

Developing a Master Plan for the City of Kirkwood, MO

The City of Kirkwood is always looking at ways to streamline costs and improve services for residents. SCS Engineers was commissioned in 2016 to complete an alternatives analysis to assist the City as they dealt with challenges, including providing cost-effective solid waste services and future management options.

■ By Marc J. Rogoff, Ph.D., William E. Bensing and Anastasia Welsh, P.E.

Kirkwood is an inner-ring suburb of St. Louis. Founded in 1853, the City was the first planned suburb located west of the Mississippi River. Kirkwood was also the first St. Louis-area municipality to provide sanitation services to its residents in 1953 with the purchase of three 13-cubic yard, rear-loader trash trucks. The City has one of the longest running recycling drop-off centers in the State of Missouri: the Francis Scheidegger Recycling Depository, which was constructed in 1971.

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Solid Waste System

Residential solid waste collection services are provided by the City for approximately 9,100 single-family residences one day per week, throughout the City. Regular household solid waste is picked up by the City in plastic bags with a limit of five bags per week per residence. Disposal of waste occurs at a privately-owned St. Louis-area landfill.

Curbside, single-stream recycling was implemented City-wide in January 2011. The City has provided one 65-gallon rolling cart to each single-family residence and multiple carts to institutions and businesses to encourage access to recycling. Some customers have been provided with a larger 96-gallon cart upon request. The Division's automated side loaders deposit single-stream recyclables into a

“transfer station” where they are compacted into 30-yard compactor boxes. The compactor boxes are then delivered to a private materials recovery facility.

In Missouri, municipalities are prohibited from disposing of yard waste in landfills. Yard waste includes garden residues, plant debris, grass, leaves, trees or brush clippings. Yard waste is collected in Kraft paper bags, which can be purchased from the City or other retailers. A charge of \$9.25 for five bags or stickers covers the City's cost of both collection and disposal.

The City currently charges residential households \$17.06 per month for solid waste services, inclusive of waste, recycling and yard waste. The fee is charged to cover the costs of collecting, handling, and disposing of the City's solid waste and debris. This fee, initiated April 1, 2005, is included with the combined utility service statement, which also includes charges for water and electric.

Efficiency in operations has allowed the City to continue operation within the \$17.06 rate since 2005 with the use of existing City revenue balances. At the outset of the study, the City expressed an interest in evaluating six future solid waste options and programs to improve overall efficiency and estimate the future residential household fee necessary to cover the costs of the City's solid waste programs. The options or programs that were evaluated are discussed below. A Pro Forma Rate Model was developed in conjunction with the options/programs to determine the direct result on solid waste fees to be charged in order to implement a given option.

Options and Programs Evaluated

Automated Residential Solid Waste Collection

The City currently has a manual residential solid waste collection system that includes rear-load trucks. Automated collection using rolling carts would be one of the major options to improve cost efficiency. While the capital costs are generally high, the increased productivity and cost savings in most communities from implementing an automated collection program will generally offset the differences in capital costs between rear-loader and automated programs over time. Savings are also produced from labor-related costs, including lower worker's compensation costs, reduced health insurance rates and lower staff turnover. Ancillary benefits that are often difficult to quantify include reduced wear and tear on streets and reduced air emissions due to shorter truck operation times.



Kirkwood encourages recycling through public education.

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Kirkwood was one of the first cities in St Louis to offer recycling services.
Photos courtesy of SCS Engineers.

SCS was asked to conduct a financial analysis of automated residential solid waste collection. The Pro-Forma model estimated that the City could reduce costs by an estimated \$3.76 per month. Cost savings are gained in labor, benefits, equipment and supplies. Full conversion to an automated collection program is projected to result in a cumulative savings for the Department of \$453,502 annually in 2016.

Elimination of Commercial Solid Waste Collection

The Division currently competes with the private sector in providing commercial solid waste collection services within the City. In 2015, the Council passed an ordinance requiring all residential and commercial solid waste customers to use the Division's services. However, the Council has since modified the ordinance to eliminate mandatory commercial waste service. Based on SCS's "windshield survey" at the beginning of the project, it appears the Division provides services to about 40 to 50 percent of the potential commercial customer base. Private waste haulers annually submit a license fee to the City, with the \$200 fee being the only revenues received by the City from commercial haulers.

