improvements would improve the efficiency and equity of the current system, and reduce operating costs. The changes could allow the Department to defer major restructuring of the trash collection system for several years.

1. Introduction and Background

Purpose of the feasibility analysis

This feasibility analysis was conducted in response to a resolution by Commissioner Jose "Pepe" Diaz and approved unanimously by the Infrastructure and Land Use Committee of the Board of County Commissioners. The resolution instructed the County Manager to "conduct a feasibility analysis, including recommendations to the Board of County Commissioners, as part of the upcoming fiscal year 2005-2006 proposed operating budget, to significantly improve the curbside collection of bulky trash in the Department of Solid Waste Management's waste collection service area. The Manager is directed to include within the study the feasibility of implementing a level of curbside bulky trash collection which is consistent with or better than that provided by the incorporated municipalities, including possible bi-weekly zoned trash collection. The study shall include timing of implementation and the cost of implementation."

Scheduled zone trash collection, often referred to as trash sweeps, is a system where the trash that has accumulated in a service area is collected on a regularly scheduled basis. It is the most common trash collection procedure in South Florida. The trash may be collected using any of several types, or a combination, of equipment and crews. Scheduled zone trash collection service is also characterized according to collection frequency, setout limits, permissible material, and required preparation of material, each of which is addressed in this report.

This report presents the results of the feasibility analysis. It addresses a series of alternative scheduled zone trash collection alternatives, the advantages and disadvantages, their costs, how they compare to trash collection programs of incorporated municipalities in Miami-Dade County, and the cost and household fee implications associated with implementing each alternative. The analysis evaluated the alternative scheduled zone trash collection alternatives and identified the preferred system, including the frequency of collection, method of collection including labor and equipment, amount of trash allowed per pickup and charges for excess trash, and setout rules. The analysis also identified several improvements that should be made in the existing trash collection system.

Disposal of garbage and trash

Both garbage and trash are disposed of at the County's Resources Recovery Facility as well as at landfills. However, at the Resources Recovery Facility, garbage and trash are directed to different parts of the plant because they are processed differently. And when landfilled, garbage and some trash are disposed of at the South Dade Landfill while the less costly North Dade Landfill accepts only trash. For these reasons, it is important for the trash collection system to maintain the trash separate from garbage to the greatest practicable extent.

Current system for collection of garbage and trash in the Department's direct service area

The Department provides garbage and trash collection service to residences in the unincorporated County as well in those municipalities that have been incorporated since 1995. Garbage is collected from each residence twice each week. Since the service was instituted, the Department has collected garbage manually, whereby a garbage truck with a driver and two collectors moves through a route, stopping near each residence, and the collectors manually lift garbage cans and bags and place waste into the back of the truck. Typically, the daily route is interrupted by the truck being filled, and the need to deliver the waste to a disposal or transfer facility. Sometimes the truck must be emptied twice during the route.

The Department is now implementing a garbage collection system that is safer for employees, reduces employee turnover and reduces cost. The new system, called automated garbage collection, employs a truck with just an operator, but the truck is equipped to lift a specially designed garbage container from the edge of the street into the vehicle using a hydraulically operated arm, empty the container, and return it to the curb. The system is being implemented widely in the United States. It is a relatively new collection method because the vehicles needed for automated garbage collection have only recently become available at an acceptable level of cost, performance, and reliability.

The Department's current trash collection system is a product of the development history of Miami-Dade County. Prior to about 1980, Miami-Dade County's trash collection system included scheduled zone trash collection routes, or trash sweeps, whereby trash collection crews regularly drove through neighborhoods collecting trash. However, as the County began to develop and much of the service area became pockets of development and semi-rural, it became clear that it was no longer economical or operationally practical to continue collecting trash through scheduled routes. For this reason, the County instituted a system, still in place today, of trash and recycling centers where residents could take their trash, including yard trash, and once-per-year bulky waste pickup by individual request. Until 1990, when curbside recyclable collection was initiated, the trash and recycling centers also served as drop off locations for recyclables. Until 1996, each resident was allowed two call-in pickups per year. Between 1996 and 2003, each resident was allowed to call in for only one pickup per fiscal year for up to 50 cubic yards. Beginning in 2004, residents were again allowed to call in for two pickups per year. This system has proven to be economical and generally acceptable to the majority of the direct service area residents.

Drawbacks to the County's current trash collection system – opportunities for improving service and reducing cost

As the County became more and more built out during the last few years, the advantages of the current system began to recede, and problems began to surface. With more dense development, the economic advantages of the current system over

scheduled zone trash collection declined. Moreover, two major problems with the trash and recycling center system were revealed: (1) the increasing use of the facilities by non-residents, along with the virtual impossibility of effectively policing such use, and (2) the imbalance of service among customers, whereby some customers receive much greater service through the use of trash and recycling centers and bulky trash pickups, thereby driving up the cost to everyone.

The Department currently examines driver licenses of persons arriving at the trash and recycling centers to determine whether or not they reside in the direct service area and are entitled to enter. The system is difficult to administer because of the difficulty in determining quickly whether the address is indeed in the direct service area. In addition to checking addresses, trash and recycling center staff exclude vehicles that are obviously commercial, either because of vehicle size or they show company names. This check is also a problem because there is no practical way to exclude commercial waste from entering the facilities in vehicles considered not to be commercial. The checking process becomes more strenuous when there are long lines at the centers.

The use of the facilities by non-residents has come in two forms. First, landscapers permitted to use the facilities for disposing of yard waste were found to be disposing of large amounts of yard trash from outside the direct service area at the trash and recycling centers. This problem has been largely corrected through instituting a charge for landscapers. Second, anyone with a driver's license from the service area is allowed to use the trash and recycling centers, which basically allows anyone with a qualifying driver's license to bring waste regardless of its origin, including commercial waste. With a disposal cost of over $50 per ton, this leakage of trash into the system has significantly increased the cost of providing trash collection services to the Department's residential customers.

The imbalance of service stems from the ability and willingness of some customers to bring very large amounts of trash to the trash and recycling centers, and to take full advantage of the now available two call-in bulky trash pickups per year, while others do not have the resources to use trash and recycling centers and rarely if ever call in for a pickup.

A system that would allow the County to close off the leakage of non-paying waste into the system has advantages to everyone other than those persons who use the current system to its full potential or who abuse the system by bringing in trash other than their own residential material. Also, the current system is of limited use to a typical resident that does not own or have access to a truck for taking trash to a trash and recycling center. Without such a vehicle and the ability to load and unload trash, the resident must either hire someone to carry the trash or rely on call in trash collection pickups. For most residents, this level of service is below the service offered by the majority of municipalities, many of which collect trash weekly or biweekly. This type of scheduled collection is a service directly usable by all residents, contrasted to the County's current service that is accessible to or used by only a portion of the residents. Also, scheduled

zone trash collection, especially when it occurs frequently, may result in a cleaner community due to the frequent collection of all trash setout.

While the current trash collection system has served the County well for a long time, there are now opportunities for both providing better service to most of the Department's and improving neighborhoods.

Scheduled zone trash collection

The Infrastructure and Land Use Committee has directed the Department to analyze the feasibility of instituting scheduled zone trash collection, and to conduct the assessment in a creative fashion. The directive is timely, and consistent with planning efforts already conducted by the Department. The Department has previously addressed the potential for instituting scheduled zone trash collection as well as converting the trash and recycling centers to a pay-per-use basis. A pay-per-use system for the trash and recycling centers would address both the leakage of non-paying trash into the Department's system as well as provide sites for residents to take trash in excess of what is allowed through scheduled zone trash collection - at a fee. Moreover, it would allow non-residents to use the facilities, which would generate revenue for the Department.

The feasibility analysis

The feasibility analysis began by identifying the basic objectives of trash collection in Miami-Dade County and the trash collection alternatives that are in common use in the United States. The alternatives were evaluated with respect to their ability to meet the County's objectives, and the ones most appropriate for the Department of Solid Waste Management were identified. Cost estimates were then developed for those alternatives considered most suitable for the County. Combining the evaluation of the alternatives with the cost estimates, the feasibility analysis reached several conclusions on the trash disposal alternatives. The remainder of this report presents each of these elements of the feasibility analysis.

2. Trash Collection Alternatives

Trash collection alternatives may be characterized in terms of process, equipment and crew deployed, and in the case of scheduled zone trash collection, collection frequency. This section describes the trash collection alternatives that are commonly used by solid waste companies and utilities in the United States, and the advantages and disadvantages, other than cost, of each. Cost is addressed in the following section. This section also includes conclusions concerning the alternatives that would be suitable for implementation by the Department of Solid Waste Management.

Trash collection processes

Several different trash collection processes are applied by solid waste utilities across the United States and South Florida. Table 2-1 lists trash collection systems employed in selected South Florida municipalities. The two most widely used systems are scheduled zone trash collection - using routes run on a predetermined schedule, and trash drop-off centers. A third procedure, used in Miami-Dade County, is call-in trash pickup, which is much less prevalent. Each of these processes is described below.

Scheduled zone trash collection is particularly prevalent in densely populated areas, typically with 5,000-10,000 persons per square mile (the population density of the City of Miami is about 10,000 persons per square mile), where trash piles are close together. Parts of the Department of Solid Waste Management's direct service area have a density within this range, but some areas, mainly in the southwest, are less dense. The densely populated areas are not all contiguous, but occupy a large proportion of the Department's service area. In rural areas, scheduled zone trash collection is much less economical because of the travel distance between pickups and the resulting higher cost of collection on per resident and per ton basis.

Where it is economical, scheduled zone trash collection offers numerous benefits to residents:

- It is effective in terms of trash removal and convenient to residents.
- When collection is frequent, streets and neighborhoods are kept clean.
- It is able to respond to storm events through extending work hours and more intensive use of equipment; generally little or no restructuring in the trash collection system is needed other than to prepare waste for collection where large trees must be removed.
- Scheduled zone trash collection is easily used by residents.
- In built out areas, with reasonable setout limits, scheduled zone trash collection can be offered at affordable rates

- It is a service that serves all residents.

- The system complements virtually any garbage and trash disposal operation.

- With properly specified equipment, good maintenance, and well trained crews, scheduled zone trash collection is a reliable and predictable service.

- With setout limits and charges for overages, scheduled zone trash collection can reduce leakage of trash into the system from outside the service area and from commercial waste sources.

- Where the service is provided frequently, as often as twice per month, a solid waste utility is justified in discontinuing free access to drop-off centers to reduce costs to most residents.

A possible advantage to the Department of Solid Waste Management is that scheduled zone trash collection every two weeks would be more labor-intensive than the current trash collection system and could absorb employees displaced in the Department's garbage collection system due to automation. However, those employees would require training and quality to become drivers. Currently, the Department has 98 persons assigned to collecting bulky trash, while scheduled zone trash collection would require close to 300 positions.

The principal disadvantages to scheduled zone trash collection are the following:

- When first initiating the service, there is a significant requirement for purchasing and financing collection equipment.

- Implementation can be a sizeable effort due to the logistical requirements of equipment acquisition, laying out routes and schedules, and managing and deploying collection crews. At the Department of Solid Waste Management, much of the infrastructure needed to manage these logistics already exists, but early in the program, a considerable period of adjusting and balancing routes will inevitably occur.

- A considerable staff training effort is required, although this would be less of a problem for the Department of Solid Waste Management where persons already familiar with the County's garbage and trash operations would probably be reassigned to scheduled zone trash collection.

- Residents currently using the call-in bulky trash collection system to have tree trimmings removed prior to hurricane season would be required to begin the trimming process earlier to accommodate setout limits or pay for

collection, unless the Department were to relax the setout limit prior to or following major storm events.

- The need for code enforcement actions may increase due to the greater prevalence of trash setouts and the need to encourage residents to set out no earlier than the day before scheduled collection and to adhere to the setout limit.

- Over time the loaders remove soil and often create a depression in the swale, which can require filling. While the responsibility for filling the depressions may lie with the resident, the solid waste utility often assumes the responsibility in order to minimize complaints. Also, loaders may occasionally damage sidewalks. It is important to resolve the matter of the responsibility and cost for filling the depressions prior to initiating the service. In Miami-Dade County, this issue also applies to a lesser extent to the Department's current call-in bulky trash service.

For Miami-Dade County, another disadvantage of scheduled zone trash collection relates to phasing out unrestricted use of trash and recycling centers. This process would probably involve the conversion of trash and recycling centers in areas served by scheduled zone trash collection to pay-per-use, while trash and recycling centers in other parts of the service area would need to remain available to residents at no charge. During the phasing in period, the Department could be expected to receive increased amounts of trash at the trash and recycling centers that continue to remain available at no charge to residents, receiving waste from both residents of the direct service area as well as non-residents. Just as it is virtually impossible to exclude non-residents from the trash and recycling centers under the current trash collection system, this problem would continue and probably intensify as a pay-per-use system phased in.

