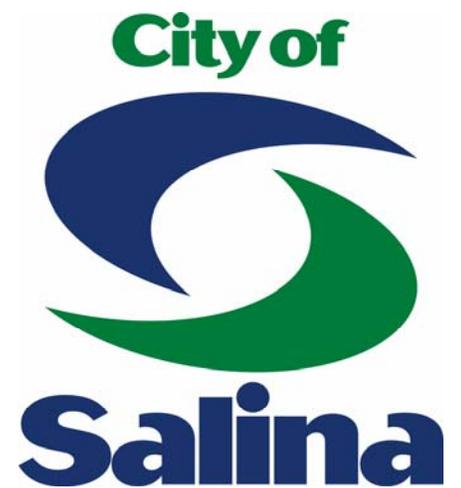




# Business Plan for Automated Refuse Collection and Recycling



**City of Salina**

**March 2017**





March 20, 2017

Mr. Jim Teutsch  
Operations Manager  
Public Works Department  
City of Salina  
412 East Ash Street  
Salina, KS 67401

Re: Business Plan for Automated Refuse Collection and Recycling

Dear Mr. Teutsch:

Burns & McDonnell appreciates the opportunity to have partnered with the City of Salina to develop this business plan for fully-automated refuse and recycling collection. Should you have any questions regarding this report, please contact me at (512) 872-7141 or [spasternak@burnsmcd.com](mailto:spasternak@burnsmcd.com). Thank you for the opportunity with the City of Salina.

Sincerely,

A handwritten signature in black ink, appearing to read 'Scott Pasternak', written in a cursive style.

Scott Pasternak  
Senior Project Manager

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## EXECUTIVE SUMMARY

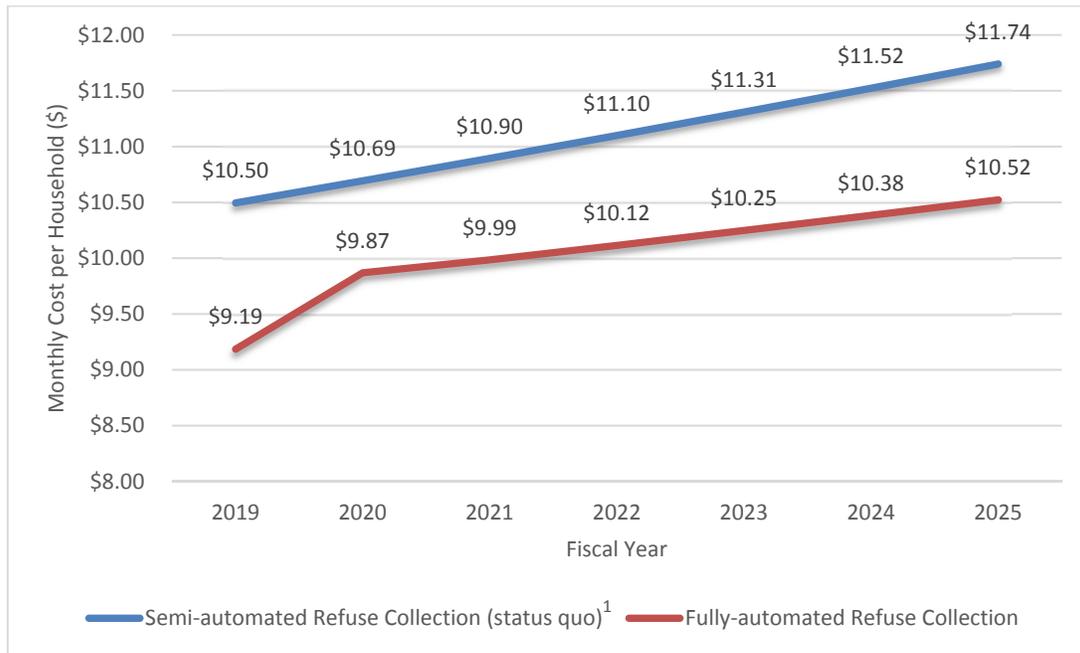
The City of Salina (City) retained Burns & McDonnell to conduct a business plan to evaluate the feasibility to implement fully-automated residential refuse collection and recycling collection for the City. This business plan is a follow-on study to the “Community-wide Recycling Program Feasibility Study” that the City completed in January 2013. Although the primary focus of this plan was on the costs and configurations of the residential refuse and recycling programs, Burns & McDonnell also conducted a limited analysis of the yard waste program and the potential financial impact if the City decides to discontinue the program and co-collect yard waste with refuse. This report is organized into the following four sections, and the remainder of this Executive Summary highlights key aspects of each section.

- Section 1.0: Automation of Refuse Collection Operation
- Section 2.0: Single-stream Recycling Collection Operation
- Section 3.0: Pricing and Market Share Analysis
- Section 4.0: Refuse and Recycling Implementation Plans

### Automation of Refuse Collection Operation

As detailed in Section 1.0, Burns & McDonnell independently evaluated the current semi-automated refuse collection program (status quo) and agrees with the City that it requires adjustments to continue to meet the demands of a growing population. Burns & McDonnell identified that the changes needed to the status quo program include adding a fifth collection route and an additional backup refuse collection vehicle. Therefore, Burns & McDonnell included the costs of these changes in the status quo refuse collection program costs, which allows for a direct comparison of the status quo refuse program cost with the cost of fully-automated refuse collection provided in Figure ES-1. The monthly cost per household in each year is less expensive for fully-automated refuse collection than for the status quo configuration.

**Figure ES-1: Comparison of Monthly Cost per Household of Semi-automated Refuse Collection to Fully-automated Refuse Collection**



1. Semi-automated Refuse Collection assumes that the City makes route and staff changes necessary to continue the current refuse collection program.

Burns & McDonnell evaluated the costs associated with implementation of a fully-automated refuse program, which would include five collection routes, five frontline fully-automated refuse collection vehicles, and one backup vehicle. The fully-automated refuse collection costs are shown in Table ES-1. The monthly cost per household assumes that the refuse system operates efficiently, which will require the City to implement and adhere to collection policies (i.e., only collecting material placed in the refuse cart). A public education program during the transition period will help to clarify policies for fully-automated refuse collection. Section 1.0 provides a detailed discussion and analysis of each of the individual costs for the fully-automated refuse collection program.

**Table ES-1: Summary of Fully-automated Refuse Collection Costs**

<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Personnel <sup>1</sup>	\$364,216	\$373,321	\$382,654	\$392,221	\$402,026	\$412,077	\$422,379
Fuel	\$84,366	\$86,475	\$88,637	\$90,853	\$93,124	\$95,453	\$97,839
Vehicle Maintenance	\$194,168	\$199,022	\$203,997	\$209,097	\$214,325	\$219,683	\$225,175
Capital Cost – Vehicles	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078
Capital Cost – Carts	\$128,648	\$135,271	\$135,436	\$135,606	\$135,780	\$135,958	\$136,141
Other Operating and Maintenance Cost <sup>2</sup>	\$611,243	\$715,770	\$733,665	\$752,006	\$770,806	\$790,077	\$809,829
Contributions to Reserve Fund	\$0	\$9,656	\$7,597	\$7,787	\$7,981	\$8,181	\$8,385
<b>Total Annual Collection Cost</b>	\$1,689,718	\$1,826,593	\$1,859,065	\$1,894,648	\$1,931,121	\$1,968,506	\$2,006,826
Households <sup>3</sup>	15,330	15,422	15,515	15,609	15,703	15,798	15,893
<b>Monthly Cost per Household</b>	<b>\$9.19</b>	<b>\$9.87</b>	<b>\$9.99</b>	<b>\$10.12</b>	<b>\$10.25</b>	<b>\$10.38</b>	<b>\$10.52</b>

1. Personnel cost includes base salary, benefits, and overtime costs.
2. Other operating and maintenance cost includes costs such as office supplies, uniforms, tools, administration, data processing, etc.
3. Number of households is based on a population current growth rate of 0.6 percent per year.

### Single-stream Recycling Collection Operation

As detailed in Section 2.0, Burns & McDonnell evaluated the financial impact of the City implementing a new fully-automated single-stream recycling program to replace the existing subscription program. The City's goal is for all residents to have access to curbside recycling collection services. The City has shown its interest in moving towards single-stream recycling through the 2016 pilot study using semi-automated collection vehicles. Burns & McDonnell estimated the costs associated with the implementation of a new recycling program, which would include two fully-automated recycling collection vehicles and one backup collection vehicle. The fully-automated recycling collection costs are shown in Table ES-2. The monthly cost per household assumes that the recycling system operates efficiently, which will require the City to implement and adhere to collection policies (i.e., only collecting uncontaminated recyclable material placed in the recycling cart). The 95-gallon recycling cart will provide residents with significantly more recycling capacity than the current 18-gallon recycling bins used in the subscription recycling program. Section 2.0 provides a detailed discussion and analysis of each of the individual costs for the fully-automated single-stream recycling collection program.