While most municipalities operate commercial waste collection programs with the objective of providing a subsidy for residential collection programs and other solid waste related services, the opposite is currently in effect in Kirkwood. The City services commercial accounts with rear-loaders rather than more efficient front-loader vehicles, which are the industry standard for commercial waste collection. Furthermore, there is a lack of economy of scale since only a limited number of commercial accounts are currently held by the City.

It was determined that these operational inefficiencies, combined with the uncompensated wear and tear on City street pavements by private commercial haulers, essentially resulted in a subsidy from residential customers to the less efficient commercial solid waste collection services.

Recycling and Transfer Station Operations

The City currently delivers residential recyclables into a transfer station where a Bobcat is used, along with two employees, to feed recyclables into a compactor. This requires a "double handling" of the recyclable materials and increases the costs of the recycling program. SCS determined that the simple incorporation of a hopper and conveying system could eliminate double handling, increase efficiency of the system and potentially reduce City labor costs.

Recycling Incentives

Because recycling rates have been fairly flat over the past five years, a variety of options were evaluated to increase diversion. These include the following:

- Opportunities to minimize contamination in the recycling waste stream.
- Improvements that could be made to public outreach.
- Offering route-based incentives such as those offered by Recycle Bank.
- SCS provided background to the City regarding different strategies for increasing diversion in a market with established recycling programs. The City will use this information in the future to make decisions about outreach, education and recycling program changes.



Route Optimization and Advanced Electronics

Routing software is used by both private and municipal operations to optimize solid waste collection routing and assist managers in monitoring the performance of their solid waste collection fleets and personnel. The decision to purchase or use a routing software application must be carefully considered. Since equipment costs, labor and fuel are significant operating expenses for waste collection operations, reducing the number of routes, labor hours and mileage through route optimization is a critical and straightforward approach to increasing efficiency and reducing costs. However, waste routing software is typically complex to implement and has a high rate of failed implementations by municipalities. Typical complaints we have heard include that the software is too complicated to be adopted into daily operations, it is too expensive to purchase outright or procure through a monthly service fee, or the system maintenance requirements are too extensive.

Point-to-point routing software is an alternative that is used when the daily delivery locations, or in the case of solid waste, daily collection of bulky waste, might vary. No one application on the market can handle all types of waste routing effectively. Each program uses various routing techniques and algorithms, graphical information system (GIS) applications, automatic vehicle location technologies, and on-route mapping and monitoring. Multiple applications sometimes need to be implemented to service all types of waste collection routing required of a given solid waste system.

The use of enhanced electronics is another emerging trend for solid waste collection. In recent years, many agencies have installed cameras on the outside of the residential collection vehicles to help improve safety. DVD recorders have also been installed to track backup and potential safety issues. This equipment provides an additional pair of eyes for drivers and has proven beneficial in improving safety. SCS provided background to the City regarding route optimization and emerging technologies for potential future evaluation.

Incentive Pay

To increase efficiencies, many local governments have implemented programs to improve crew productivity through development of special pay structures and "gainsharing" initiatives. Most public collection systems use an incentive or "task pay" system, whereby each crew is assigned to a specific route with a fixed number of stops each day. Under this type of program, the crew is given the incentive to complete the route as quickly as possible, while at the same time ensuring that all stops are collected for that route.

Increasingly, the public sector is moving away from the incentive or task pay system towards work strategies that require more work from each crew to keep collection costs more in line with that of private haulers. To overcome the challenges of working quicker and faster, local governments are providing gain-sharing bonuses, absenteeism and safety incentives, and route/vehicle selection initiatives to individual employees or crews based on achieving a defined budget or efficiency goal. SCS evaluated the City's incentive pay strategy and recommended alternatives, taking into account financial impacts of the incentive options.