A final disadvantage of converting to scheduled zone trash collection is that the Department of Solid Waste Management may expect to receive complaints from residents displeased with losing no-cost access to the trash and recycling centers and no-cost call in for bulky pickup.

Drop-off centers, referred to as trash and recycling centers in Miami-Dade County and convenience centers in other areas, are sites where residents can bring waste material for disposal. In Miami-Dade County, there are 14 such centers located throughout the Department's direct service area. Drop-off centers may be designed and operated to accept a variety of waste or recyclable materials, not just household trash. For dropping off trash, the design of a drop-off center is usually similar to a transfer station, where persons delivering material can push the trash out of a vehicle onto a tipping floor or directly into a trailer or roll-off container positioned below the edge of the tipping floor.

Drop-off centers are widely used in rural areas, where trash collection is particularly inefficient due to the distance between pickups. In many areas, drop-off centers are the only affordable means for providing trash collection services.

In addition to their lower cost, drop-off centers have several advantages:

- A resident with the means for transporting trash to a drop-off center can dispose of trash at her or his convenience.

- In Miami-Dade County, many residents are familiar with and accustomed to using the trash and recycling centers; retaining the status quo and avoiding change is comfortable to many residents.

- The trash and recycling centers assist some residents in preparing for storms and disposing of trash after storm events.

- When a charge is imposed at a drop-off center, it provides both a source of revenue to the utility to cover its costs as well as prevents the unabated inflow of waste from persons not legally entitled to use the facilities when the service is offered at no charge. In areas where the service area is interspersed with or adjacent to other jurisdictions, charging for use or imposing strict limits on use are virtually the only basis for managing drop-off centers economically; unfortunately, there are few if any effective methods for limiting use of drop-off centers to qualifying residents, and none without drawbacks.

- Providing universal access to drop-off centers, even at a cost, would reduce the incidence of illegal dumping by providing a site for residents of the service area and non-residents alike to dispose of trash. .

- Drop-off centers function well within the Department's solid waste management system, and effectively isolate a large amount of trash from garbage to support the system's disposal needs.

- Drop-off centers offer reliable and predictable service to residents, with little risk of service disruption.

Drop-off centers have several disadvantages:

- Where no charge is imposed for use, as is the current case in Miami-Dade County, the Department has no very effective means for prevent the leakage of waste into the system from persons outside the service area or commercial waste generators.

- Some residents inevitably take much greater advantage of the no-cost access for trash disposal than most, benefiting some residents but increasing the cost to all.

- Persons not having use of a truck or trailer and those unable to load and unload trash cannot effectively use drop-off centers, so receive no benefit from this form of trash collection. While some people use cars to bring waste to drop-off centers, cars can carry one a few square feet of material and are impractical for transporting debris.

- Drop-off centers, especially where access is restricted to service area residents, provide relatively little benefit to maintaining clean streets.

- Drop-off centers offer limited assistance in cleaning up in preparation for or after storm events due to the need for having access to a truck or trailer and because the debris amounts are often great.

- Like virtually all solid waste facilities, residents prefer not to have a drop-off center located in the neighborhood, but appreciate it being a short drive.

Call-in trash pickup. Many solid waste utilities offer call-in service for trash pickup, usually with a charge. Residents call and schedule a pickup, and provide an estimate of the amount of trash.

Call-in trash pickup, at an additional cost, is generally provided in addition to another trash collection service, including scheduled zone trash collection, for residents with large trash accumulations that cannot be accommodated during the scheduled zone trash collection route.

In Miami-Dade County, each resident of the Department's direct service area is entitled to call in for two pickups during each County fiscal year at no charge. However, any resident may obtain additional pickups at a charge that largely covers the Department's cost. To obtain the service, the resident calls the Solid Waste Department to schedule the pickup. The resident is given the next available date. Once scheduled, the resident is then permitted to begin setting out trash. For this reason, it is imperative that the collection be scheduled and take place as soon as possible after the request for pickup, to avoid having a trash pile sit for an extended period of time. Miami-Dade County strives to collect each trash pile within five working days after the request is called in, but this target is currently not being met due to workload and a limited number of crews. The average time between call in and actual pickup is in excess of one week. Each pickup is limited to 25 cubic yards, which is approximately the volume of a large van. Residents also have the option of calling for both annual pickups at one time, thereby increasing the allowable setout amount to 50 cubic yards.

With both call-in trash pickup and no-charge use of trash and recycling centers, the County's existing trash collection service is an acceptable level of service for many customers, and very high level of service for those residents that are able to take advantage of both services.

Call-in trash pickup has several advantages:

- It accommodates residents' major cleanup efforts, allowing for larger setouts than could be accommodated with normal scheduled zone trash collection.

- It accommodates the schedule of each resident, rather than the solid waste utility - a major source of convenience to the resident.

However, call-in trash pickup has a number of disadvantages:

- The service is inefficient in terms of the cost of collection per resident or per ton of trash collected, due to the costs of scheduling pickup and the long distance traveled between pickups.

- Call-in service has several logistical problems, including a limitation on which trash piles a crew can pickup while collecting; only trash piles actually scheduled for pickup can be collected, because picking up any other trash pile is likely to occur prior to the resident's having completed cleanup.

- Code enforcement with call-in trash pickup can be challenging, because residents frequently begin setting out trash prior to scheduling a pickup, although the Department has improved its enforcement program through the use of portable computers with wireless connectivity so that scheduled pickup dates are quickly available to code enforcement officers. Also, when the Department receives an unusually large number of calls for pickup, the scheduled date for pickup must be delayed, causing trash to remain on the street longer.

- Trash piles left for more than a few days tend to accumulate waste, including garbage, from others, and are a nuisance and eyesore for the neighborhood. Eventually, trash piles can become a public health problem.

- Comparatively few residents, only about 17-19 percent in one recent year, use call-in trash pickup services, so the service benefits a relatively small number of residents, whereby the majority of residents pay for a service used by a few.

- While the service can be adapted for preparation for and recovery from storm events, such deployment results in deferring bulky trash collection in other areas.

Another disadvantage of the current call-in service is that if it were to become more widely used by residents, the cost would escalate sharply. Measured on the basis of

the per ton cost of collection, call-in bulky trash collection is a very inefficient means for picking up trash. It is actually to the County's advantage that only a relatively small proportion of residents – less than 25 percent - call in to schedule bulky trash pickup each year. As long as the program exists, it will present the major risk that it could gain in popularity and greatly increase the Department's costs. For this reason, it would be unwise to openly promote the service.

Equipment and crews

Rear mount loaders and trash trucks. In providing scheduled zone trash collection and call-in trash pickup service, the most common types of equipment employed are rear mount loaders and trash trucks, although combination loader-dump body trucks, commonly referred to as Lightning Loaders, are gaining wider use. A rear mount loader consists of a hydraulically-operated loader mounted to the rear of a heavy duty truck chassis. They are often equipped to be driven at low speeds from the truck bed at a driving station adjacent to the loader controls, which enables the operator to move efficiently from one pickup to the next. The rear mounted loaders usually pick up trash from the swale, or right-of-way, and place the material into a trash truck, a large dump body mounted to a heavy duty truck chassis. When the trash truck is full, it delivers the trash to a designated facility, either a transfer station or disposal site. Another trash truck is dispatched to support the continuing loading operation. The ideal trash truck dispatching system minimizes the idle time of both the loaders and the trash trucks. Each vehicle may operate with a single driver/operator or also with a person to assist in traffic control and cleanup. Effective trash truck dispatching is especially important in areas some distance from a disposal or transfer site, where wait times for either the loaders or trash trucks can be the greatest. In most service areas, especially in the private sector, each vehicle carries just one crew member, one of whom is assigned to clean up the collection site to an acceptable level.

The Department of Solid Waste Management and a number of other solid waste utilities use crane trucks instead of or in addition to rear mount loaders. A crane truck serves the same function, but uses a cable-operated crane and bucket to load trash rather than a hydraulically-operated boom and bucket. Crane trucks have minor operational advantages over loaders, but their advantages are now mostly offset by federal rules that limit the speed at which cables may be operated, thus slowing overall operation. This rule applies to new cranes and whenever a crane receives a major overhaul.

Combination loader dump body vehicle. An alternative to using separate loaders and trash trucks is the combination vehicle. Often referred to as a Lightning Loader, the name applied by the manufacturer that has popularized such vehicles in the Southeastern United States, this type of vehicle mounts a dump body behind the loader, enabling the operator to fill the dump body, then deliver the trash to a transfer or disposal site. The advantages of this equipment are that it eliminates an equipment type and eliminates trash truck dispatching complexities and inevitable trash truck idle time. The principal disadvantage of the use of the Lightning Loader is that it is out of service as a loader for prolonged periods of time when collecting and hauling trash from

some distance from the transfer or disposal site. Where efficient trash truck dispatching is possible, separate loaders and trash trucks are more efficient and cost-effective when operating at some distance from a transfer or disposal site. As in the case of the separate rear mount loader and trash truck team, a Lightning Loader may have a single person crew or be assisted by a person responsible for site cleanup.

Aside from their respective advantages relating to the distance to deliver trash, both teams of rear mount loaders and trash trucks, and Lightning Loaders offer a number of advantages:

- They operate with considerable flexibility in trash collection. Skillfully operated, a loader operator is able to pick up large and small accumulations, and there is no special requirements for the setout other than it cannot be near a fence, tree, vehicle, or other obstacle, or under a low utility line. No arduous waste preparation is required, other than trash items should not exceed about six feet in length. The equipment can pick up virtually any household trash.

- The vehicles are reliable, and their performance is predictable.

There is no significant disadvantage to the deployment of these types of vehicles other than their inherent inefficiency in areas a considerable distance from a disposal or transfer site, where teams of loaders and effectively dispatched trash trucks have an operating advantage.

Rear loading packer vehicles. Rear loading garbage trucks are occasionally used in trash collection. While a packer truck can accept trash, tree limbs and other rigid material often thwart and can damage the hydraulically-operated packing assembly in the vehicle. For this reason, packers are effective for trash collection only where there are strict rules on the preparation and contents of the trash, such as the allowable size of tree limbs, and the rules are strictly enforced. Also, if the trash is placed on the ground, loading is manual. A hydraulic arm can be appended to the rear of the vehicle for loading from a small cart or garbage can, but this requires that the material be containerized. Also, the hydraulic arm can lift only relatively light containers, which greatly limits its applicability to trash collection.

The Department of Solid Waste Management is migrating to automated garbage collection for a number of reasons, including lower cost of collection and greatly reduced incidence of injuries to waste collectors from manual collection. In trash collection applications, rear loaders are of virtually no use for collecting storm debris.

Automated trash collection vehicles. Trash, like garbage, can be collected through an automated process using an automated collection vehicle. Many solid waste utilities, including Miami-Dade County, are adopting this system for collecting garbage. The collection vehicle is a side-loader, equipped with a hydraulically-operated arm for automatically lifting and emptying a large cart, usually about 95 gallons. Primarily

designed for collecting garbage, the vehicles, whose arms generally have a lifting capacity of up to 450 pounds, can also collect trash that is placed in a suitable container. However, because the automated collection vehicle contains a hydraulic packing mechanism, similar to a rear loading collection vehicle, it is necessary that the material size be tightly regulated. Also, to accommodate the more rigid trash material, the packing mechanism in the vehicle must be adjusted to a lower a compression level to avoid damaging the equipment. As in the case of automated garbage collection, automated trash collection requires only one crew member per vehicle.

There are two advantages associated with using trash carts and automated collection:

- The collection process is very cost-effective, similar to automated garbage collection, as long as the equipment is not damaged from improper compression settings or collection of inappropriate materials.

- The system effectively defines the setout limit available under the standard trash collection service as 95 gallons, or about one-half cubic yard. Unfortunately, this low setout limit is also a disadvantage.

There are several disadvantages of deploying automated collection vehicles with carts for trash collection in Miami-Dade County:

- Using automated collection vehicles requiring that trash be placed in a cart creates an additional burden for the resident.

- Limiting a setout to the amount of trash that can be placed in a 95 gallon cart would create a very low setout limit for residents of Miami-Dade County, who generate large quantities of vegetative waste.

- Regardless of any requirement for placing trash in carts, trash accumulations on the ground will continue to occur. Trash collection crews would not be able to collect such trash piles, requiring a major code enforcement effort and leading to more trash on streets and less attractive neighborhoods. Moreover, trash piles that are not picked up promptly create a variety of neighborhood problems.

- They are not able to collect storm debris, which cannot practically be placed in containers.

- They are not able to collect bulky trash, so additional vehicles are still required for that assignment.

- The reliability of the vehicles for trash collection is not proven, and could present a problem.

Trash preparation

Trash preparation may include bundling, limiting the size of individual trash items, or requiring that the material fit in a container.