**Table ES-2: Summary of Single-stream Recycling Collection Costs**

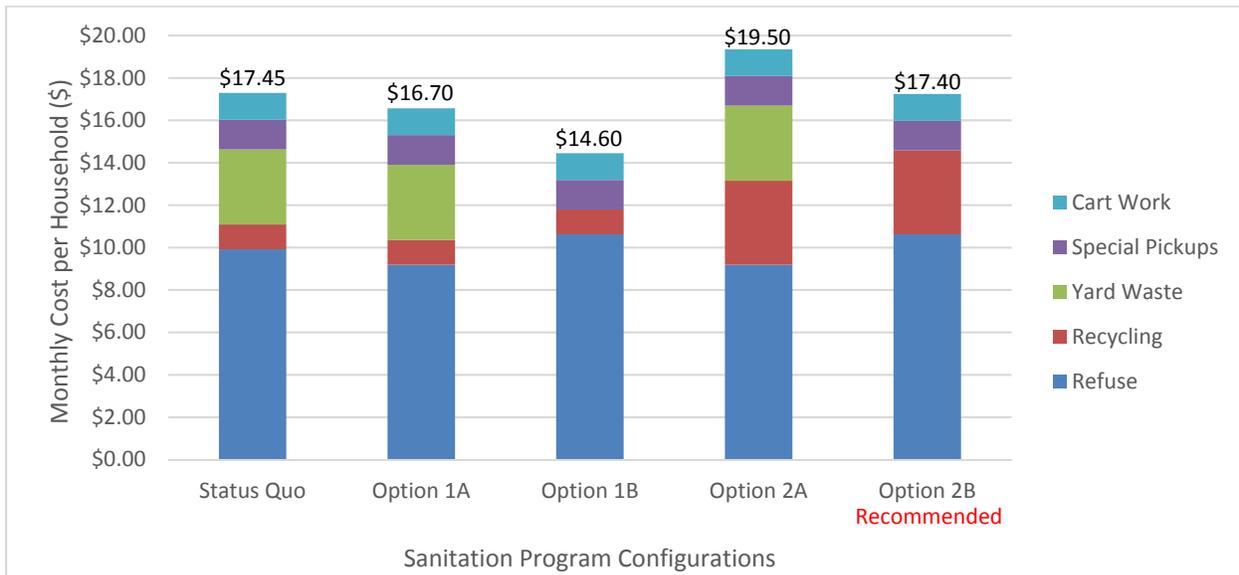
<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Personnel <sup>1</sup>	\$116,451	\$119,363	\$122,347	\$125,405	\$128,540	\$131,754	\$135,048
Fuel	\$34,196	\$35,051	\$35,927	\$36,826	\$37,746	\$38,690	\$39,657
Vehicle Maintenance	\$97,248	\$99,679	\$102,171	\$104,725	\$107,343	\$110,027	\$112,777
Capital Cost – Vehicles	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539
Capital Cost – Carts	\$128,648	\$135,271	\$135,436	\$135,606	\$135,780	\$135,958	\$136,141
Other Operating and Maintenance Cost <sup>2</sup>	\$173,214	\$206,378	\$201,661	\$207,328	\$213,165	219,187	\$225,390
Contributions to Reserve Fund	\$24,927	\$24,927	\$24,927	\$24,927	\$24,927	\$2,869	\$2,947
<b>Total Annual Collection Cost</b>	\$728,223	\$774,207	\$776,008	\$788,355	\$801,040	\$792,024	\$805,499
Households <sup>3</sup>	15,330	15,422	15,515	15,609	15,703	15,798	15,893
<b>Monthly Cost per Household</b>	<b>\$3.96</b>	<b>\$4.18</b>	<b>\$4.17</b>	<b>\$4.21</b>	<b>\$4.25</b>	<b>\$4.18</b>	<b>\$4.22</b>

1. Personnel cost includes base salary, benefits, and overtime costs.
2. Other operating and maintenance cost includes costs such as office supplies, apparel, tools, administration, data processing, and public education, etc.
3. Number of households is based on a population current growth rate of 0.6 percent per year.

### Pricing and Market Share Analysis

As detailed in Section 3.0, Burns & McDonnell evaluated the City's sanitation rates with the rates charged by private haulers in the local market. Burns & McDonnell estimated the costs of the City's current sanitation services (status quo) and evaluated the costs of four different options that the City could consider implementing as shown in Figure ES-2. A detailed breakdown of the monthly household costs is provided in Section 3.0.

**Figure ES-2: Monthly Cost per Household for Sanitation Services**



Collection Service	Collection Services Provided				
	Status Quo	Option 1A	Option 1B	Option 2A	Option 2B (recommended)
Semi-automated Refuse	X				
Fully-automated Refuse		X	X	X	X
Subscription Recycling	X	X	X		
Fully-automated Single-stream Recycling				X	X
Yard Waste	X	X	Co-collected with refuse	X	Co-collected with refuse
Special Pickups	X	X	X	X	X
Cart Work	X	X	X	X	X
<b>Monthly Cost per Household</b>	<b>\$17.45<sup>1</sup></b>	<b>\$16.70<sup>1</sup></b>	<b>\$14.60<sup>1</sup></b>	<b>\$19.50</b>	<b>\$17.40</b>

1. The monthly cost per household for sanitation services does not include the additional monthly recycling subscription fee for participating residents, currently \$5.40 per month.

Based on discussions with City staff, Burns & McDonnell determined that the City prefers to implement fully-automated refuse collection and single-stream recycling collection with yard waste co-collected with refuse (Option 2B). The City is considering discontinuing the current yard waste collection program as a cost reduction effort for City residential customers, and Burns & McDonnell performed an additional analysis of how the monthly cost per household would change if yard waste is co-collected with refuse. The detailed sanitation costs and recommended rates for Option 2B is provided in Table ES-3.

**Table ES-3: Monthly Cost per Household for Sanitation Services for Recommended Option**

<b>Program Services</b>	<b>Refuse</b>	<b>Recycling</b>	<b>Yard Waste</b>	<b>Special Pickups</b>	<b>Cart Work</b>	<b>Total Cost per Month</b>	<b>Recommended Rate per Month</b>
Option 2B: Fully-automated Refuse Collection and Co-collected Yard Waste, Single-stream Recycling Collection <sup>1, 2</sup>	\$10.62	\$3.96	\$ -	\$1.40	\$1.26	\$17.24	\$17.40

1. These costs are based on the sanitation services in the first year of operation (FY 2019).
2. The stranded costs remaining after the elimination of the yard waste program are assigned to the refuse program as customers would commingle yard waste with refuse for disposal.

Burns & McDonnell recommends that the City set the monthly rate per household higher than the total monthly cost to allow the City to slightly over recover program costs, to build its reserve to cover potential, unanticipated costs, and to delay the amount of time before the next rate increase would be required. While the recommended City rates are higher than the current monthly rates charged by private haulers, which include Salina Waste Systems (\$15 per household) and Salina Iron and Metal (\$17 per household), the private haulers currently do not provide residential curbside recycling services. As part of a city-wide recycling collection program, Burns & McDonnell recommends that the City adopt an ordinance that would require all residential solid waste providers (including the City) to provide recycling collection as part of their services to maintain an equal level of competition. With this change, Burns & McDonnell would anticipate that private haulers would need to increase their rates to provide recycling services, which would mean that the City's rates would still be relatively competitive.

Burns & McDonnell recommends that the City transport collected mixed recyclables to the McPherson Area Solid Waste Utility (MASWU) for processing and to provide private haulers with the same opportunity to haul their recyclables to the MASWU. The City would coordinate with the MASWU to maintain consistency of recycling requirements for private haulers and the City. Private haulers would still have the option to choose to use another processing facility of their choice. If a private hauler chooses to transport its recyclables to the MASWU, the private hauler would need its own agreement with the MASWU.

### **Cash Flow Analysis**

Burns & McDonnell performed a cash flow analysis based on the proposed sanitation rate for Option 2B shown in Table ES-3. For the purposes of this cash flow analysis the starting reserve fund balance in FY 2019 is based on the reserve fund at the end of FY 2016, the most recent fund data available. The City will need to re-evaluate this cash flow analysis if the fund balance changes significantly prior to FY 2019.

As shown in Table ES-4, both the fully-automated refuse collection program and single-stream recycling program would generate sufficient revenue to cover the City’s costs and to grow the reserve fund based on a sanitation rate of \$17.40 per month per household. The City could allocate a portion of the reserve fund to help cover the costs of purchasing a replacement fleet for fully-automated vehicles at the end of the seven-year vehicle life cycle.