Construction and Demolition Debris Hauling

Roll-off service is generally viewed as a revenue producer for waste collection programs in the solid waste industry. With significant revenue potential, many public agencies have entered this private sector marketplace in recent years as a way to shore up revenue base and provide extra income for supplemental environmental programs such as household hazardous waste collection and public education.

The City offers roll-off service for C&D waste to some customers, albeit limited at this time. The City only operates one roll-off vehicle and owns eight large (2, 4, 6 and 30 cubic yards) roll-offs for residential and commercial accounts. Many of the larger commercial generators of solid waste in the City use larger roll-off containers (10, 20 and 40 cubic yards) to dispose of their C&D debris. These commercial accounts have been historically serviced by private solid waste haulers. SCS evaluated the City's roll-off service and how to improve its operations and financial performance in light of the private solid waste hauler competition.

Pro Forma Rate Model

A Pro Forma Rate Model was developed with the above options/programs incorporated into it to determine the direct result on solid waste fees to be charged in order to implement a given option. City staff provided background data and information concerning residential collection revenues and operating expenses.

The Pro Forma Model is a Microsoft Excel™ spreadsheet-based model that includes the following facets:

- An analysis of operational expenditures (personnel, contract and purchased services, materials and supplies, transfers).
- Analysis of capital outlays (equipment replacement and capital projects).
- Revenue sufficiency analysis (annual revenue projections and rate plan to provide sufficient revenues).
- Funds analysis (reserve requirements, transfers to general fund, administrative costs, beginning and ending fund balances).

Individual spreadsheets containing the data and information provided by the City were linked to develop an overall model to conduct the rate and assessment analysis. The following methodology was used by SCS to conduct the initial phase of the cost of service analysis:

- Collect Historical Actual Expenses and Revenues for the City System—Gather available historical actual revenue and cost data to input into financial database.
- Develop the “Test Year”—Develop an annual revenue requirement for a “Test Year”. The revenue requirement represents the total revenue necessary for the solid waste system to recover during a year to fund all

system costs. SCS worked with City staff to select a period that reflected a typical year for the System. Actual expenses for FY 16/17 were used as the basis of the Test Year for the Study.

- Develop a Revenue Requirement Projection—After developing the revenue requirement for the Test Year, SCS worked with City staff to project changes in anticipated costs due to inflation, labor increases, facility and vehicle maintenance, planning costs, etc. This resulted in a five-year revenue requirement forecast for the entire sanitation program including collection, recycling and disposal of solid waste.
- Develop Revenue Offsets—SCS worked with City staff to develop estimates of the sales of recyclables, and additional revenues from yard waste and bulky waste collection.
- Determine Number of Customer Units—SCS worked with City staff to determine the number of customers being serviced by the City.
- Calculate Monthly Customer Service Fee—SCS then distributed the revenue needs across the proper billing units to estimate the necessary monthly customer fee to cover the cost of service.

The resulting Test Year model was used as the basis for forecasting expenses for FY 16/17 through FY 20/21. In order to develop the forecast, SCS projected how costs would change over the forecast period due to factors such as inflation. The assumptions used to develop the forecast include a 2.3 percent annual increase for general, salary, medical insurance and other benefits, and fuel, while solid waste and customer growth were assumed to be zero percent. A solid waste tipping fee of \$44 a ton was used. In addition to forecasting cost increases due to inflation, etc., SCS accounted for capital improvements, customer account growth and solid waste generation changes over the five-year forecast period.

Rate Scenarios

A total of six Rate Model scenarios were developed to evaluate the impact of changes to the Solid Waste System. This information was used when presenting potential changes or programs for consideration.

Current Status

The City of Kirkwood is always looking at ways to streamline costs and improve services for residents. Recently the City discontinued commercial sanitation services in an effort to maintain a viable residential solid waste collection program. The City continues to assess the residential sanitation program with the goal of ensuring sustainable service to residents. This could mean a rate increase, which would be the first increase in more than 10 years, or it could mean automation, service reduction, or outsourcing sanitation services. The City will be looking at all options in the effort to continue to provide excellent sanitation service to residents at a reasonable rate. | **WA**

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