Bundling. Some municipalities require that trash be bagged or bundled – tied up using string in a package with limits on weight and dimensions. This system, sometimes referred to as gift wrapping, allows trash to be collected manually, regardless of the type of vehicle used, and it effectively limits the amount of trash set out. Also, it controls the blowing of trash. However, it is very demanding on the residents, and where mechanical trash collection methods are used, gift wrapping is mostly superfluous.

Limit on size of individual trash items. The most common restrictions placed on trash setouts, other than on material types, are length and diameter of individual trash items. The loading equipment generally used in trash collection cannot easily load material longer than about six feet, and tree limbs greater than about 4 inches in diameter, if collected in quantity, can overload or damage a dump body or chassis. Also, it is common to draw a distinction between household trash and land clearing or tree trimming. Enabling a trash collection system to routinely handle large tree limbs and tree stumps would require the deployment of more expensive equipment, slow down the collection process, cause more wear and tear and damage to equipment, and cause equipment failures. Of course if a resident chooses to reduce large tree limbs to an acceptable size, the smaller material would be acceptable.

Acceptable materials

The basic definition of household trash is fairly broad, so it must be interpreted to some degree to identify, for both collection crews and residents, what materials are acceptable. Fortunately, with only a few exceptions, virtually all the waste generated in and around a residence is acceptable for trash collection. The exceptions normally made are the following:

Long and thick tree limbs and tree stumps. Residents should arrange for a landscaper or private hauler to dispose of any tree trimmings where the length exceeds six feet or the diameter exceeds four inches.

Construction and demolition debris. Materials produced from construction activity are rarely included in the definition of household trash, and are often not allowed in trash in any significant quantity. They are not considered normal household trash, and can weigh too much for the collection and hauling equipment to collect the materials without risk of equipment damage. Generally, any accumulation greater than a cubic yard or so should be hauled and disposed of by the contractor or the resident, and any especially heavy materials should not be collected.

Used tires. Used tires, which are clearly not a household waste, require special processing prior to disposal, so collecting them through the trash collection process is

inefficient. Moreover, in Florida and most other states, new tire dealers must collect a fee at the time of new tire sale for the cost of accepting and disposing of a used tire. Therefore, trash collection rarely includes used tires, although residents and tire dealers alike are allowed to deliver used tires to a designated disposal facility for a standard fee.

Other unusually heavy items. Engine blocks, concrete blocks, and other especially heavy items should not be collected through the trash collection service in order to avoid damage to collection and hauling equipment.

White goods, including refrigerators, washers and dryers, dishwashers, and window air conditioning units, are often excluded from the definition of household trash because the resident may usually arrange with the retailer from whom the replacement appliance was purchased to dispose of the old unit. However, the Department has an ongoing program to collect and process white goods, so these materials may continue to be collected under a scheduled zone trash collection system.

Limit on setout time in advance of trash pickup

Whether trash is collected through scheduled zone trash collection, call-in pickup, or by a private hauler or landscaper, an enforceable rule is needed governing the number of days or hours that trash may be set out prior to pickup. Without such a limit, trash would remain at the curb for long periods of time, attracting more trash, and garbage, and generally detracting from the attractiveness of the neighborhood. With scheduled zone trash collection on a frequent basis, such as weekly or twice per month, a resident would normally not be permitted to set out trash, other than vegetative matter, prior to the evening before scheduled pickup. Where collection is less frequent, a longer allowable period of time, such as two-to-three days, may be appropriate.

Limit on amount of setout or drop off

Regardless of the collection process, a limit is needed to ensure that charges among residents are equitable and to prevent trash leakage into the system. With no setout or drop off limit, some residents receive much greater service than others, while the charges imposed on all residents must cover the cost of service to the few. Moreover, with no setout our drop off limit, there is no effective barrier to the entry of commercial waste and trash from outside the service area from being leaked into the system. Setting a limit also helps to equalize setout and drop off amounts over time, which in turn improves collection efficiency.

The Department of Solid Waste Management currently applies no ceiling to the amount of waste persons showing residency in the direct service area may deliver to the trash and recycling centers. Moreover, with a high setout limit of 25 cubic yards for call-in trash pickup service, there is no significant barrier to the introduction of waste from outside the system.

Several factors should be taken into account in establishing a setout limit:

- It should be large enough to be fair and reasonable to most residents.
- It should be small enough to avoid large trash accumulations.
- It should be no larger than necessary so that residents moderate the amount of each setout, which helps keep collection amounts and route times fairly level from one collection period to the next.
- It should discourage landscapers from routinely leaving large amounts of yard trash at the curb.

In Fiscal year 2005, the total estimated amount of trash generated from service area residents is projected to be about 263,000 tons, generated by approximately 305,000 households. The average trash generation per household per year is estimated to be approximately 0.86 tons. The Department has estimated that each ton constitutes about 7.2 cubic yards at the curb, although it is compressed during the loading process. Based on this estimate, the average trash generation per household is about 6.2 cubic yards. Interestingly, this average includes trash from numerous households that generate far more than this amount. Therefore, the median trash generation per household, or the amount generated by the average household, is less than 6.2 cubic yards per year. This information indicates that the current system effectively accommodates the large trash generators, but at the expense of the average resident.

The Department service area's average trash generation per household does not differ a great deal from amounts generated in other utility service areas. However, it is likely that a considerable amount of trash is being included with garbage setouts at the present time where automated garbage collection has not yet been initiated. With a more convenient and accessible trash collection system and garbage setout limited to the cart size, residents would likely direct more waste to the trash system.

While no figures are available, it is likely that a large proportion of households generate no more than 12-15 cubic yards of trash per year. For this reason, a setout limit aimed at accommodating this amount of trash would meet the needs of the majority of residents. Because few residents set out trash frequently, the setout limit also must allow each resident some flexibility in when trash is setout, rather than establishing a system that assumes a uniform, consistent setout throughout the year. That is, with a 15 cubic yard per year target allowance, the average amount of trash to be accommodated with, say, twice per month collection would be about two-thirds of a cubic yard. However, because the typical resident will not set out trash regularly, the setout limit would have to be set well above that amount. With twice per month pickup, two cubic yards would be a generally acceptable setout rate, accommodating the needs of most residents. This amount would afford residents the same total annual trash collection service as currently provided by the call-in bulky trash collection system, which is well above the average household trash generation amount.

The primary function of the trash collection system is to clean up trash and maintain clean streets and neighborhoods. Therefore, although a setout limit needs to be set, the Department must pick up all the trash that is set out, and charge residents for

overages. Trash cannot be left on the street unless the amount is well in excess of the allowable amount, such that picking it up would jeopardize the Department's ability to complete the route. One procedure for addressing this condition would be to require residents to call for a special pickup when the setout exceeds, say, five-to-six cubic yards. With this procedure, when encountering a trash pile of excessive dimension, the Department would leave a notice that the amount of trash is excessive, and stating the resident's options.

Imposing setout, or delivery limits at drop-off centers, is practical only where there is a charge for use. Otherwise, the Department's only alternative where a resident brings an excessive amount is to turn the resident away. Turning waste loads away encourages illegal dumping, so should not be done.

Charge for excess trash or special pickup

Having established a limit to the amount that a resident may set out under the annual household fee, a solid waste utility must determine the additional charge to impose for additional trash, as well as the method by which the additional charge is to be collected. As noted above, trash amounts are usually measured in terms of estimated cubic yards. It can be difficult to compute an accurate estimate of cubic yardage of trash, so residents are usually given some latitude in the allowable setout amount.

However, once a resident has clearly exceeded the setout limit, the Department should collect the overage amount and impose and collect an overage charge. The Department may apply its published charge for trash collection, which is based on the Department's estimated cost of trash collection and disposal. However, the method for estimating the number of cubic yards should be standardized, based on the measured length, width, and height of the trash pile. The formula is one-third the product of these three values. Residents would need to be well informed of this policy to avoid surprises when the resident receives the invoice for the overage.

Collection frequency

When using scheduled zone trash collection, different solid waste utilities provide the service at varying frequencies. The most common frequencies are between weekly and monthly. Collection monthly or less frequently is generally considered inadequate without offering residents another trash collection service as well, usually drop-off centers.

More frequent service is invariably more convenient for residents, and provides greater benefits to keeping streets and neighborhoods clean. More frequent collection reduce the average size of trash piles, and allows the utility to reasonably set lower setout limits as well as place a shorter time that the resident may set out trash prior to scheduled pickup. As collection frequency increases to monthly, code enforcement challenges begin to emerge, the allowable size of setouts needs to increase, the allowable time prior to collection for setout needs to increase, and the overall level of convenience to

residents declines. With less frequent pickup, residents are forced to store trash until the scheduled collection date, unless an alternative trash collection process such as drop-off centers is available and the resident has the means for transporting the trash. Otherwise, the resident is compelled to call for a special trash pickup. Collection monthly or less frequently is effectively a substitute for call-in bulky trash collection.

More frequent trash collection is generally more convenient to residents from a scheduling standpoint. With weekly and biweekly collection, trash collection occurs on the same day of the week. With twice-per month collection, a schedule for the upcoming year must be provided to each resident. A similar requirement applies with monthly and less frequent pickup.

The only disadvantage of more frequent scheduled zone trash collection is that it raises the cost of collection. However, where collection is frequent, more frequent than monthly, it provides a level of service that is sufficient to warrant elimination of any other no-charge trash collection process, including free use of drop-off centers. While drop-off centers may remain a viable element of the trash collection system, with frequent trash collection, drop-off centers may reasonably be converted to pay-per-use, and made accessible to any potential customer.

3. Trash collection alternatives suitable for the Department of Solid Waste Management

The Department of Solid Waste Management has conducted a number of analyses of its trash collection system, and has identified several specific objectives:

1. Excellent service
2. Clean streets and neighborhoods
3. Responsiveness to storm events
4. Easily understood collection system
5. Meet demands of residents
6. Consistency with other components of solid waste management system
7. Reliability and predictability
8. Affordable and equitable charges

The main basis for selecting a trash collection system for the Department of Solid Waste Management is the ability to meet these objectives and address the specific provisions of the resolution to conduct this feasibility analysis. Specifically, the resolution called for identifying a trash collection system that will "significantly improve the curbside collection of bulky trash in the Department of Solid Waste Management's waste collection service area," and which would be "consistent with or better than that provided by the incorporated municipalities, including possible bi-weekly zoned trash collection."

Trash collection processes. The current trash collection service has provided an adequate level of service and the Department has received few complaints concerning the cost of the service. Residents are accustomed to the service, and with certain modifications, it is possible that the service could remain practicable for several more years. The changes needed most urgently relate to limiting the amount of trash delivered to trash and recycling centers by non-residents and limiting the no-charge heavy use of the facilities by a few residents. Limiting resident use has been addressed elsewhere by issuing coupons or electronic cards to each residential unit, allowing a limited number of uses of the facilities each fiscal year. After the allowable number of uses, residents would be required to pay for using the facilities. All others would be allowed to use the trash and recycling centers for a fee, set high enough to recover the costs of operating the trash and recycling centers and disposing of the waste delivered. Permitted landscapers are already allowed to use the trash and recycling centers at a fee.

While these changes to the trash and recycling centers would be beneficial, they would not address the problem of potential growth in the use of call-in bulky trash pickups. As noted above, these pickups are very costly in terms of the cost per ton collected. If more residents begin to use this service, the call-in system would become unreasonably expensive for the Department.

Scheduled zone trash collection, especially at more frequent intervals, offers advantages over the current system. Scheduled zone trash collection alternatives potentially suitable for the Department of Solid Waste Management include several scheduled zone trash collection alternatives, including the following:

- Bi-weekly or twice per month trash collection with pay-per-use trash and recycling centers

- Monthly, bi-monthly, or less frequent trash collection with trash and recycling centers remaining available to residents at no charge

While weekly trash collection constitutes excellent service, the benefits associated with collection at this frequency would be offset by materially higher costs than warranted, especially in the Department of Solid Waste Management's vast and, in some parts dispersed, service area.

While automated trash collection, using automated trash collection vehicles, has certain advantages, this system presents an excessive number of serious issues that this type of collection system should not be considered for the Department of Solid Waste Management, and probably for few parts of South Florida where large amounts of vegetative waste are generated. This type of process would not provide an adequate level of service to residents and presents equipment reliability risks that the Department should avoid.

Equipment and crew. The preferred equipment for use with scheduled zone trash collection is a combination of rear mount loaders with trash trucks and combination loader dump body vehicles – Lightning Loaders. These types of vehicles, which are standards in the trash collection industry, offer tremendous versatility for collecting trash, can be operated efficiently, and have proven reliability. The exact mix of vehicles should be determined once routes are laid out, based on estimated collection amounts and distance to waste transfer or disposal facilities.