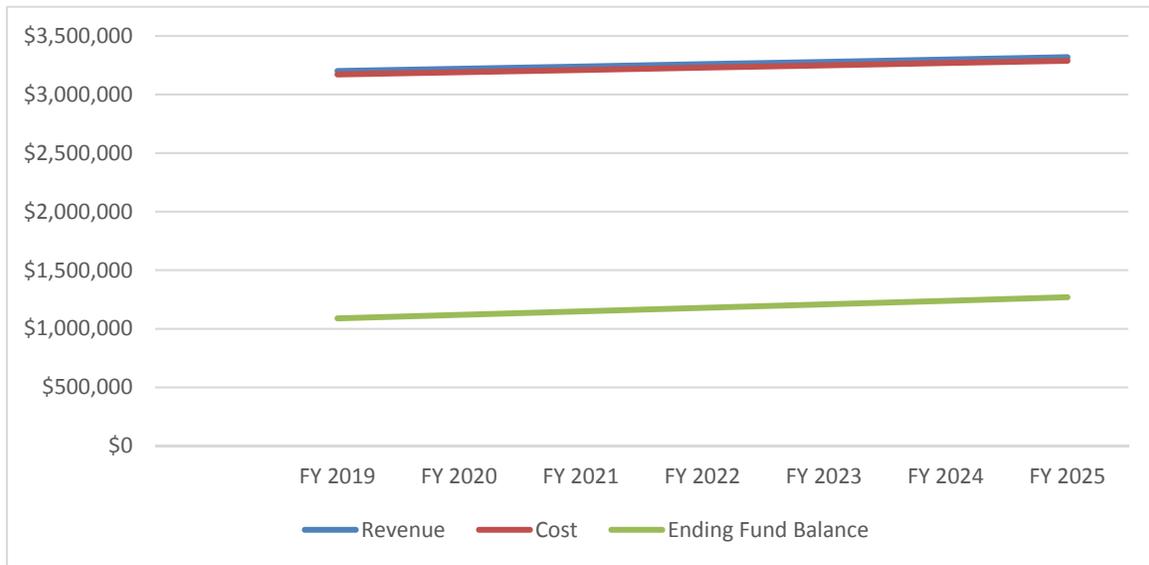
**Table ES-4: Cash Flow Analysis for Recommended Option**

Description	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Starting Fund Balance <sup>1</sup>	\$1,059,797	\$1,089,230	\$1,118,841	\$1,148,629	\$1,178,599	\$1,208,748	\$1,239,081
Revenue	\$3,200,904	\$3,220,114	\$3,239,532	\$3,259,159	\$3,278,786	\$3,298,622	\$3,318,458
Cost	\$3,171,470	\$3,190,503	\$3,209,743	\$3,229,190	\$3,248,637	\$3,268,290	\$3,287,944
Ending Balance	\$1,089,230	\$1,118,841	\$1,148,629	\$1,178,599	\$1,208,748	\$1,239,081	\$1,269,595

1. The starting fund balance for FY 2019 is based on the fund balance at the end of FY 2016, the most recent fund data available.

The data shown in Table ES-3 above is shown graphically in Figure ES-3 below. The graph shows that the revenue is sufficient to cover the costs of the sanitation programs, which continues to grow the reserve fund to cover potential contingency costs or to help offset the cost of future vehicle purchases.

**Figure ES-3: Cash Flow Analysis for Recommended Option**



### Refuse and Recycling Implementation Plans

As detailed in Section 4.0, Burns & McDonnell developed implementation plans to help guide the City through the major steps in the process to implement fully-automated refuse collection and single-stream recycling collection. Since the City may decide to implement one or both new collection programs, Burns

& McDonnell developed the implementation plan for each program so that it can be a stand-alone decision. Each of the implementation plans address the following key issues:

- Policy Decisions
- Ordinance Development
- Service Implementation
- Public Education
- Transition Schedule

Burns & McDonnell estimates that it would take the City 14 months to implement fully-automated refuse collection and 22 months to implement fully-automated single-stream recycling.

## 1.0 AUTOMATION OF REFUSE COLLECTION OPERATION

This section includes Burns & McDonnell’s evaluation of costs of the City of Salina’s (City) refuse collection system. Burns & McDonnell developed this business plan to describe the costs associated with implementing a fully-automated refuse collection system. The existing system is also described in this section to provide a basis of comparison. The plan forecasts costs over a seven-year period from 2019 to 2025, which coincides with a complete lifecycle of fully-automated vehicles.

### 1.1 Existing Refuse Collection System

The City’s current refuse collection system is manually intensive. It consists of four collection routes operated by four semi-automated vehicles, five days per week. Figure 1-1 shows an example of a semi-automated collection vehicle. Each semi-automated vehicle includes one driver and two workers at the rear of the vehicle to collect refuse carts. The City purchases refuse containers from Ameri-Kart, which are upright carts unique to semi-automated collection operations.

**Figure 1-1: Semi-automated Rear-Load**



In January 2013, SAIC conducted a “Community-wide Recycling Program Feasibility Study,” for the City to provide recommendations to improve efficiencies and increase material recovery of the City’s semi-automated refuse collection system. A follow-on evaluation in October 2015 by Burns & McDonnell identified that the City needs to add a fifth refuse collection route to accommodate the growing number of households served even if the City decides to maintain the refuse collection program in its current configuration with semi-automated vehicles. The studies recommended that the City consider transitioning to a fully-automated collection system to improve collection efficiency and to

increase capacity. The City purchased a new semi-automated refuse vehicle in 2016 in preparation for implementing a fifth refuse collection route but has not yet hired a driver and two workers to operate it. In addition, the Public Works Department identified a concern with multiple frontline vehicles being unavailable for maintenance and the time for an outside facility to complete repairs, and the need for an additional backup refuse vehicle. Since the fifth refuse collection route and backup refuse vehicle are already needed to meet the City's growing number of customers and to provide operational continuity, the costs in the financial analysis are based on a refuse collection program consisting of five collection routes and an additional refuse backup vehicle when comparing to the costs of a new fully-automated collection system.

## 1.2 Automation of Refuse Collection Operation

The conversion to a fully-automated collection system will require changes in the types of vehicles, containers, routing modifications, and adjustments in staffing. The fully-automated collection system to be implemented would include:

- Five fully-automated frontline refuse collection vehicles
- One fully-automated backup refuse collection vehicle
- Five refuse collection routes
- Five day per week collection
- Eight-hour work day

Key changes from the current semi-automated refuse collection system include:

- One driver to operate each fully-automated vehicle instead of one driver and two workers per semi-automated vehicle
- A refuse collection vehicle with a 28-cubic yard capacity to increase collection efficiency and reduce frequency of trips to the landfill
- Replace current refuse collection carts with new carts compatible with fully-automated collection
- Requirement to set-out carts at the curb so they are accessible to fully-automated collection vehicles. Currently, approximately 85 percent of carts are placed at the curb and 15 percent are in the alley

Burns & McDonnell developed a financial model based on budget information provided by the City to forecast the costs associated with implementation of a fully-automated refuse collection system.

### 1.2.1 Personnel Costs

Converting to a fully-automated collection system will reduce the number of staff required to be dedicated to each refuse route. A semi-automated vehicle requires one driver and two workers at the rear of the vehicle for collecting carts. In a fully-automated system only one driver is required to drive the vehicle and operate the collection arm. Figure 1-2 shows an example of a fully-automated collection vehicle.

**Figure 1-2: Fully-automated Collection Vehicle**



Based on the City’s FY 2016 Budget, and discussions with City staff, Burns & McDonnell determined the allocation of each staff person to the refuse collection program as shown in Table 1-1.

**Table 1-1: Refuse Collection Personnel Requirement**

<b>Personnel <sup>1</sup></b>	<b>Semi-automated (FY 2018)</b>	<b>Fully-automated (FY 2019)</b>
Superintendent	0.40	0.40
Supervisor	0.40	0.40
Admin. Assistant	0.35	0.35
Driver Specialist	1.00	1.00
Driver	4.00	4.00
Worker/Driver	1.34	1.00
Worker	9.70	0.00
<b>Total</b>	<b>17.19</b>	<b>7.15</b>

1. Personnel allocated to refuse collection based on City’s FY 2016 Budget. An allocation less than one indicates that the staff person assists with other programs.

The allocation of supervisory and administrative staff is not expected to change in a fully-automated system as these tasks are required for the operation of either refuse collection configuration.

A fully-automated collection system will result in a reduction in the crew size needed to operate each refuse collection route. A fully-automated route requires one driver while a semi-automated route requires one driver and two workers. Burns & McDonnell anticipates that the current five drivers that operate the semi-automated vehicles will be trained to operate the fully-automated vehicles and use of the collection arm. Burns & McDonnell anticipates that the City could transition the current worker staff to fill other roles with the City. For example, the City could transfer workers to other public works departments such as streets, water, or sewer. Additionally, some staff reductions could occur by attrition. Currently, the City is filling staffing needs by only hiring temporary employees until transitioning to the new fully-automated refuse program to reduce the need for transfers or staff reductions.

The City has a current need for an additional worker/driver position to provide operational continuity for the refuse operation. In addition, the City could train some of the current workers to be drivers to increase backup driver capacity. The Public Works Department indicated that it has had difficulty filling all sanitation worker positions and historically has run a personnel shortage of one to three positions. By not filling vacant positions, the City could reduce the number of workers that would need to be transitioned to another role.

Based on the allocation of staff for a fully-automated collection system in Table 1-1, Table 1-2 shows the total personnel costs over the next seven years.

**Table 1-2: Personnel Costs in a Fully-automated Refuse Collection System**

<b>Personnel Cost <sup>1</sup></b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Base Salaries	\$246,226	\$252,381	\$258,691	\$265,158	\$271,787	\$278,582	\$285,546
Benefits	\$117,212	\$120,142	\$123,146	\$126,224	\$129,380	\$132,614	\$135,930
Overtime	\$778	\$798	\$818	\$838	\$859	\$881	\$903
<b>Total</b>	<b>\$364,216</b>	<b>\$373,321</b>	<b>\$382,654</b>	<b>\$392,221</b>	<b>\$402,026</b>	<b>\$412,077</b>	<b>\$422,379</b>

1. Personnel costs include an assumed 2.5 percent inflation rate.

Figure 1-3 shows an organization chart depicting the collection personnel required for a semi-automated refuse system (status-quo) compared to a fully-automated collection system.

**Figure 1-3: Comparison of Existing Semi-automated Refuse Collection System to Fully-automated Refuse Collection System**

Semi-automated Collection  
(status quo)

Fully-automated Collection  
(proposed)



Daily Personnel Requirement

10 workers

5 drivers

0 workers

5 drivers

Legend



Driver



Worker

### 1.3 Vehicle Costs

The City's current refuse collection system consists of five<sup>1</sup> semi-automated vehicles that will need to be replaced with five fully-automated vehicles. In addition, the City has a current need for an additional backup refuse vehicle to provide operational continuity for when a regular frontline vehicle is unavailable for maintenance. Through discussions with City staff, Burns & McDonnell based the new fully-automated vehicle costs on the City replacing the current fleet with six new fully-automated vehicles (i.e., five frontline vehicles and one backup vehicle). Burns & McDonnell typically recommends a backup vehicle ratio of about 20 to 30 percent for similar operations. In this scenario, the backup ratio for refuse vehicles would be 20 percent. If the City implements a fully-automated recycling program, backup vehicles can be shared between refuse and recycling, further increasing backup capacity. Burns & McDonnell understands that vehicle service performed by outside repair facilities have at times caused longer than anticipated downtime for collection vehicles. If this continues to be an issue for the City, Burns & McDonnell recommends the City evaluate alternatives, including adding additional backup vehicles, new vendors, or contract performance standards with existing vendors. The following sections address the costs associated with fully-automated collection vehicles.

#### 1.3.1 Vehicle Operating and Maintenance Costs

Fully-automated collection vehicles typically have higher fuel and maintenance costs compared to semi-automated vehicles. A fully-automated vehicle will consume more fuel due to a higher vehicle weight and additional hydraulic motors associated with the automated collection arm. Burns & McDonnell recommends that the City plan on a 30 percent higher annual fuel cost per fully-automated vehicle. Burns & McDonnell used actual fuel usage information for the City's refuse operation as a basis to develop a fuel cost assumption.

The maintenance cost of a fully-automated vehicle is typically higher because of the increased level of hydraulics and number of moving parts. Burns & McDonnell assumed a maintenance cost of \$30,000 per year in 2016 dollars for fully-automated vehicles based on Burns & McDonnell's experience with refuse operations maintenance costs typically seen in other cities with fully-automated systems.

Table 1-3 shows the estimated average fuel and maintenance cost for a fully-automated collection vehicle.

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<sup>1</sup> The City currently has four frontline refuse collection vehicles with a fifth vehicle purchased anticipating the implementation of a fifth refuse collection route.

**Table 1-3: Average Operating and Maintenance Costs per Fully-automated Refuse Vehicle**

O&M Cost	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Fuel Cost <sup>1</sup>	\$16,723	\$17,141	\$17,570	\$18,009	\$18,459	\$18,921	\$19,394
Maintenance Cost <sup>2</sup>	\$32,307	\$33,114	\$33,942	\$34,791	\$35,661	\$36,552	\$37,466
<b>Avg. Cost per Vehicle</b>	<b>\$49,030</b>	<b>\$50,256</b>	<b>\$51,512</b>	<b>\$52,800</b>	<b>\$54,120</b>	<b>\$55,473</b>	<b>\$56,860</b>

1. Fuel cost is based on the price of Midwest diesel provided by the US Energy Information Administration (7/2016) inflated at 2.5 percent per year.
2. Maintenance cost is based on \$30,000 per year in 2016 dollars inflated at 2.5 percent per year.

The approximate vehicle operating and maintenance costs for the entire refuse collection fleet are shown in Table 1-4. The total fuel cost is determined by multiplying the amount shown in Table 1-3 by five frontline fully-automated vehicles as the sixth vehicle would be used as a backup for one of the frontline vehicles when it is unavailable for maintenance. The total maintenance cost is determined by multiplying the amount in Table 1-3 by six fully-automated vehicles to include the maintenance cost for the frontline vehicles as well as the incremental maintenance cost for the backup vehicle. The fuel and maintenance costs shown also include the costs associated with supervisors' pickups.

**Table 1-4: Total Fuel and Maintenance Costs for Refuse Vehicles**

O&M Cost	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Fuel Cost <sup>1</sup>	\$84,366	\$86,475	\$88,637	\$90,853	\$93,124	\$95,453	\$97,839
Maintenance Cost <sup>2</sup>	\$194,168	\$199,022	\$203,997	\$209,097	\$214,325	\$219,683	\$225,175
<b>Total</b>	<b>\$278,534</b>	<b>\$285,497</b>	<b>\$292,635</b>	<b>\$299,951</b>	<b>\$307,449</b>	<b>\$315,136</b>	<b>\$323,014</b>

1. Includes cost of fuel for five frontline fully-automated vehicles and supervisors' vehicles.
2. Includes cost of maintenance for six fully-automated vehicles (frontline and backup) and supervisors' vehicles.

### 1.3.2 Vehicle Capital Costs

The specific pricing of the fully-automated vehicles will be based on multiple factors, including preferred features, number of vehicles, financing, and individual pricing options negotiated at the time of purchase. Burns & McDonnell reviewed pricing for fully-automated low-entry vehicles published on HGACBuy, which is a cooperative purchasing program, to estimate an average cost for a fully-automated collection vehicle. Based on the information reviewed, Burns & McDonnell estimated a purchase price of approximately \$275,000 per vehicle and \$1,650,000 for six vehicles in 2016 dollars. The City's preferred features include:

- Aluminum wheels to reduce weight
- Large hauling capacity to reduce frequency of trips to landfill (i.e., 28 cubic yards)
- Minimum 50-gallon fuel tank
- Weight scale to monitor gross vehicle weight
- Camera and monitor system (rear view, blind spot, hopper)

- Low entry cab

Features such as weight scales and aluminum wheels may be an additional cost and could vary depending on the specific system chosen. The list of vehicle features may be further defined by the City prior to purchase of the fully-automated collection vehicles, which may affect the final vehicle cost.

### 1.3.3 Use of Existing Semi-automated Refuse Fleet

With the purchase of the fully-automated collection vehicles, the existing fleet of semi-automated refuse collection vehicles will no longer be needed for refuse collection. While the semi-automated vehicles are capable of collecting the carts, using a semi-automated vehicle as a backup for a fully-automated route can cause operational challenges due to the differences in collection efficiency and personnel requirements. Table 1-5 shows possible options for how the City could choose to use its existing fleet of semi-automated refuse vehicles and Burns & McDonnell’s recommendation for the City.

**Table 1-5: Usage Options for Existing Semi-automated Refuse Fleet**

Options	Recommendation for City
Sell all frontline and backup semi-automated refuse vehicles	Transfer semi-automated refuse vehicles to other collection programs and sell older semi-automated vehicles to offset cost of new fully-automated vehicles <ul style="list-style-type: none"> <li>• Transfer two semi-automated refuse vehicles to the special pickups program (one frontline and one backup)</li> <li>• Sell the remaining semi-automated vehicles</li> </ul>
Support yard waste collection, subscription recycling collection, or special pickups	
Transfer semi-automated refuse vehicles to other collection programs and sell older semi-automated vehicles to offset cost of new fully-automated vehicles	

The existing fleet of semi-automated refuse vehicles is relatively new. At the time the City implements fully-automated refuse collection in FY 2019, several of the vehicles will be three years old or less. Since newer vehicles generally have lower maintenance costs, Burns & McDonnell assumed that the City would choose to transfer two of the existing semi-automated refuse vehicles to replace the older vehicles used for the special pickups program.