While each vehicle requires an operator or driver, there is some question concerning the need for also including a person, referred to in Miami-Dade County as a waste attendant, for pickup site cleanup and assistance with traffic. The prevailing practice in the trash collection industry is not to include such personnel, in view of the expense associated with these personnel. However, the need for such personnel depends to some degree on the extent to which each pickup site should be cleaned. A skilled loader or crane operator is able to pickup up all but a very small amount of waste using the bucket. To clean up any remaining debris, it must be manually shoveled or pushed into the bucket, requiring that either the driver or operator exit the vehicle to perform this task. Where rear mount loaders or crane trucks are used with trash trucks, the trash truck operator could effectively perform this task, because the trash truck is usually stationary during the loading process and the driver could exit the vehicle to provide this function. It is important to note, however, that the Department currently assigns waste attendants to crane/loader vehicles, and under the Department's current union

agreement, operators and drivers are not required to exit the vehicle to clean a pickup site. Where Lightning Loaders are used, it is less convenient for the operator to step down from the controls to push any remaining trash into the bucket, and then return to the controls to complete the effort.

While there is some convenience to employing a waste attendant, the waste attendant is idle during large parts of any route, including between pickups and while traveling to and from the equipment yard and the disposal site. Therefore, it is reasonable to consider operating some scheduled zone trash collection equipment without trash attendant positions.

Trash preparation. Setting a limit on the size of trash items is necessary and appropriate to ensure that the equipment deployed can efficiently load the material and that the equipment is not damaged during the loading or hauling process. The standard restriction of limiting the length of trash items to six feet and four inches in diameter is reasonable and effective. There is no advantage to requiring any additional trash preparation, such as bundling, inasmuch as the collection equipment is designed to load loose waste. While collection crews may pick up trash piles where materials exceed the allowable dimensions by a small amount, piles where the materials significantly exceed the allowable dimensions may be left along with a notice explaining the reason. As in the case of piles greatly in excess of the setout limit, residents must be well informed in advance of the policy on trash preparation.

Acceptable materials. Only normal household trash should be collected through the trash collection process. The responsibility for disposing of white goods, long tree and thick limbs, excessive amounts of construction and demolition debris, used tires, and unusually heavy items such as engine blocks should remain with the resident. In the case of used tires, retailers from whom new tires are purchased are equipped to collect and dispose of the used tires. Similarly, landscapers and contractors are generally responsible for managing large tree trimmings and construction and demolition debris, respectively. The Department may choose to continue its practice of collecting white goods.

Limit on setout in advance of trash pickup. Where trash collection is frequent, it is reasonable to allow non-vegetative trash to be set out only the evening prior to pickup. Vegetative waste may reasonably be set out as much as three days prior to collection. When trash collection is as infrequent as monthly, the resident will often need an allowance of as much as two or three days to set out trash prior to scheduled pickup.

Limit on amount of setout. As noted above, larger setout amounts are appropriate with less frequent pickup. For bi-weekly or twice per month collection, a two cubic yard setout limit is reasonable, although it is recognized that this limit should not be rigorously imposed. When residents set out somewhat in excess of this amount, the collection crew should simply accommodate this overage. However, when the setout is significantly more than two yards, the crew should measure the excess using a standardized procedure and document the results. The crew may pick the trash pile

and invoice the resident for the overage or, if collecting the overage would significantly disrupt the route, leave the trash pile along with a notice explaining the reason and the resident's options for having the pile picked up.

If collection is less frequent, the allowable amount of the setout should increase in rough proportion to the infrequency of collection. For example, with monthly pickup, a four to five cubic yard limit would be appropriate, and so forth. Theoretically, this would allow a resident to dispose of as much as about 50 cubic yards per year. As noted earlier, the average resident generates an estimated 6.2 cubic yards of trash per year, so these allowances should provide very good service to most residents.

Prior to and following hurricanes, the Department may choose to relax the setout limit, and provide a notice to residents of the temporary policy.

Charge for excess trash or special pickup. The Department has established a charge per cubic yard for collecting trash in response to special requests, which should be applied for overages. While the charge for special pickups could be amended to include an additional charge for travel to the pickup site, the Department currently receives very few such requests. With setout limits under scheduled zone collection, the Department might receive additional requests for special pickups as residents trim trees prior to the hurricane season. The current per cubic yard charge should remain for special pickups.

Collection frequency. Collection as frequent as bi-weekly should be considered for the Department of Solid Waste Management. Weekly service, while superior to bi-weekly, is only marginally improved while posing significant increases in logistics, equipment, crews, management, overhead, and cost. Less frequent collection, including monthly, bi-monthly, every three months, and every four months, should also be considered as an alternative to call-in pickup, because of the very high cost per ton for call-in trash pickup.

4. Estimated Costs

This section presents cost estimates for both the Department of Solid Waste Management's current trash collection system and the scheduled zone trash collection alternatives described above. In comparing the current system with scheduled zone trash collection, the following conditions were taken into account:

- Only direct costs were considered; overhead and administrative costs would not be materially different between the current system and scheduled zone trash collection or combinations of the two systems.

- Scheduled zone trash collection less frequent than monthly would allow the Department to eliminate the current bulky trash collection system and convert the trash and recycling centers to a self sustaining pay-per-use operation.

- Scheduled zone trash collection monthly or less frequent would require that the Department continue to make the trash and recycling centers available to residents at no additional charge. Otherwise, a large number of residents currently using trash and recycling centers would be materially inconvenienced by having to hold their trash for monthly collection or pay for disposal. Holding trash for biweekly collection would not constitute a material inconvenience, especially inasmuch as small amounts of trash can be disposed with garbage.

- Even though transfer of trash from trash and recycling centers to disposal facilities is handled by the Department's disposal system, the cost of this service was included in this analysis because it is an essential element of the trash and recycling center operation.

Accuracy of the cost estimates

Before presenting the estimated costs of the current system and the alternatives, it is important to note two factors:

The estimated costs of the current system are based on the Department's Fiscal Year 2004-05 budget, which is based on the Department's considerable experience in providing these services. For this reason, the estimated cost for the current system can be expected to be quite accurate.

The estimated costs for scheduled zone trash collection at the different frequencies levels are based on a variety of factors and assumptions that are thought to be reasonable and suitable for planning purposes and for determining the feasibility of alternative trash collection system. However, because of the large number of factors considered, including the cost of vehicles, maintenance, repairs, fuel, and labor, and a host of items relating to the size of trash collection

routes such as setout rates and amounts, the potential variability in these factors, and the complexity of the analysis, actual results could vary from those shown.

Current trash collection system

Table 4-1 shows the direct costs of the current trash collection system, based on the Department of Solid Waste Management's Fiscal Year 2004-05 budget, which itself is based on historical and projected operating conditions. The costs include all of the direct costs for operating the trash and recycling centers and the bulky trash collection program..

While the table shows the cost of disposing of residential trash, with one exception, disposal costs have been excluded from the feasibility analysis because the overall amount of trash to be disposed is expected to vary little from one trash collection system to another. The exception is that certain alternatives considered would enable the Department to recover, through pay-per-use charges at trash and recycling centers and for collection of excess trash amounts, some or even all of the disposal costs incurred for a portion of the trash generated. In effect, this represents a cost savings to the Department, which is considered below in the comparison of the current system with alternatives.

The direct cost of operating the County's 14 trash and recycling centers is approximately $10.0 million per year, and the bulky trash collection effort costs approximately $9.5 million annually, for a total annual cost of $19.5 million. This total cost breaks down to $64 per residential unit per year, which is collected through the Department's household fee, currently $399 per year.

Table 4-1 shows an especially important aspect of the current trash collection system, the very high cost per ton of collecting trash through the bulky trash collection system – an estimated $99 per ton. The high cost is due to the fact that collection crews must be scheduled and routed, then must travel relatively long distances between pickups. The time lost between pickups adds a great deal to the cost of this program. On the other hand, the cost per ton for collecting trash through the trash and recycling centers is much less - $60 per ton, because this system incurs costs only for administering the centers and transferring trash to disposal facilities, while residents incur the cost for

Table 4-1
Current Department of Solid Waste Management Trash Collection System
Direct Costs – Budget Fiscal Year 2004-05

Item	Estimated cost		
	Trash and Recycling Centers	Bulky Trash Collection	Total
Trash Collection			
Salary & fringe benefits	$3,781,615	$4,691,736	$8,473,351
Scheduling and routing		$300,000	$300,000
Overtime and fringe benefits	$603,000	$498,000	$1,101,000
Temporary help	$89,400	$71,500	$160,900
Fleet maintenance	$233,050	$ 2,166,050	$2,399,100
Other operating	$929,365	$ 173,125	$1,102,490
Capital - excludes depreciation & cost of capital	$17,861	$ 7,700	$25,561
Transfer	$4,340,000		$4,340,000
Countywide litter control		$ 1,608,300	$1,608,300
Collection of illegally dumped waste		$ 24,000	$24,000
Collection cost per year	$9,994,290	$9,540,411	$19,534,701
Number of customers	305,761	305,761	305,761
Trash tonnage from residents	166,621	96,356	262,977
Average collection cost per customer	$33	$31	$64
Collection cost per ton	$60	$99	$74
Trash Disposal			
Disposal cost per ton	$52.25	$52.25	$52.25
Trash disposal cost	$8,705,947	$5,034,601	$13,740,548
Average trash disposal cost per customer	$28	$16	$45
Average trash collection and disposal cost per customer	$61	$48	$109

Please note: Excludes costs of collecting used tires, white goods, and cost of disposal of waste tires, white goods, litter, illegally dumped waste, and trash delivered to trash and recycling centers by permitted landscapers. These costs are incurred irrespective of the trash collection system.

Please note: Some values are rounded. Level of precision shown generally exceeds the level of accuracy of the information. Figures are shown with greater precision to allow tracking of information and calculations within the table.

bringing the trash to the centers. If the cost to residents, including vehicle expense, fuel, and time, of bringing the trash to the trash and recycling centers were considered, the cost of this system would be far higher than the figure shown in Table 4-1.

Scheduled zone trash collection

Table 4-2 shows the estimated costs for seven different frequencies of scheduled zone trash collection. The costs were estimated based on deployment of Lightning Loaders in one-half of the service area and crane/loaders, each with two trash trucks, in the other half of the service area. Each Lightning Loader would carry an operator and waste attendant, and in the areas covered by crane/loader vehicles and trash trucks, each crane/loader vehicle would carry an operator and a waste attendant and each trash truck would carry a driver. While trash truck drivers could also conduct waste attendant duties, waste attendants are currently deployed by the Department of Solid Waste Management for this work, in accordance with the Department's union agreement.

Where routes would be conducted by crane/loaders with trash trucks, the routes would be approximately twice as long as those conducted by Lightning Loaders. In general, Lightning Loaders are more efficient on routes with low setout amounts and close to disposal sites or transfer stations, while crane/loaders with trash trucks are more efficient where setouts are large and some distance from transfer or disposal facilities. Establishing an efficient mix of equipment and crews could be expected to reduce the total cost to some degree.

The estimated costs for scheduled zone trash collection are based on a series of key assumptions. While all of the detailed assumptions are provided in Appendix A, Table 4-2 lists several data items for each collection frequency that together form the basis for the cost estimates:

- Trash pickups per year per residential unit – ranging from 52 for weekly collection down to 3 for pickup every 4 months.

- Residential units per route – This figure, which is based on an analysis of how a collection route is structured and executed, declines as the collection frequency increases because with more time between trash pickups, more residents set out trash and setout amounts increase. The figures shown for each collection frequency are consistent with route sizes experienced in other trash collection systems.

- Residential units collected per day – This figure is derived from the number of residential units in the service area – 305,761 in the current fiscal year, and the number of work days between pickups

Table 4-2
Scheduled Zone Trash Collection at Alternative Frequencies
Estimated Direct Cost of Scheduled Trash Collection - Net of Trash Disposal

Item	Collection Frequency						
	Weekly	Biweekly	Twice per month	Monthly	Bimonthly	Every 3 months	Every 4 months
Number of pickups per year per household	52	26	24	12	6	4	3
Number of residential units	number	305,761	305,761	305,761	305,761	305,761	305,761
Number of work days between pickups - 4 work days per week	4.0	8.0	8.7	17.3	34.7	52.0	69.3
Tons collected	277,250	265,948	264,282	244,729	184,484	157,564	139,938
Routes and costs							
Residential units per route							
Lightning Loaders	465	320	304	207	153	131	116
Crane/loader vehicles with trash trucks	930	639	608	415	306	263	232
Residential units collected per day	76,440	38,220	35,280	17,640	8,820	5,880	4,410
Number of routes per day							
Lightning Loaders	82	60	58	43	29	22	19
Crane/loader vehicles with trash trucks	41	30	29	21	14	11	10
Cost per route							
Lightning Loaders	$ 222,130	$ 222,130	$ 222,130	$ 222,130	$ 222,130	$ 222,130	$ 222,130
Crane/loader vehicles with trash trucks	$ 441,647	$ 441,647	$ 441,647	$ 441,647	$ 441,647	$ 441,647	$ 441,647
Total routes	123	90	87	64	43	34	29
Weighted average cost per route	$ 295,302	$ 295,302	$ 295,302	$ 295,302	$ 295,302	$ 295,302	$ 295,302
Total cost per year	$ 36,391,160	$ 26,480,168	$ 25,690,015	$ 18,840,267	$ 12,768,771	$ 9,914,674	$ 8,416,459
Collection cost per residential unit per year	$119	$87	$84	$62	$42	$32	$28
Collection cost per ton	$131	$100	$97	$77	$69	$63	$60

Please note: Some values are rounded. Level of precision shown generally exceeds the level of accuracy of the information. Figures are shown with greater precision to allow tracking of information and calculations within the table.