### 1.3.4 Funding Options for Fully-automated Refuse Vehicles

The City has typically set aside an annual budget amount to support the purchase of replacement vehicles. However, given that the City will need to completely transition all customers to a fully-automated collection system in FY 2019, Burns & McDonnell recommends that the City issue debt, or borrow from other City funds, to help fund the purchase of the six fully-automated vehicles. Burns & McDonnell inflated the estimated \$275,000 purchase price for new fully-automated vehicles (in 2016 dollars) by 2.5 percent per year for three years to account for an increase in purchase price between now and when the

City purchases the vehicles in FY 2019. Based on these assumptions, Table 1-6 shows the estimated debt service for the six fully-automated collection vehicles.

**Table 1-6: Fully-automated Refuse Vehicle Annual Debt Service**

<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Debt Service <sup>1</sup>	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078

1. Debt service is based on a term of seven years at a 5 percent interest rate.

Burns & McDonnell assumed the City would sell its older semi-automated vehicles. For this analysis, Burns & McDonnell estimated a salvage value of approximately \$87,000 for the sale of the five oldest existing semi-automated vehicles from across its fleet. This value is based on 15 percent of the vehicle’s original purchase price as the oldest semi-automated vehicles will be more than seven years old at the time of sale in FY 2019. In the financial analysis, revenue from the sale of these vehicles was shown as a one-time credit in FY 2019 (see

Table 1-8), which will help offset some of the implementation costs of the new program.

#### 1.4 Refuse Container Cost

Currently, the City uses Ameri-Kart 3190 refuse carts. These carts include metal bars that would hinder the operation of the collection arm and the plastic lid latch would need to be manually unlatched before the cart could be emptied. Figure 1-4 shows an example of the current cart and a typical new cart for fully-automated collection. The City indicated that it is currently paying about \$67 per cart, which is higher than the \$60 per cart amount used in this analysis. Typically, the City has purchased carts in limited quantities to replace damaged carts and part of a replacement cycle to replace older style carts, resulting in a marginally higher per cart cost.

**Figure 1-4: Example of Current Cart and Cart for Fully-automated Collection**



**Current Ameri-Kart 3190 Refuse Cart**



**Refuse Cart for Fully-automated Collection**

The transition to a fully-automated collection system will require the City to immediately upgrade all existing refuse carts for all customers to new refuse carts compatible with automated collection arms. Based on a population growth rate of 0.6 percent, Burns & McDonnell estimates that the City will have grown to over 15,300 households by 2019, and that up to eight percent of customers may have more than one refuse cart. Therefore, Burns & McDonnell estimates that the City will need to purchase approximately 16,550 refuse carts to implement a fully-automated refuse collection system. Burns & McDonnell also estimates that the City will need to purchase an additional 100 refuse carts annually beginning in FY 2020 to account for future population growth and to replace customer-damaged refuse carts. Defective carts should be covered under the cart manufacturer's warranty. With the quantity of carts to be purchased, the City has the opportunity to reduce the per cart cost by taking advantage of bulk pricing options. The City can either develop a request for proposals for carts or use a cooperative

purchasing program, such as HGACBuy. Based on experience with other refuse collection programs, Burns & McDonnell estimated a refuse cart cost of \$60 per cart, including delivery to Salina, assembly, and delivery to customers. The refuse cart capital cost is shown in Table 1-7.

**Table 1-7: Refuse Cart Capital Cost**

<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Purchase of Carts <sup>1</sup>	\$128,648	\$128,648	\$128,648	\$128,648	\$128,648	\$128,648	\$128,648
Additional/ Replacement Carts <sup>2</sup>	\$0	\$6,623	\$6,788	\$6,958	\$7,132	\$7,310	\$7,493
<b>Total</b>	<b>\$128,648</b>	<b>\$135,271</b>	<b>\$135,436</b>	<b>\$135,606</b>	<b>\$135,780</b>	<b>\$135,958</b>	<b>\$136,141</b>

1. Based on a 10-year cart useful life and a 5 percent interest rate, which would continue through FY 2028.
2. Assumed that the City would purchase an additional 100 carts per year for replacing damaged carts or for new customers. The \$60 purchase price in 2016 dollars was inflated at 2.5 percent per year.

Once the new refuse carts compatible with the fully-automated refuse vehicles are distributed to customers, the existing refuse carts will no longer be needed. There are multiple options that the City could consider for what to do with the unneeded refuse carts.

- Determine if there is a materials recovery facility (MRF) willing to accept plastic refuse carts for recycling. This option would require collecting the unneeded refuse carts and transporting them to the MRF. In addition, there would likely be a one-time fee to process the refuse carts.
- Allow customers to keep their current refuse cart. Customers would not be able to use the old refuse cart for refuse or recycling collection as the carts are not compatible with fully-automated collection vehicles. However, customers may choose to use their old refuse cart for other home uses.
- Transition the existing refuse carts to the yard waste program if the City decides to continue providing yard waste collection. The existing carts would be compatible with the semi-automated collection vehicles used to collect yard waste.

## 1.5 Other Operating and Maintenance Costs

In addition to the personnel, vehicle, and cart costs discussed, there are other operating and maintenance (O&M) costs that the City will incur as part of the refuse collection operations. Most of these costs, such as disposal costs, will not be impacted by the transition from semi-automated collection to fully-automated collection, while some, such as uniform costs, will vary based on the number of collection staff.

Table 1-8 shows the annual disposal costs and the other O&M costs that were included in the total refuse collection budget. These additional O&M costs include:

- Parts – machinery and equipment
- GPS equipment for vehicles
- Uniforms
- Employee development
- Administration, billing, and data processing charges
- Telephone, water service, and other operating supplies

**Table 1-8: Other Operating and Maintenance Costs**

<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Disposal Costs <sup>1</sup>	\$529,373	\$542,608	\$556,173	\$570,077	\$584,329	\$598,937	\$613,911
Other Operating Costs <sup>1</sup>	\$168,939	\$173,163	\$177,492	\$181,929	\$186,477	\$191,139	\$195,918
Vehicles Sold <sup>2</sup>	(\$87,070)	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total</b>	<b>\$611,243</b>	<b>\$715,770</b>	<b>\$733,665</b>	<b>\$752,006</b>	<b>\$770,806</b>	<b>\$790,077</b>	<b>\$809,829</b>

1. Variable and fixed costs include an assumed 2.5 percent inflation rate.
2. Value of semi-automated vehicles sold from existing fleet (i.e., one-time credit).

The financial analysis assumes that other operating and maintenance costs associated with the refuse collection program would continue based on their current allocation, except for two line items, “Vehicles” and “Other Equipment.” The vehicles line item represents cash that the City typically sets aside for the purchase of new vehicles being applied to the purchase of the new fully-automated vehicles as described in Section 1.3.4, and other equipment costs represents cash allocated to the purchase of new refuse carts as described in Section 1.4. Since the City is planning to implement the fully-automated refuse collection beginning in FY 2019, Burns & McDonnell removed the costs for these two items from other operating and maintenance costs beginning in FY 2019, as they have been accounted for in the capital purchases to implement the fully-automated program. Other operating and maintenance costs begin increasing in FY 2020 based on an assumed 2.5 percent inflation rate. In addition, there will be a one-time credit in FY 2019 from the sale of the five semi-automated vehicles that will no longer be required as part of the City’s vehicle fleet.

In addition, there will be some public education costs regarding the changes from semi-automated to fully-automated refuse collection. The primary goal of this public education effort will be making sure that residents understand proper cart management and proper cart placement to facilitate collection by fully-automated vehicles (i.e., placing materials within the cart and placing the cart at the curb). Burns & McDonnell included the public education cost of the refuse collection program with the single-stream recycling public education cost and public education officer discussed in Section 2.6. If the City decides to not implement single-stream recycling, then the City would need to include additional funds in the refuse program budget to support some public education activities related to the transition from semi-automated to fully-automated collection.

## 1.6 Contributions to Solid Waste Reserve Fund

The proposed changes to the refuse collection system are not intended to affect the overall allocation of the Solid Waste Reserve Fund among the individual sanitation programs, including refuse, recycling, yard waste, special pickups, and cart work. Burns & McDonnell compared the amount that the City budgeted

for the reserve fund to the total sanitation budget for FY 2016. In FY 2016 the reserve fund represented about 22 percent of the total sanitation budget based on approximately \$680,000 in the reserve fund and a total sanitation budget of approximately \$3.1 million. Of the \$3.1 million sanitation budget, the City allocated approximately \$1.8 million, or about 58 percent, to refuse collection. Burns & McDonnell used a target ratio of 22 percent to estimate the contributions that the City would need to make to the reserve fund each year in FY 2019 to FY 2025 to maintain a sufficient reserve balance and the percentage of the reserve fund represented by the refuse program.

Table 1-9 shows the annual contributions that the City would need to make to the reserve fund to maintain a 22 percent target ratio of the reserve fund to the total sanitation budget.

**Table 1-9: Reserve Fund Contributions for Fully-automated Refuse Collection**

<b>Reserve Fund</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Contribution Amount <sup>1</sup>	\$0	\$9,656	\$7,597	\$7,787	\$7,981	\$8,181	\$8,385

1. Reserve fund contributions are based on maintaining a target ratio of the value of the reserve fund to the total sanitation budget at 22 percent.

The cost of the fully-automated refuse collection program is intended to be funded through the monthly fee that the City charges for residential refuse collection services. Going forward the amount needed to meet the 22 percent target ratio would need to be achieved through future budgeting processes or potential refuse collection rate adjustments.

## **1.7 Comparison of Fully-automated Refuse Collection to Status Quo**

Table 1-10 summarizes the costs described in this section. By implementing a fully-automated refuse collection program, Burns & McDonnell expects that the City could reduce the monthly cost per household over the next seven-year period as compared to maintaining the status quo. These lower costs can be attributed to a greater efficiency in refuse collection using fully-automated vehicles and reducing the number of staff needed to run each route. The monthly cost per household is based on a population growth rate of 0.6 percent per year. The City may need to re-evaluate these costs if there is a significant change in the annual population growth rate.

**Table 1-10: Summary of Fully-automated Refuse Collection Costs**

<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Personnel <sup>1</sup>	\$364,216	\$373,321	\$382,654	\$392,221	\$402,026	\$412,077	\$422,379
Fuel	\$84,366	\$86,475	\$88,637	\$90,853	\$93,124	\$95,453	\$97,839
Vehicle Maintenance	\$194,168	\$199,022	\$203,997	\$209,097	\$214,325	\$219,683	\$225,175
Capital Cost – Vehicles	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078	\$307,078
Capital Cost – Carts	\$128,648	\$135,271	\$135,436	\$135,606	\$135,780	\$135,958	\$136,141
Other Operating and Maintenance Cost <sup>2</sup>	\$611,243	\$715,770	\$733,665	\$752,006	\$770,806	\$790,077	\$809,829
Contributions to Reserve Fund	\$0	\$9,656	\$7,597	\$7,787	\$7,981	\$8,181	\$8,385
<b>Total Annual Collection Cost</b>	\$1,689,718	\$1,826,593	\$1,859,065	\$1,894,648	\$1,931,121	\$1,968,506	\$2,006,826
Households <sup>3</sup>	15,330	15,422	15,515	15,609	15,703	15,798	15,893
<b>Monthly Cost per Household</b>	<b>\$9.19</b>	<b>\$9.87</b>	<b>\$9.99</b>	<b>\$10.12</b>	<b>\$10.25</b>	<b>\$10.38</b>	<b>\$10.52</b>

1. Personnel cost includes base salary, benefits, and overtime costs.
2. Other operating and maintenance cost includes costs such as office supplies, uniforms, tools, administration, data processing, etc.
3. Number of households is based on a population current growth rate of 0.6 percent per year.

Table 1-11 shows the cost of the existing semi-automated refuse collection program if the City were to continue the program in its current configuration (status quo). Burns & McDonnell calculated the total annual collection costs for FY 2019 to 2025 based on the FY 2016 budget provided by the City and continuing the current budget allocations attributed to the refuse collection program. As discussed in Section 1.1, Burns & McDonnell modified the refuse program costs to also include additional personnel and other operating maintenance costs associated with an additional semi-automated refuse vehicle for the fifth collection route and an additional semi-automated backup refuse vehicle, which the City indicated are already needed to support the existing refuse collection program. If the City makes no other changes to the current program operating costs are anticipated to increase each year based on inflationary factors.

**Table 1-11: Projected Cost of Existing Refuse Collection Program if No Change**

<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Total Annual Collection Cost	\$1,930,740	\$1,979,009	\$2,028,484	\$2,079,196	\$2,131,176	\$2,184,455	\$2,239,066
<b>Monthly Cost per Household</b>	<b>\$10.50</b>	<b>\$10.69</b>	<b>\$10.90</b>	<b>\$11.10</b>	<b>\$11.31</b>	<b>\$11.52</b>	<b>\$11.74</b>

Table 1-10 and Table 1-11 show that the total annual collection cost and the projected monthly cost per household would be lower if the City implemented fully-automated refuse collection.

## 1.8 Future Vehicle Purchases

Burns & McDonnell has accounted for the purchase of new refuse collection vehicles using debt service over the assumed seven-year vehicle life cycle, and this cost is built into the refuse program costs. Seven years is a standard expected life cycle for frontline fully-automated refuse vehicles. At the end of the seven-year service life as a frontline vehicle, the City will need to purchase additional fully-automated vehicles. Depending on the condition of the vehicles at that time, the City may choose to either purchase the replacement vehicles all in one year, or possibly over a two to three-year period. The City may also wish to purchase a new set of fully-automated vehicles at one time to maintain identical make, models, and features of the fleet. Burns & McDonnell did not include additional contributions to a vehicle replacement fund in the budget. The City could choose to use some of the annual cost savings from implementing the fully-automated system to establish a vehicle replacement fund, or consider issuing debt again at the end of the seven years. If some of the fully-automated vehicles are still in good condition after seven years, then the City could keep those vehicles in service and use the savings (or deferred cost) to partially fund the cost of new fully-automated vehicles. If the City purchases the new vehicles using debt service, then the cost of the debt service can be spread over the seven-year life cycle of the new fleet and included as part of the sanitation rate. The City would need to re-evaluate the sanitation rate to determine if any adjustment is needed based on the fully-automated vehicle cost at the time it purchases the replacement fleet.

## 1.9 Milestone for Increasing the Number of Future Routes

By implementing fully-automated refuse collection, the City will significantly increase its capacity for expanding refuse collection as the City population increases. Burns & McDonnell estimates that by implementing fully-automated refuse collection, the City would have a capacity to collect almost 20,000 refuse carts. Based on the current population growth rate of 0.6 percent per year, Burns & McDonnell estimates that the City would not exceed its collection capacity over the seven-year planning horizon of this study. However, the City may need to re-evaluate adding a new refuse collection route if the annual population growth rate changes significantly from the projected rate or if there is a significant increase in the number of households with multiple refuse carts.

## 1.10 Facility Needs for Fully-automated Refuse Collection

Currently, the Public Works Department parks the four semi-automated refuse vehicles inside the sanitation building. Each of the semi-automated vehicles is about 11 feet tall and 9 feet wide. Fully-automated vehicles typically vary in height from approximately 12.5 feet up to approximately 13.5 feet depending on the chassis and body configuration selected and have a width of 9 feet. The opening for

each bay on the sanitation building is just under 12 feet high by 10 feet wide. Therefore, the City will need to evaluate whether the existing facility bay openings could be modified to accommodate the additional height of the fully-automated vehicles based on the actual model selected. Alternatively, the City could park the fully-automated vehicles outside the sanitation building or consider constructing a new sanitation building. The cost to modify the existing sanitation building or to construct a new facility is not included in the current financial model for the fully-automated refuse collection program.

**Figure 1-5: City Sanitation Building**



The City will also need to identify a temporary staging area where it can receive the 16,550 new refuse carts that will need to be purchased for the fully-automated refuse program. A temporary staging area would need to be secure and paved, such as a parking lot at a City facility, park, or school that could be used for several weeks until the carts are distributed to customers. Once the carts are distributed, the Public Works Department can store additional refuse carts in the sanitation building. The current space appears to be adequate as the number of extra refuse carts would be similar to the number of upright carts (Ameri-Karts) the City currently keeps available for new customers and replacements, and the City would no longer need to maintain a supply of the older style refuse carts. Figure 1-6 shows the current cart storage area within the sanitation building.

**Figure 1-6: Current Cart Storage Area in City Sanitation Building**



## 2.0 SINGLE-STREAM RECYCLING COLLECTION OPERATION

Burns & McDonnell evaluated the cost of the City implementing a new single-stream residential recycling program to replace the existing subscription program. The existing system is also described in this section to provide a basis of comparison. Since the City may decide to implement a new residential recycling program independent of its decision to implement fully-automated refuse collection, Burns & McDonnell addressed each of the costs and considerations that will affect the operation of the single-stream recycling program in this section, so that it can stand alone from the fully-automated refuse program. Burns & McDonnell and the City's Public Works Department staff discussed beginning a single-stream recycling program in FY 2019. Burns & McDonnell developed this business plan to describe the costs associated with implementing a single-stream residential recycling program. The plan forecasts costs over a seven-year period from 2019 to 2025, which coincides with a complete lifecycle of fully-automated vehicles.