- Number of routes per day – This figure is derived from the number residential units per route and the number of residential units collected each day. As collection frequency increases and the size of the average route decreases, more routes are needed to collect trash.

- Estimated average annual cost per route, for routes deploying Lightning Loaders and crane/loader vehicles with trash trucks – These figures include labor including benefits, field level supervision, labor coverage of 25 percent for leave and other absences (the Department's average), equipment depreciation (amortization), maintenance, repairs, insurance, and fuel.

- The Department would incur a cost for filling depressions created from repeated pickups. The estimated cost of filling the depressions was taken into account in developing the cost estimates.

The total cost per year is determined by the number of routes per day and the estimated average annual cost per route. In Table 4-2, the estimated biweekly collection cost is $26.5 million. The estimated costs decline as the frequency of collection decreases.

It is important to recognize that these cost estimates do not represent cash flow to the Department of Solid Waste Management. Rather, the figures are based on (1) annualizing capital outlays for equipment and (2) a mature, stable trash collection system. The cost per residential unit would probably be higher during the first few years of the system's implementation due to planning and logistics requirements.

Another important aspect of these cost estimates is that they are based on labor rates and practices currently in effect at the Department of Solid Waste Management and governed by the County, and equipment maintenance and repair services provided by the County's General Services Administration. It is important to note that the analysis is based on the Department's recent vehicle availability rate, the percentage of working hours that a vehicle is, on average, available for service, which has been below industry standards. This raises the required fleet size and associated costs to the Department. The reasons for this increased cost may relate to the average age of the Department's vehicles, the standard of maintenance they receive, or both of these factors.

Comparison of costs of current system and scheduled zone trash collection alternatives

Table 4-3 shows a comparison of the costs of the current trash collection system and the scheduled zone trash collection alternative described above. The cost estimate for scheduled zone trash collection and the comparison are based on the cost figures shown in Tables 4-1 and 4-2, with four exceptions for frequent scheduled zone trash collection:

Table 4-3
Current Trash Collection System and Scheduled Zone Trash Collection Alternatives
Comparison of Direct Costs

Number of residential units	305,761

Trash Collection System/ Cost Item	Annual cost		Annual Cost per Residential Unit	
	Total Cost	Additional Cost (Savings) Over Current Trash Collection System	Cost per Residential Unit	Additional Cost (Savings) per Residential Unit (Additional Cost) Over Current Trash Collection System
Current trash collection system				
T&R centers	$ 9,994,290		$ 33	
Bulky trash collection	$ 9,540,411		$ 31	
Total cost	$ 19,534,701		$ 64	
Scheduled Trash Collection - routes and costs using Lightning Loaders in one-half of service area and crane/loaders with trash trucks in one				
Weekly				
Direct collection cost	$ 36,391,160			
Savings from transfer and disposal of trash from non-residents[1]	$ (8,400)			
Increased cost for filling depressions in swale[2]	$ 500,000			
Total cost	$ 36,882,760	$ 17,348,060	$ 121	$ 57
Biweekly				
Direct collection cost	$ 26,480,168			
Savings from transfer and disposal of trash from non-residents[1]	$ (8,400)			
Increased cost for filling depressions in swale[2]	$ 500,000			
Total cost	$ 26,971,768	$ 7,437,067	$ 88	$ 24
Twice per month				
Direct collection cost	$ 25,690,015			
Savings from transfer and disposal of trash from non-residents[1]	$ (8,400)			
Increased cost for filling depressions in swale[2]	$ 500,000			
Total cost	$ 26,181,615	$ 6,646,915	$ 86	$ 22
Monthly				
Direct collection cost	$ 18,840,267			
T&R centers	$ 9,994,290			
Total cost	$ 28,834,557	$ 9,299,857	$ 94	$ 30
Bimonthly				
Direct collection cost	$ 12,768,771			
T&R centers	$ 9,994,290			
Total cost	$ 22,763,061	$ 3,228,360	$ 74	$ 11
Every three months				
Direct collection cost	$ 9,914,674			
T&R centers	$ 9,994,290			
Total cost	$ 19,908,964	$ 374,263	$ 65	$ 1
Every four months				
Direct collection cost	$ 8,416,459			
T&R centers	$ 9,994,290			
Total cost	$ 18,410,749	$ (1,123,951)	$ 60	$ (4)

[1]Savings based on diverting 10,000 tons per year from non-residents currently received at no charge to pay-per use.

[2]If (1) one of four residents routinely used biweekly trash collection service and a depression requiring filling were to form after three years on those rights-of-way, and (2) one-half of the residents filled the depressions themselves, then the County would need to fill approximately 25,000 depressions annually. With a cost per depression of about $40, including labor, equipment, and gravel cost, the additional cost to the Department would be about $0.5 million per year.

Please note: Some values are rounded. Level of precision shown generally exceeds the level of accuracy of the information. Figures are shown with greater precision to allow tracking of information and calculations within the table.

Elimination of call-in bulky trash collection. Scheduled zone trash collection is a direct replacement for the Department's current call-in bulky trash pickup program. Therefore, all of the scheduled zone trash collection alternatives would be phased in as the call-in bulky trash collection system is phased out.

Conversion of trash and recycling centers to pay-per-use. With biweekly or twice per month trash collection, the majority of residents would have no need for taking normal household trash to the trash and recycling centers. Therefore, the centers would be used only for disposal of excess amounts of trash by residents of the direct service area or for trash disposal by non-residents. For either of these uses, the Department would establish a reasonable charge for delivering trash to these facilities, allowing the trash and recycling centers to pay for themselves through the charges. For these reasons, with scheduled zone trash collection biweekly or twice per month, the cost estimates are based on eliminating the costs of the trash and recycling centers. While some or all would remain open, the cost of operation would be recovered through user fees.

Savings in disposal of trash from non-residents. While detailed estimates have not been developed, it is well recognized that trash generated by non-residents leaks into the Department's solid waste system in some quantity through the trash and recycling centers. With frequent scheduled collection and the conversion of trash and recycling centers to pay-per use, much of this waste would be excluded from the system or delivered at a fee that would offset the disposal cost for this material. With well over 200,000 tons of trash per year moving through the trash and recycling centers, the somewhat arbitrary assumption was made that 10,000 tons per year of trash would be excluded, or would be delivered to trash and recycling centers through a pay-per-use system. The disposal cost of this waste amount was applied as a savings associated with biweekly and twice per month scheduled zone trash collection.

Increased cost for filling depressions in swales. These increased costs would be incurred due to the continual operation of loaders in swale area and the consequent removal of soil. The cost estimates take into account a cost that would be incurred by the Department for filling the depressions.

Weekly trash collection. With the adjustments described above, Table 4-3 shows that weekly trash collection is substantially more costly than the current trash collection system. After inclusion of the savings noted above, weekly trash collection would add an estimated $16.9 million per year to the overall cost of trash collection, or about $55 per year to the annual cost per residential unit.

Biweekly and twice per month trash collection. Biweekly and twice per month trash collection are also more costly than the current system. After inclusion of the savings noted above, biweekly trash collection would add an estimated $7.4 million per year to the overall cost of trash collection, or about $24 per year to the annual cost per residential unit. Twice per month would be about $0.8 million less costly than biweekly.

Monthly trash collection. The estimated cost of monthly trash collection is much higher due to the need to continue providing residents with free access to trash and recycling centers. The cost analysis clearly illustrates that scheduled zone trash collection at a frequency that would provide a high level of service to most residents, biweekly or twice per month, requires that trash and recycling centers be converted to a self-supporting operation. Otherwise, the cost of frequent trash collection is much higher than the current trash collection system.

Bimonthly trash collection. This alternative also includes continued operation of trash and recycling centers available at no cost to residents. While bimonthly trash collection is considerably less costly than monthly trash collection, it is still somewhat more costly than the current trash collection system.

Collection every three months. This is the first of the scheduled zone trash collection alternatives that carries an estimated cost below that of the current system. This is mainly due to shorter distances between pickups than occur under the current call-in bulky trash collection system.

Collection every four months. Like collection every three months, this alternative too is less costly than the current system, for the same reason. With less frequent trash pickup, the setout amounts and setout rate would increase, improving the efficiency of the trash collection process.

Table 4-4 shows projected expenditures for both the current trash collection system and biweekly trash collection. The difference in costs between the two systems varies from year to year depending mainly on the capital costs associated with the current system, which are funded with cash. The cost estimates for biweekly trash collection include annual depreciation of collection equipment, so the projected costs increase at a level rate.

Table 4-4
Current Trash Collection System and Biweekly Scheduled Zone Trash Collection
Projected Costs Fiscal Years 2005 - 2010

Item	Fiscal Year					
	2005	2006	2007	2008	2009	2010
Inflation and growth rates						
General inflation rate		2.2%	2.2%	2.2%	2.2%	2.2%
Labor inflation rate		8.5%	7.9%	6.6%	6.6%	6.6%
Growth in customer base		1.0%	1.0%	1.0%	1.0%	1.0%
Current trash collection system cost						
Percent labor costs[1]	54%					
Percent non-labor cost	46%					
Labor cost	$ 10,548,738	$ 11,556,639	$12,589,640	$13,552,219	$14,591,132	$15,709,688
Non-labor cost	$ 8,985,962	$ 9,275,490	$ 9,574,346	$ 9,882,832	$10,201,256	$10,529,941
Capital costs		$ 2,282,700	$ 1,825,600	$ 747,600	$ 674,600	$ 80,000
Total cost	$ 19,534,701	$ 23,114,828	$23,989,586	$24,182,651	$25,466,989	$26,319,629
Biweekly scheduled zone trash collection cost						
Percent labor costs	0.57					
Percent non-labor cost	0.43					
Labor cost	$ 15,144,725	$ 16,591,758	$18,074,829	$19,456,794	$20,948,352	$22,554,252
Non-labor cost - includes capital	$ 11,424,968	$ 11,793,080	$12,173,053	$12,565,269	$12,970,122	$13,388,019
Total cost	$ 26,569,693	$ 28,384,838	$30,247,882	$32,022,063	$33,918,474	$35,942,272
Additional cost for biweekly collection	$ 7,034,992	$ 5,270,010	$ 6,258,295	$ 7,839,412	$ 8,451,485	$ 9,622,642
Percentage cost of biweekly trash collection over current system	36.0%	22.8%	26.1%	32.4%	33.2%	36.6%

[1]The percentage of current trash collection costs that are allocable to labor is a rough estimate because maintenance costs are not available according to labor and other.

Please note: Some values are rounded. Level of precision shown generally exceeds the level of accuracy of the information.

5. Findings

This analysis concluded that the County may reasonably follow either of two courses of action in improving its trash collection system:

- Adopt a frequent scheduled zone trash collection system at a higher cost to residents

- Improve the current trash collection system primarily by reducing the leakage of trash into the system from non-residents and commercial waste generators

The selection of the preferred course of action depends mostly on whether the additional cost of the first alternative would offset its benefits.

Frequent scheduled zone trash collection

The current trash collection system has a number of major flaws that have developed or been exposed as the County has become more densely developed. When the density of development was low, the County's only practical means for controlling the cost of trash collection was to offer what became the current trash collection system. However, as development gained momentum and many parts of the direct service area approached buildout, the current system's problems with trash leakage into the system, abuse of the unlimited disposal allowance at trash and recycling centers, and growing incidence of trash pile and litter eyesores in many parts of the service area have converged with declining cost per residential unit of providing frequent scheduled zone trash collection service to bring the much improved service to within the grasp of the Department's residential customers.