### 2.1 Existing Subscription Recycling Program

The City currently runs a subscription recycling program. Subscribing customers receive 18-gallon plastic bins with lids for weekly recycling collection. The City previously used one Kann curb-sort truck with nine sorting compartments operated by a single driver and two pickup trucks with Gaylord boxes as backup collection vehicles when the Kann curb-sort truck was unavailable for maintenance. The backup operation required the recycling driver and one refuse worker/driver to operate the two pick-up trucks. Figure 2-1 shows the Kann curb-sort collection vehicle and the 18-gallon recycling bins provided to each customer.

**Figure 2-1: Kann Curb-sort Vehicle and Recycling Bins**



In 2016, the City began a pilot study of subscription single-stream recycling collection using two semi-automated collection vehicles from the yard waste program. The City's Kann curb-sort truck is over ten years old and is requiring more frequent maintenance. The conversion to single-stream recycling system also eliminates the need for customers to sort recyclable materials prior to collection. Early results and feedback received by the City are positive, and the City expects to continue providing single-stream recycling collection.

## **2.2 Automation of Single-stream Curb-side Recycling Collection Operation**

The new residential recycling program would completely replace the existing subscription recycling operation beginning in FY 2019. Similar to refuse collection, recycling services would be provided to all the City's residential customers. The new recycling program would include:

- Single-stream collection for all City residents
- Two fully-automated frontline recycling collection vehicles
- One fully-automated backup recycling collection vehicle
- Every-other week collection, assumed a 77 percent participation/set-out rate
- Eight-hour work day
- Assumed average of 300 recyclable pounds per household in FY 2019, rising to 400 pounds in FY 2020 and 500 pounds in FY 2021 and subsequent years

## **2.3 Implementation Schedule**

The implementation of single-stream residential recycling will require changes in the types of vehicles, containers, routing modifications, and adjustments in staffing. Based on discussions with City staff, Burns & McDonnell identified that the City prefers to purchase the three fully-automated recycling collection vehicles at the same time that it purchases the fully-automated refuse collection vehicles. The City prefers this option because it would maintain consistency in the make, model, and year of the vehicles, which simplifies operations through standard maintenance and training requirements.

Key changes from the current subscription recycling collection system include:

- Retirement of the Kann curb-sort recycling vehicle
- Two drivers, one to operate each fully-automated frontline recycling vehicle, plus backup driver shared with other collection operations
- Replacement of current 18-gallon recycling bins with new 95-gallon recycling carts compatible with single-stream fully-automated collection

- Requirement to set-out carts at the curb so they are accessible to fully-automated collection vehicles.

Burns & McDonnell developed a financial model based on budget information provided by the City to forecast the costs associated with implementation of a single-stream recycling collection system.

### 2.3.1 Personnel Costs

Burns & McDonnell determined the allocation of each staff person to the single-stream recycling collection program as shown in Table 2-1.

**Table 2-1: Daily Recycling Personnel Requirement**

<b>Personnel <sup>1</sup></b>	<b>Fully-automated (FY 2019)</b>
Superintendent	0.05
Supervisor	0.05
Admin. Assistant	0.05
Driver	2.00
Worker/Driver	0.34
Worker	0.00
<b>Total</b>	<b>2.49</b>

1. Personnel allocated to recycling collection. An allocation less than one indicates that the staff person assists with other programs.

The allocation of supervisory and administrative staff is not expected to change in a fully-automated system as these tasks are required for the operation of either recycling program configuration.

Each fully-automated vehicle will require one driver to drive the vehicle and operate the collection arm. See Figure 1-2 in Section 1.2.1 for an example of a fully-automated vehicle. With the implementation of fully-automated refuse collection and the addition of another full-time worker/driver position to the refuse collection program, Burns & McDonnell recommends that the City reallocate the worker/driver partially allocated to the refuse collection program (0.34 of a full-time employee shown in Table 1-1) from providing backup support to the refuse program to the recycling program. Based on experience with similarly sized cities, Burns & McDonnell typically recommends a backup driver ratio of about 20 percent, and the worker/driver position would provide flexibility in recycling driver staffing when a regular driver is unavailable.

Based on the allocation of staff for single-stream recycling collection in Table 2-1, Table 2-2 shows the total personnel costs over the next seven years.

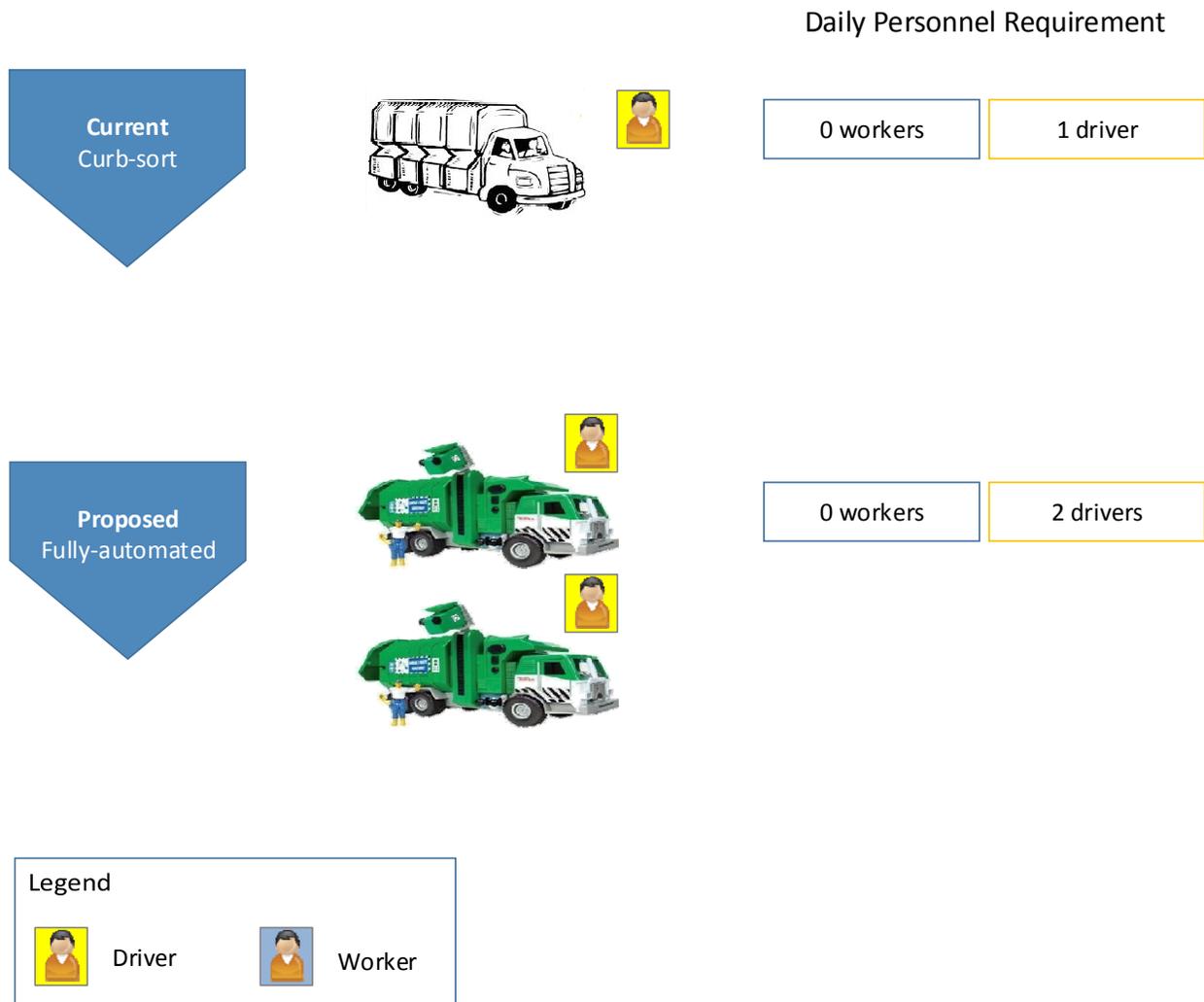
**Table 2-2: Personnel Costs in a Fully-automated Recycling Collection System**

Personnel Cost <sup>1</sup>	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Base Salaries	\$78,726	\$80,694	\$82,712	\$84,779	\$86,899	\$89,071	\$91,298
Benefits	\$37,476	\$38,413	\$39,374	\$40,358	\$41,367	\$42,401	\$43,461
Overtime	\$249	\$255	\$261	\$268	\$275	\$282	\$289
<b>Total</b>	<b>\$116,451</b>	<b>\$119,363</b>	<b>\$122,347</b>	<b>\$125,405</b>	<b>\$128,540</b>	<b>\$131,754</b>	<b>\$135,048</b>

1. Personnel costs include an assumed 2.5 percent inflation rate.

Figure 2-2 shows an organization chart depicting the collection personnel required for a subscription recycling collection system and for fully-automated single-stream recycling collection.