Biweekly or twice per month trash collection, implemented along with converting trash and recycling centers to a self-sustaining operation, would best address the County's objectives for trash collection and the provisions of the resolution authorizing this feasibility analysis:

- It would be a high level of service to all residents, and would meet the demands of most residents most of the time.
- Streets and neighborhoods would be cleaner.
- It would be able to respond to most storm events by merely extending the hours of collection in affected areas.
- It would be convenient and easily understood by residents.
- It would be a very reliable and predictable service, with little risk relating to equipment or procedures; indeed, most of the municipalities in South Florida offer some form of scheduled zone trash collection
- In Miami-Dade County, implemented in conjunction with converting trash and recycling centers to a self-sustaining operation, it would eliminate

much of the leakage of trash into the system from non-residents and commercial waste generators

Of the two alternatives for frequent trash collection considered, biweekly is superior to twice-per-month. First, in return for a modestly higher price, service would be provided more frequently. Second, and of greater importance, service to each resident would always be on the same day of the week – a major simplification for residents and the Department alike. For this reason, the biweekly schedule is preferred.

With an estimated additional annual cost to each residential unit of $24, the additional cost to each household would be about 5 percent more than the current annual household fee of $399.

The principal drawbacks to biweekly scheduled zone trash collection mostly relate to cost, financing, logistics, and implementation. Also, while scheduled zone trash collection is being phased in, the Department can be expected to receive complaints from persons no longer allowed use of the trash and recycling centers at no charge. Once fully implemented, the principal disadvantage to frequent scheduled zone trash collection is that it comes at a higher cost than the current system. .

Improvements to the current system

While not specifically requested by the resolution that prompted this feasibility analysis, the analysis necessarily included a detailed assessment of the current trash collection system. An advantage of the current trash collection system is that residents and the Department of Solid Waste Management are accustomed to the system, and change is disruptive. Unfortunately, however, the current system has a series of weaknesses, some of which are structurally unavoidable, including the inherent inequity among residential customers, relatively low level of service for some residents, and the financial and operational risk to the Department that more residents may choose to take advantage of the very costly call-in bulky trash pickup service.

One of the most serious, and expensive, weaknesses is the leakage of trash into the system from non-residents and commercial waste generators. This problem could be addressed through implementation of a coupon or electronic system allowing each resident only a limited number of trips to the trash and recycling centers, while allowing everyone unlimited access at a charge covering the cost of operating the centers and disposal of trash. Charges could be collected using either a coupon system or credit cards. While accepting cash at disposal and transfer sites is common in other parts of South Florida, the Department has preferred to avoid the problems associated with this payment method. It is important to note that these changes present several difficult implementation challenges, and no system would substantially reduce the trash leakage problem other than pay-per-use by all users.

The additional revenue that could be generated at the trash and recycling centers from accepting waste at a charge would depend on a number of factors, including

assumptions on waste density and billing system such as a flat charge for a pickup truck. However, if the Department were to recover its full cost of handling and disposing of trash received at the trash and recycling centers, the fee per cubic yard would be calculated as follows:

Collection cost per ton	$ 60.00
Disposal cost per ton	52.25
Total cost per ton	112.25
Cubic yards per ton	7.2
Charge per cubic yard	$15.50

Currently the trash and recycling centers receive an estimated 166,621 tons of trash per year, which is exclusive of yard trash delivered by permitted landscapers. Recent estimates of the use of trash and recycling centers have shown that the use rate by non-residents could be close to 30 percent. If ten percent of the current trash – 16,660 tons (166,621*0.1), or 120,000 cubic yards - were collected through this system, then the trash and recycling centers would generate revenues of about $1.8 million per year. This figure could be substantially greater if the system were to attract waste that is currently being disposed of elsewhere or illegally dumped. It is important to note that this additional revenue would be realized both under the current system as well as with biweekly trash collection.

In addition to reducing the leakage of trash into the system, allowing everyone access at a charge would reduce the incidence of illegal dumping by persons currently excluded from using the trash and recycling centers. With few exceptions, residents of the County residing outside the direct service area can dispose of trash only at the landfills and regional transfer stations, which can be quite inconvenient and hazardous. Allowing non-residents and commercial waste generators into the trash and recycling centers would permit them to dispose of trash legally and conveniently. Those individuals disinclined to illegally dump but who also prefer not to drive long distances to dispose of trash legally, would find this access to be a real benefit.

Making these improvements would not address the problem of abuse by residents of the direct service area, nor would they improve the overall level of service currently provided. Nonetheless, they would improve the efficiency and equity of the current system, and reduce operating costs. The changes could serve as a short-term measure, allowing the Department to defer major restructuring of the trash collection system for several years.

Table 2-1

Trash Collection Programs in Selected Florida Municipalities

Denotes service provided by Miami-Dade County DSWM

Municipality	Contact Person	Frequency of pickup	Materials collected and requirements	Setout limit	Drop off Centers	Code enforcement	Equipment	Crew	Households per crew-day	Problems with potholes and sidewalk damage	Personnel payment basis
Bal Harbour Village	Sanitation Department Phone 305-866-4633 Ext 36	No yard trash pickup except when a hurricane is coming. Residents take their yard trash to centrally located yard trash bins. Yard trash pickup for low rise apartments is twice a month, and for shopping centers twice a week. Bulky waste is picked up on Tuesdays and Thursdays only by request.	Bulky waste includes furniture, white goods, refrigerators, washing machines, and appliances	No set out limit	No	Yes	Lightning loaders	Operator	No applicable	None	Set work schedule
City of Aventura	Trash collection provided by Miami-Dade County Department of Solid Waste Management David White Phone 305-594-1509	Yard trash collected with regular garbage collection twice per week . Bulky waste collected twice per fiscal year.	Yard trash collected at curb side twice a week with garbage collection - must be inside the green cart where automated garbage collection is provided. Otherwise, it must be placed in bags or cans . Bulky waste pickups must be requested. Bulky waste items include furniture, white goods, refrigerators, water heaters, washing machines, tree cuttings, and construction materials limited to 1 cubic yard or less.	Where automated garbage collection is provided, an amount that can be placed inside the green cart with garbage. Otherwise, bags or cans cannot exceed 50 pounds or 3 feet in length. Bulky waste setout limit is 25 cubic yards and no more than 6 feet in length. Excess bulky waste is billed at the rate of $21 per cubic yard. There is a minimum charge of $105 (5 cubic yards) for additional pickups.	13 trash and recycling centers at no charge, unlimited use	Yes	Cranes and trash trucks, and lightning loaders	Crane operator, trash truck drivers - usually two trash trucks - and waste attendant	Averages 20 pickups per day	No problem - operators trained to pick up piles without damaging surface	Set work schedule
City of Miami	Solid Waste Department Mr. Allen Roker, Assistant Director Phone 305-575-5107	Trash collected weekly on a set day of the week . Small bulky items and small trimmings may be placed inside the green garbage container with lid properly closed.	Commingled trash - tree cuttings, household furniture, appliances and bulky items. Trash must be securely tied in bundles and placed in front of the residence.	No limit on the amount. However, bundles cannot be more than 3 feet in length, nor weigh more than fifty pounds.	Drop off event days where people can dispose of tree trimmings, furniture, carpet, bathroom fixtures, and domestic waste	Yes	Cranes and trash trucks	Driver, operator and sweeper	Crew assigned to an area - specific number of household to an area not known	Yes - Public Works is assigned the responsibility of fixing potholes and sidewalk damage	Task incentive
City of Sunny Isles Beach	Trash collection services provided by Miami-Dade County Department of Solid Waste Management Phone 305-947-0606										
City of Coral Gables	Waste Collection Division Zety Marino, Superintendent Phone 305-460-5346	Weekly	Commingled trash. Large appliances like washers, dryers, or refrigerators or any bulky or heavy item must be scheduled for special pickup and payment of a fee is required. Construction debris, soil, rock, concrete blocks or hazardous materials cannot be placed in front of homes.	1 cubic yard - if additional trash is set out the City will automatically charge $10 per cubic yard for the excess amount. $50 charge for large appliances and white goods. No courtesy estimate will be given.	No	Yes. Any violation of regulations regarding set out limits and requirements may result in a fine of $250 without warning.	Loader trucks and trash trucks	Drivers and operators, with rake person in loader vehicle	500 - 800	Yes. City is responsible for filling up and repairing. There is a designated crew working on this two days per week, uses lime rock to fill potholes, exact amount spent not known.	Task incentive

Table 2-1
Trash Collection Programs in Selected Florida Municipalities

Denotes service provided by Miami-Dade County DSWM

Municipality	Contact Person	Frequency of pickup	Materials collected and requirements	Setout limit	Drop off Centers	Code enforcement	Equipment	Crew	Households per crew-day	Problems with potholes and sidewalk damage	Personnel payment basis
City of Doral	Trash collection services provided by Miami-Dade County Department of Solid Waste Management										
El Portal	Waste Management For Information must call Clerk's office Phone 305-795-7880	Yard trash picked up on Saturdays. Bulky waste pickups need to be scheduled.	Clean yard trash, leaves, and tree cuttings bundled	Bundled yard trash cannot weigh more than 50 pounds or be more than 4 feet in length	No	Yes	Not known	Not known	Not known	No problems	Not known
Florida City	Department of Public Works Mr. Darren Baldwin Phone 305-242-8131	Information requested but not received									
City of Hialeah	Solid Waste Department Phone 305-687-2625	Once a month	Clean yard trash and other trash. Crews collect everything but construction debris	No limit	No	Yes	Loader with two trash trucks	Drivers and operators only	275-300	Yes, responsibility of the Street Department	Task incentive
Hialeah Gardens	Public Works Department Phil Chest field Phone 305-56-2029 or 305-342-0567	Once a month	Commingled yard trash, including furniture, carpet and white goods. Materials not accepted are cement blocks, cement crumbs, roof tiles, floor tiles, paint cans, carpets, shingles, and sheet rock.	Material should not occupy a space larger than 3 feet in length by 3 feet in height. Bulk trash out no more than 24 hours before the scheduled collection date or fine will be imposed	No	Yes	Loader and trash truck	Operator and assistant, and truck driver	Crew assigned to area - typical area from NW 108 St. to 122 St, and from SW 87th Ct. to 92nd Ave.	Yes. Public Works fills holes with rock and dirt.	Regular work schedule
City of Homestead	Milton Bailey Solid Waste Manager Phone 305-224-4864	Weekly yard trash and bulky waste	Commingled yard trash, including furniture, carpet and white goods	10 cubic yards; if more quantity collection is done for a fee	One center - residents can use at no cost Wednesday through Sunday	Yes	Crane and trash trucks	Crane operator and two trash trucks drivers	Not known	Some. It is the responsibility of Solid Waste. The Department spends approximately $200 on this activity.	Task incentive
City of Miami Beach	Waste Management - 305-471-4444 For information Alberto Zamora, Director or Shana Sanitation Department Phone 305-673-7600 Ext. 3541 Phone 305-673-7616	Twice per week	Clean yeard trash, leaves, tree cuttings, and household trash	Limited to 4 cubic yard	First weekend of every month, bulky waste can be taken to a container placed in one or two places in the City.	Yes	Loader and trash truck	Operator and driver	Not known	No problems	Not applicable because it is performed by a private contractor.
City of Miami Gardens	Trash collection services provided by Miami-Dade County Department of Solid Waste Management										
Village of Miami Shores	Sanitation Department Pam Cappuccio Phone 305-795-2210	Twice a month	Garden cuttings, tree limbs, furniture and appliances - refrigerators and stoves. Items not accepted are concrete and building materials. Items must be placed in alleyway.	Up to a truck load. If more than a truck load, there is a limit of two per year without charge. After limit is exceeded, there is a charge.	No	Yes	Loaders, lightning loaders, and trash trucks	Basically two person crew, but could be more depending on size of pile - operator and driver.	There are 10,200 households in the village, there are 10 people assigned to trash collection.	Some, the Village fills them up	Regular work schedule.
City of Miami Springs	Sanitation Department Raul Rodriguez Phone 305-805-5170	Once per week	Yard trash including trees and shrubs, leaves, general householsd trash, boxes, furniture, and white goods. Materials excluded are construction debris, roofing material, and drywall.	Limited to 6 cubic yards, or half pick up load. Anthing above this amount the customer is charged	No	Yes	Crane and trash trucks	Crane operator and three trash truck drivers	Not known	Yes. Public Works fills holes with rock and dirt.	10-hour days, 4 days a week - crew cannot go home before 3:20 p.m
City of North Bay Village	Public Works Phone 305-865-0506	Information requested but not received									

Table 2-1
Trash Collection Programs in Selected Florida Municipalities

Denotes service provided by Miami-Dade County DSWM

Municipality	Contact Person	Frequency of pickup	Materials collected and requirements	Setout limit	Drop off Centers	Code enforcement	Equipment	Crew	Households per crew-day	Problems with potholes and sidewalk damage	Personnel payment basis
City of North Miami	Donald L. Smathers Sanitation Superintendent Phone 305-949-7125 E-mail dsmathers@northmiamifl.gov	Twice per month	Garden cuttings, tree limbs, and wood boards without nails, all of which must be less that 5 feet in length. Includes also furniture and appliances - refrigerators and stoves. Items not accepted are concrete, building materials, rocks, or scrap iron.	6 cubic yards. The customer pays for amount above the limit	No	Yes	Front end loader with clapper bucket, and open bed trucks	One operator and a driver	Total of 9,800 households in the service area - approximately 1,300 household per route	Public Works responsible for filling holes.	10-hour days, 4 days a week.
City of North Miami Beach	Solid Waste Division 1965 NE 151 Street North Miami Beach, FL 33162 Phone 305-948-2904	Twice per month on designated days in a particular zone. Special collection is scheduled for household appliances and dead animals left on right-of-ways	Commingled trash - trees and shrubs, leaves, yard clippings, general household debris, boxes, and furniture. These items should be cut in lengths that are less than 5'. Trash must be set out no more than 2 days prior to pick up. Items not accepted are tires, dirt, sod, concrete, toxic materials, old vehicles, motorcycles, boat, trailers, flammable materials, construction and remodeling debris.	No more than a back of a pickup truck. If more than , a fee of $100 per pickup load is charged	No	Notice of Violations provide 24 hours to correct problem. If not done, City will make a special collection and charge $150 that must be paid in 30 days	Combination loader/27 yard dump body	One operator and a driver	900 - may be population rather than households	Solid Waste Division and Public Works share the responsibility of filling up holes caused by trash pickups.	Task incentive
City of Doral	Trash collection services provided by Miami-Dade County Department of Solid Waste Management										
City of Opa-Locka	Public Works/Utilities Department 305-953-2828	Information requested but not received									
Village of Pinecrest	Trash collection services provided by Miami-Dade County Department of Solid Waste Management Phone 305-234-2116										
City of South Miami	W. Ajibola Balogun, Director Cynthia Coroju, Assistant Public Works Department - Solid Waste Division 305-663-6350	Weekly trash pick-up	Materials collected are bagged general household debris, boxes, bagged yard clippings, including leaves and grass, trees and shrubs, cut in lengths that are less than 4 feet. Refrigerators, stoves, washers, dryers must have doors removed and will be picked up by a special service. Also, air conditioners, microwaves, water heaters, paint cans, and furniture need to be scheduled for pick-up. Construction and remodeling debris, trailers, boats, vehicles, flammable materials, dirt or sod are unacceptable and cannot be set out for pick-up.	Bundled or bagged trash shall not weight more than 50 pounds. Pick-up must be less than a half-truck load. Additional pick-ups need to be scheduled and carry a charge of $130 for half a truck, and $260 for a full truck.	No	Yes	One crane and two trash trucks	Operator and driver	Total of 3,000 households in the City. A crew is assigned to a specific area of approximately 600 households	Yes. The City goes by and fills them up with dirt and lime rock. No special crew for this activity. Supervisor sends whoever is available. Big effort to have crane operators well trained and aware of problem. Cost unknown	Crews are paid a salary and work 8 hours a day.
City of Sweetwater	Mr. Antero Espinosa Director of Maintenance Phone 305-221-0411 Ext. 124	Once a week	Commingled trash - trees and shrubs, leaves, yard clippings, general household debris, boxes, and furniture. No construction material is allowed.	No more than a back of a pickup truck.	Customers are allowed to use Miami-Dade County trash and recycling centers.	Yes	Cranes and trash trucks	Operator and Driver	Crews work in specified areas. Area for Monday includes SW 100 Ave to 107th Ave., and Flagler to SW 7th Terrace	Yes some. City is responsible for repairing potholes and sidewalk damage. The budge associated with this activity is not known.	Crews are paid a salary and work 8 hours a day.
Town of Bay Harbour Island	Private Contractor Carla at Town'sSanitation Department Phone - 305-866-6241	Once per week	Commingled trash - trees and shrubs, leaves, yard clipping, general household debrix, and furniture. No construction debris or hazardous material. White goods must be scheduled.	Loose leaves must be bagged. Tree limbs no longer than 4 feet in length	No	Yes	Lightning Loaders	Operator	Not known	Public Works responsible for filling holes.	Not applicable because it is performed by a private contractor.

Table 2-1
Trash Collection Programs in Selected Florida Municipalities

Denotes service provided by Miami-Dade County DSWM

Municipality	Contact Person	Frequency of pickup	Materials collected and requirements	Setout limit	Drop off Centers	Code enforcement	Equipment	Crew	Households per crew-day	Problems with potholes and sidewalk damage	Personnel payment basis
Town of Golden Beach	Public Works Garbage and Trash Collection Division Phone 305-932-0744	Tree trimmings and plant waste and small trash pickup twice per week with garbage collection. All other items will be picked up after arrangements are made.	Tree trimmings, plant waste, branches, or hedge clippings shall not exceed 3 feet in length, shall be properly tied and secured in bundles, and shall not weight more than 40 pounds. Bulky items must be scheduled with the Department. The charge for a light load is $30 for 2 cubic yard or less, and $60 for 2 - 4 cubic yards. For heavy loads, the cost of dumping may be added to the minimum charge. Loads exceeding 5 cubic yards will be charged $7 per cubic yard plus the cost of dumping.	Bundles of tree trimmings are limited to a maximum of 40 pounds and 3 feet in length. For bulky waste there is no limit because the customer pays for the set out amount. Landscapers and gardeners are responsible for hauling away the trash they generate.	No	Yes					
Town of Medley	Sanitation Department Carlos Callava Phone 305-887-9541	Twice a week	Yard clippings, leaves, trees, shrubs, furniture, and general household debris. Excludes construction debris	No setout limit	No	Yes	Front end loader and trash truck	Operator, driver, and assistant	One crew takes care of the residential units which are approximately 350. There are 800 residents in the town.	Public Works responsible for filling holes.	Regular work schedule
Town of Miami Lakes	Trash collection provided by Miami-Dade Department of Solid Waste Management										
Town of Surfside	Public Works Department Mr. Chipchoen 305-993-1058	Information requested but not received									
Village of Key Biscayne	Sanitation Department Phone 305-365-1799	Information requested but not received									
Village of Palmetto Bay	Trash collection provided by Miami-Dade Department of Solid Waste Management										
Virginia Gardens	BFI For information Sanitation Department Phone 305-871-6104	Twice per week for yard trash. Bulky waste items are picked up every three months	Yard trash includes tree trimmings, small shrubbery cuttings, and weeds properly bundled. Bulky waste materials include furniture, white goods, boxes, and general household trash. Materials not accepted are construction debris, and hazardous waste	No set out limit for bulky waste. Yard trash must be bundled, and tree clippings cann not be larger than 2 X 4	No	Yes	Not sure because is contracted out	No applicable - contracted out	Not known - contracted out	Yes. Public Works is responsible for sidewalk and right of way damage.	Not applicable because it is performed by a private contractor.
West Miami	Public Works Department Juan Pena Phone 305-266-4214	As frequent as required. Garbage crews take note of trash piles and call them in for trash crews to pick them up.	Grass clippings, loose leaves, palm fronds, cuttings, household trash, furniture, and boxes. Materials not accepted are construction debris, and hazardous materials.	Up to 7 cubic yards are free. There is a charge for material over 7 cubic yards. Also, there is a charge for appliances and white goods of $25 per item.	No	Yes	Loader and trash truck	Operator and driver	Not known	No	10-hour days, 4-days per week
Ft Lauderdale	Department of Solid Waste Management Phone 954-828-8000	Weekly yard trash with garbage collection. Bulky waste monthly	Yard trash weekly/ bulky trash monthly	Yard trash 90 gallon cart / bulky trash 10 cubic yards - additional trash collection at a fee	No	Yes	Automated collection of yard trash	Contracted out to Southern Sanitation	Not known	No.	Not known

Table 2-1
Trash Collection Programs in Selected Florida Municipalities

Denotes service provided by Miami-Dade County DSWM

Municipality	Contact Person	Frequency of pickup	Materials collected and requirements	Setout limit	Drop off Centers	Code enforcement	Equipment	Crew	Households per crew-day	Problems with potholes and sidewalk damage	Personnel payment basis
Hollywood	Department of Environmental Services 954-967-4200	Clean yard trash - once per month Other trash every four months Also limited trash drop-off	Clean yard trash picked up monthly. Needs to be in a green container. The cost is a one time $22 charge. Materials allowed are grass clippings, loose leaves, cut up palm fronds, small shrubbery cuttings, and weeds. Materials not accepted are plastic bags, rocks, soil, sand, junk and bulky items, large limbs, branches and treated wood. Commingled material includes brush, household items, white goods and loose materials like flower pots, etc.	90-gallons container for the green yard trash Maximum of 4 cubic yards of commingled material. Piles in excess of 4 cubic yards will not be removed until payment arrangements have been made.	Rocks, dirt and construction debris can be taken to the Broward County Landfill. Tires, paint, auto fluids, pool chemicals, paint thinners, pesticides, over and drain cleaners, batteries, and motor oil can be taken to the BC South Transfer Station every Saturday between 8:00 a.m. and 3:00 p.m.	$100 per violation	Crane trucks, combination loader/dump body vehicles, rear-steer loader vehicle	Drivers and operators only	300-500	No.	Task incentive
Orange County	Jim Becker Department of Solid Waste Phone 407-836-6604	Weekly	Separate clean yard trash and other trash	Clean yard trash - 3 cubic yards Other trash - 3 cubic yards - additional trash collection at a fee	No	Yes	Private collectors use different equipment - mostly loaders with trash trucks	Drivers and operators only	Not known	Responsibility of private collector	Not applicable because it is performed by a private contractor.
Tampa	Ms. Barbara Hanecan Department of Solid Waste Management Phone 813-267-7782	Yard trash collected weekly with garbage collection. Bulky waste items collected once a year	Yard trash properly bundled; if in cans, no material can be protruding from the top. Bag must be of correct thickness, 1.5 mil	Tree trims must be less than 4 feet in length or less than 50 pounds	Bulky waste disposal free of charge for residents at two sites. A particular site must be used depending on material to be disposed	Yes, if tree limbs are bigger or cans weigh more than 50 pounds, customers must call for special pickup at a fee. Department will pick up larger set out and charge customers	Special boom truck and pay loader	Bulky waste crew includes a driver for the truck and operator for pay loader. Yard trash collection with regular collection uses driver only	Not known	No.	Task incentive
West Palm Beach	Sanitation Refuse and Garbage Collection 561-659-8048	Yard trash weekly. Street sweeping done the following day to ensure all yard trash is collected and site left neat and clean. Special pickups with charge.	Collection of furniture, appliances and other large items is part of refuse collection - 3 person crew	10 cubic yards - additional trash collection at a fee	No	Yes	Combination loader/dump body	Driver only	300	No.	Task incentive

Appendix A - Detailed Cost Estimates

Estimated Direct Cost of Scheduled Zone Trash Collection - Biweekly, Twice Monthly, Monthly, Bimonthly, Every Three Months, and Every Four Months

Color codes: Key estimate Key calculation Key result

Average trash generation per household in direct service area - fiscal year 2005

Item	Units	Amount	Comments
Total delivery to T&R centers	tons	207,008	FY 05 budget
Delivery by landscapers	tons	40,387	FY 05 budget
Trash delivery to T&R centers - from residents	tons	166,621	FY 04 Projection-DSWM Rpt
Percent from residents		80%	
Collected through bulky waste system	tons	96,356	FY 05 budget
Total trash waste from residents	tons	262,977	
Number of households	number	305,761	FY 05 budget
Average tar center trash per household	tons	0.54	Calculated from numbers above
Average bulky waste per household	tons	0.32	Calculated from numbers above
Average total trash per household	tons	0.86	Calculated from numbers above

Appendix A - Detailed Cost Estimates

Estimated Direct Cost of Scheduled Zone Trash Collection - Biweekly, Twice Monthly, Monthly, Bimonthly, Every Three Months, and Every Four Months

Color codes: Key estimate Key calculation Key result

Direct Cost Estimates

Item	Units	Amount							Comments
		Weekly trash collection	Biweekly trash collection	Twice monthly trash collection	Monthly trash collection	Bimonthly trash collection	Every three months trash collection	Every four months trash collection	
Estimated average trash amounts collected per household per year									
Percent of t&r center waste from residents	percent	97%	96%	95%	85%	50%	35%	25%	Trash diverted from T&R centers to Sweeps
Percent of bulky waste	percent	100%	100%	100%	100%	100%	100%	100%	All waste currently collected
Percent of garbage go-backs	percent	100%	100%	100%	100%	100%	100%	100%	All waste currently collected
Percent left by landscapers and other haulers	percent	20%	10%	10%	7%	5%	3%	2%	
Amount diverted from tar centers	tons	161,622	159,956	158,290	141,628	83,311	58,317	41,655	
Amount of bulky waste	tons	96,356	96,356	96,356	96,356	96,356	96,356	96,356	
Amount left by landscapers and other haulers	tons	19,271	9,636	9,636	6,745	4,818	2,891	1,927	-
Total trash collected	tons	277,250	265,948	264,282	244,729	184,484	157,564	139,938	
Amount of trash per household	tons	0.91	0.87	0.86	0.80	0.60	0.52	0.46	
Estimated number of trash collection routes for entire service area - Lightning Loaders									
Time between pickup - collection cycle	weeks	1.00	2.00	2.17	4.3	8.7	13.0	17.3	
Working days per week	days	4	4	4	4	4	4	4	
Working days between pickups	days	4.00	8.00	8.67	17.3	34.7	52.0	69.3	
Total trash per year	tons	277,250	265,948	264,282	244,729	184,484	157,564	139,938	
Pickups per year per household	number	52	26	24	12	6	4	3	
Average total trash per setout day	tons	5,332	10,229	11,012	20,394	30,747	39,391	46,646	
Setout rate	percent	18%	24%	25%	32%	40%	42%	45%	
Number of setouts-pickups per collection cycle	number	55,037	73,383	76,440	97,844	122,304	128,420	137,592	
Average setout amount	tons	0.097	0.139	0.144	0.208	0.251	0.307	0.339	
Average setout amount	pounds	194	279	288	417	503	613	678	
Yards per ton at curb	yards	7.2	7.2	7.2	7.2	7.2	7.2	7.2	DSWM estimate
Average setout amount	yards	0.70	1.00	1.04	1.50	1.81	2.21	2.44	
Number of pickups per collection day	number	13,759	9,173	8,820	5,645	3,528	2,470	1,985	
Mobilize time per setout	minutes	2.50	2.50	2.50	2.50	2.50	2.50	2.50	
Load time per cubic yard	minutes	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
Average time to load each setout	minutes	3.55	4.01	4.06	4.75	5.22	5.81	6.16	
Average time to load each setout	hours	0.06	0.07	0.07	0.08	0.09	0.10	0.10	
Average number of residential units per route mile - both sides of street	number	84	84	84	84	84	84	84	Average 125 feet between residential units on route

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Estimated Direct Cost of Scheduled Zone Trash Collection - Biweekly, Twice Monthly, Monthly, Bimonthly, Every Three Months, and Every Four Months

Color codes: Key estimate Key calculation Key result

Item	Units	Amount							Comments
		Weekly trash collection	Biweekly trash collection	Twice monthly trash collection	Monthly trash collection	Bimonthly trash collection	Every three months trash collection	Every four months trash collection	
Average number of residential units with setout per mile	number	15	20	21	27	34	35	38	
Average distance between residential units with setouts	miles	0.07	0.05	0.05	0.04	0.03	0.03	0.03	
Average vehicle velocity between setouts	miles per hour	10	10	10	10	10	10	10	
Average time between stops	hours	0.007	0.005	0.005	0.004	0.003	0.003	0.003	
Average time between stops	minutes	0.39	0.30	0.28	0.22	0.18	0.17	0.16	
Total time per pickup	hours	0.07	0.07	0.07	0.08	0.09	0.10	0.11	
Total time per pickup	minutes	3.94	4.30	4.34	4.97	5.39	5.98	6.32	
Work hours per day	hours	9.50	9.50	9.50	9.50	9.50	9.50	9.50	
Travel to and from yard plus lunch & break	hours	1.75	1.75	1.75	1.75	1.75	1.75	1.75	Trash coll mgrs estimate
Travel time to tip	hours	2.25	2.25	2.25	2.25	2.25	2.25	2.25	Rough estimate - three tips
Time on route	hours	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
Pickups per route	number	84	77	76	66	61	55	52	
Residential units per route	number	465	320	304	207	153	131	116	
Average trash per route	tons	8	11	11	14	15	17	18	
Average cubic yards per ton in truck	number	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Average trash per route	yards	32	43	44	55	62	68	71	
Yards per truck	yards	23	23	23	23	23	23	23	
Average number of trash truck trips	number	1.4	1.9	1.9	2.4	2.7	2.9	3.1	
Total routes	number	657	956	1,005	1,474	1,999	2,328	2,635	
Residential units collected per day	number	76,440	38,220	35,280	17,640	8,820	5,880	4,410	
Routes per day	number	164	120	116	85	58	45	38	
Collection costs per route									
Estimated costs using Lightning Loaders									
Number of routes per day	dollars	164	120	116	85	58	45	38	
Cost per route	dollars	$ 222,130	$ 222,130	$ 222,130	$ 222,130	$ 222,130	$ 222,130	$ 222,130	
Total cost	dollars	$ 36,498,481	$ 26,558,260	$ 25,765,778	$ 18,895,829	$ 12,806,427	$ 9,943,913	$ 8,441,280	
Average costs per year per household	dollars	$ 119	$ 87	$ 84	$ 62	$ 42	$ 33	$ 28	
Average trash collection cost per ton	dollars	$ 132	$ 100	$ 97	$ 77	$ 69	$ 63	$ 60	

Appendix A - Detailed Cost Estimates

Estimated Direct Cost of Scheduled Zone Trash Collection - Biweekly, Twice Monthly, Monthly, Bimonthly, Every Three Months, and Every Four Months

Color codes: Key estimate Key calculation Key result

Item	Units	Amount: Weekly trash collection	Biweekly trash collection	Twice monthly trash collection	Monthly trash collection	Bimonthly trash collection	Every three months trash collection	Every four months trash collection	Comments
Estimated costs using crane/loaders with two trash trucks per crane/loader									
Number of routes per day	number	82	60	58	43	29	22	19	One-half number of routes as for Lightning Loaders
Cost per route	dollars	$ 441,647	$ 441,647	$ 441,647	$ 441,647	$ 441,647	$ 441,647	$ 441,647	
Total cost	dollars	$ 36,283,839	$ 26,402,075	$ 25,614,253	$ 18,784,706	$ 12,731,115	$ 9,885,434	$ 8,391,638	
Average costs per year per household	dollars	$ 119	$ 86	$ 84	$ 61	$ 42	$ 32	$ 27	
Average trash collection cost per ton	dollars	$ 131	$ 99	$ 97	$ 77	$ 69	$ 63	$ 60	
Estimated costs using Lightning Loaders on one-half of service area and crane/loaders with two trash trucks per crane/loader on one-half of service area									
Number of routes per day	number	123	90	87	64	43	34	29	Twice as many Lightning Loaders as crews with crane/loaders with two trash trucks
Cost per route	dollars	$ 295,302	$ 295,302	$ 295,302	$ 295,302	$ 295,302	$ 295,302	$ 295,302	
Total cost	dollars	$ 36,391,160	$ 26,480,168	$ 25,690,015	$ 18,840,267	$ 12,768,771	$ 9,914,674	$ 8,416,459	
Average costs per year per household	dollars	$ 119	$ 87	$ 84	$ 62	$ 42	$ 32	$ 28	
Average trash collection cost per ton	dollars	$ 131	$ 100	$ 97	$ 77	$ 69	$ 63	$ 60	
Trash disposal costs									
Trash collected through scheduled routes	tons	277,250	265,948	264,282	244,729	184,484	157,564	139,938	
Disposal charge per ton	dollars	$ 52.25	$ 52.25	$ 52.25	$ 52.25	$ 52.25	$ 52.25	$ 52.25	
Disposal cost	dollars	$ 14,486,290	$ 13,895,770	$ 13,808,711	$ 12,787,078	$ 9,639,305	$ 8,232,721	$ 7,311,780	
Average trash disposal cost per customer	dollars	$ 47	$ 45	$ 45	$ 42	$ 32	$ 27	$ 24	
Collection and disposal Cost									
Total cost	dollars	$ 50,984,771	$ 40,454,030	$ 39,574,489	$ 31,682,907	$ 22,445,732	$ 18,176,633	$ 15,753,060	
Collection and Disposal Cost per household	dollars	$ 167	$ 132	$ 129	$ 104	$ 73	$ 59	$ 52	
Collection and disposal cost per ton									
Other trash - to T&R centers	tons	(14,273)	(2,971)	(1,305)	18,248	78,493	105,413	123,039	
Disposal cost foregone	dollars	$ (745,742)	$ (155,222)	$ (68,163)	$ 953,470	$ 4,101,244	$ 5,507,828	$ 6,428,768	

Appendix A - Detailed Cost Estimates

Estimated Direct Cost of Scheduled Zone Trash Collection - Biweekly, Twice Monthly, Monthly, Bimonthly, Every Three Months, and Every Four Months

Color codes: Key estimate Key calculation Key result

Estimated Costs of Vehicles and Crews

Item	Units	Amount	Comments
Lightning Loaders - collection crew cost per year			
Direct labor costs per route			
Operator wage - per year	dollars	$ 45,696	FY05 Budget-Average N&S
Benefits	dollars	$ 17,292	FY05 Budget-Average N&S
Subtotal operator		$ 62,988	
Waste Attendant - wage		$ 27,882	FY05 Budget-Average N&S
Fringe benefits		$ 14,559	FY05 Budget-Average N&S
Subtotal waste attendant		$ 42,441	
Direct labor costs - with waste attendant	dollars	$ 105,429	
Labor coverage factor	ratio	1.25	
Direct labor costs including labor coverage	dollars	$ 131,786	
Total administrative costs	dollars	$ 7,907	6% of direct labor
Total labor costs	dollars	$ 139,693	
Vehicles			
Annualized purchase cost	dollars	$ 41,051	$125,000 over 7 years @ 7%
Maintenance	dollars	$ 5,000	Very rough estimate
Repairs	dollars	$ 15,000	Very rough estimate
Fuel	dollars	$ 8,400	20,000 miles/year, 5 miles per gallon, $2.10 per gallon
Insurance	dollars	$ 620	
Total cost per vehicle	dollars	$ 70,071	
Vehicle availability rate	percent	85%	Historical DSWM average
Total cost per vehicle with availability rate	dollars	$ 82,437	
Total	dollars	$ 222,130	

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Color codes: Key estimate Key calculation Key result

Crane/Loader vehicles with 2 trash trucks - collection crew cost per year

Direct labor costs per route

Item	Units	Amount	Comments
Operator wage - per year	dollars	$ 45,696	FY05 Budget-Average N&S
Fringe benefits	dollars	$ 17,292	FY05 Budget-Average N&S
Subtotal	dollars	$ 62,988	
Trash truck driver wage - per year	dollars	$ 37,304	FY05 Budget-Average N&S
Fringe benefits	dollars	$ 16,005	FY05 Budget-Average N&S
Subtotal	dollars	$ 53,309	
Two trash truck drivers	dollars	$ 106,617	
Waste attendant			
Waste Attendant - wage	dollars	$ 27,882	FY05 Budget-Average N&S
Benefits	dollars	$ 14,559	FY05 Budget-Average N&S
Subtotal waste attendant	dollars	$ 42,441	
Direct labor costs - with waste attendant	dollars	$ 212,046	
Labor coverage factor	ratio	1.25	
Direct labor costs including labor coverage	dollars	$ 265,058	
Total administrative costs	dollars	$ 15,903	6% of direct labor
Total labor costs	dollars	$ 280,961	

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Appendix A - Detailed Cost Estimates

Estimated Direct Cost of Scheduled Zone Trash Collection - Biweekly, Twice Monthly, Monthly, Bimonthly, Every Three Months, and Every Four Months

Color codes: Key estimate Key calculation Key result

Crane/Loader vehicles with 2 trash trucks - collection crew cost per year

Vehicles

Crane trucks-loaders

Annualized purchase cost	dollars	$ 37,767	$115,000 over 7 years @ 7%
Maintenance	dollars	$ 4,500	Very rough estimate
Repairs	dollars	$ 13,000	Very rough estimate
Fuel	dollars	$ 4,200	20,000 miles/year, 5 miles per gallon, $2.10 per gallon
Insurance	dollars	$ 620	
Total cost per vehicle	dollars	$ 60,087	
Vehicle availability rate	percent	85%	Historical DSWM average
Total cost per vehicle with availability rate	dollars	$ 70,691	

Trash trucks

Annualized purchase cost	dollars	$ 15,228	$45,000 over 7 years @ 7%
Maintenance	dollars	$ 4,000	Very rough estimate
Repairs	dollars	$ 10,000	Very rough estimate
Fuel	dollars	$ 8,400	20,000 miles/year, 5 miles per gallon, $2.10 per gallon
Insurance	dollars	$ 620	
Total cost per vehicle	dollars	$ 38,248	
Vehicle availability rate	percent	85%	Historical DSWM average
Total cost per vehicle *with availability rate*	dollars	$ 44,998	
For two trash trucks		$ 89,996	

Total vehicles	dollars	$ 160,686	

Total	dollars	$ 441,647	

Please note: Some values are rounded. Level of precision shown generally exceeds the level of accuracy of the information. Figures are shown with *greater precision* to allow tracking of information and calculations within the table.