**Figure 2-2: Comparison of Existing Subscription Recycling Collection System to Fully-automated Single-stream Recycling Collection System**



## 2.4 Vehicle Costs

As discussed in Section 2.3, the City prefers to maintain a standardized fleet of fully-automated vehicles across the refuse and recycling programs by purchasing the fully-automated vehicles at the same time. In addition to the two frontline recycling vehicles, the City plans to purchase a third fully-automated vehicle to operate as a backup recycling vehicle. Burns & McDonnell typically recommends a backup vehicle ratio of about 20 to 30 percent for similar operations. In this scenario, the backup ratio for recycling vehicles would be 50 percent. However, the City has the option to share the backup recycling vehicle with the refuse program, then the combined backup ratio would be 29 percent. The following sections address the costs associated with fully-automated collection vehicles.

### 2.4.1 Vehicle Operating and Maintenance Costs

As mentioned in Section 1.3.1, fully-automated collection vehicles typically have higher fuel and maintenance costs compared to semi-automated vehicles because of their higher vehicle weight and additional hydraulic motors associated with the automated collection arm. Burns & McDonnell recommends that the City plan on a 30 percent higher annual fuel cost per fully-automated vehicle. In addition, fully-automated vehicles typically have higher maintenance costs as a result of the increased level of hydraulics and number of moving parts. Burns & McDonnell assumed a maintenance cost of \$30,000 per year in 2016 dollars for fully-automated vehicles based on Burns & McDonnell's experience with recycling operations maintenance costs typically seen in other cities with fully-automated systems. Table 2-3 shows the estimated average fuel and maintenance cost for a fully-automated collection vehicle.

**Table 2-3: Average Operating and Maintenance Costs per Fully-automated Recycling Vehicle**

O&M Cost	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Fuel Cost <sup>1</sup>	\$16,723	\$17,141	\$17,570	\$18,009	\$18,459	\$18,921	\$19,394
Maintenance Cost <sup>2</sup>	\$32,307	\$33,114	\$33,942	\$34,791	\$35,661	\$36,552	\$37,466
<b>Avg. Cost per Vehicle</b>	<b>\$49,030</b>	<b>\$50,256</b>	<b>\$51,512</b>	<b>\$52,800</b>	<b>\$54,120</b>	<b>\$55,473</b>	<b>\$56,860</b>

1. Fuel cost is based on the price of Midwest diesel provided by the US Energy Information Administration (7/2016) inflated at 2.5 percent per year.
2. Maintenance cost is based on \$30,000 per year in 2016 dollars inflated at 2.5 percent per year.

The approximate vehicle operating and maintenance costs for the entire recycling collection fleet in Table 2-4 is determined by multiplying the costs in Table 2-3 by two frontline fully-automated collection vehicles as the third vehicle would be used as a backup for one of the frontline vehicles when it was unavailable for maintenance. The total maintenance cost is determined by multiplying the amount in Table 2-3 by three fully-automated vehicles to include the maintenance cost for the frontline vehicles as

well as the incremental maintenance cost for the backup vehicle. The fuel and maintenance costs shown include the costs associated with supervisors' pickups.

**Table 2-4: Total Fuel and Maintenance Costs for Recycling Vehicles**

O&M Cost	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Fuel Cost <sup>1</sup>	\$34,196	\$35,051	\$35,927	\$36,826	\$37,746	\$38,690	\$39,657
Maintenance Cost <sup>2</sup>	\$97,248	\$99,679	\$102,171	\$104,725	\$107,343	\$110,027	\$112,777
<b>Total</b>	<b>\$131,444</b>	<b>\$134,730</b>	<b>\$138,098</b>	<b>\$141,551</b>	<b>\$145,089</b>	<b>\$148,717</b>	<b>\$152,434</b>

1. Includes cost of fuel for two frontline fully-automated vehicles and supervisors' vehicles.

2. Includes cost of maintenance for three fully-automated vehicles (frontline and backup) and supervisors' vehicles.

## 2.4.2 Vehicle Capital Costs

To implement single-stream recycling in FY 2019, the City would need to purchase three fully-automated recycling vehicles. Burns & McDonnell assumed that the City would purchase fully-automated recycling vehicles with similar features as the fully-automated refuse collection vehicles described in Section 1.3.2. Therefore, Burns & McDonnell used the same purchase price of \$275,000 per vehicle in 2016 dollars to estimate the fully-automated recycling vehicle capital costs. Burns & McDonnell included the impact of inflation based on the timing of the fully-automated vehicle purchases in FY 2019 in the financial model. The specific pricing of the fully-automated vehicles will be based on a number of factors, including preferred features, number of vehicles, financing, and individual pricing options negotiated at the time of purchase.

## 2.4.3 Funding Options for Recycling Collection Vehicles

The City has typically set aside an annual budget amount to support the purchase of replacement vehicles. However, given that the City will need to purchase new recycling collection carts for all customers and the City is planning to automate its refuse collection system, Burns & McDonnell recommends that the City issue debt, or borrow from other City funds, to help fund the purchase of the three fully-automated recycling vehicles. Burns & McDonnell inflated the estimated \$275,000 purchase price for fully-automated vehicles (in 2016 dollars) by 2.5 percent per year for three years to account for an increase in purchase price between now and when the City purchases the vehicles in FY 2019. Based on these assumptions, Table 2-5 shows the estimated cash capital outlay for the three fully-automated recycling vehicles.

**Table 2-5: Recycling Vehicles Cash Capital Outlay**

Cost	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Debt Service <sup>1</sup>	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539

1. Debt service is based on a term of seven years at a 5 percent interest rate.

## 2.5 Recycling Container Cost

Currently, the City uses 18-gallon plastic bins with lids for recycling collection, which would need to be replaced with recycling carts. The 95-gallon recycling carts provide a much larger capacity than the current bins, which will allow the City to collect recycling every other week instead of weekly as in the current system. In addition, the recycling carts would have an attached lid to prevent recyclable items from being blown out or getting wet. Figure 2-3 shows an example of the current recycling bins and a typical new recycling cart for fully-automated collection. A recycling cart for fully-automated collection would be equivalent (but a different color) to a refuse cart for fully-automated collection. As described in Section 1.4, Burns & McDonnell based the purchase cost on \$60 per cart.

**Figure 2-3: Example of Current Bins and Cart for Fully-automated Collection**



**Current 18-gallon Plastic Recycling Bins**



**Recycling Cart for Fully-Automated Collection**

The transition to a fully-automated collection system will require the City to immediately provide all customers with new recycling carts compatible with automated collection arms. Based on a population growth rate of 0.6 percent, Burns & McDonnell estimates that the City will have grown to over 15,300 households by 2019, and that eight percent of customers may have more than one recycling cart. Therefore, Burns & McDonnell estimates that the City will need to purchase 16,550 recycling carts to implement a fully-automated recycling collection system. Burns & McDonnell also estimates that the City will need to purchase an additional 100 recycling carts annually beginning in FY 2020 to account for future population growth and to replace customer-damaged recycling carts. Defective carts should be covered under the cart manufacturer's warranty. As described in Section 1.4, the City can either develop a request for proposals for carts or use a cooperative purchasing program. Based on experience with other refuse collection programs, Burns & McDonnell estimated a recycling cart to cost of \$60 per cart,

including delivery to Salina, assembly, and delivery to customers. The recycling cart capital cost is shown in Table 2-6.

**Table 2-6: Recycling Cart Capital Cost**

<b>Cost</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Purchase of Carts <sup>1</sup>	\$128,648	\$128,648	\$128,648	\$128,648	\$128,648	\$128,648	\$128,648
Additional/ Replacement Carts <sup>2</sup>	\$0	\$6,623	\$6,788	\$6,958	\$7,132	\$7,310	\$7,493
<b>Total</b>	<b>\$128,648</b>	<b>\$135,271</b>	<b>\$135,436</b>	<b>\$135,606</b>	<b>\$135,780</b>	<b>\$135,958</b>	<b>\$136,141</b>

1. Based on a 10-year cart useful life and a 5 percent interest rate, which would continue through FY 2028.
2. Assumed that the City would purchase an additional 100 carts per year for replacing damaged carts or for new customers. The \$60 purchase price in 2016 dollars was inflated at 2.5 percent per year.

The 18-gallon recycling bins would no longer be needed with the transition to fully-automated recycling collection. There are a couple of options that the City could consider for what to do with the unneeded recycling bins.

- Determine if there is a materials recovery facility (MRF) willing to accept the plastic bins for recycling. This option would require collecting the existing recycling bins and transporting them to the MRF. In addition, there would likely be a one-time fee to process the recycling bins.
- Allow customers to keep their recycling bin. Customers would not be able to use the recycling bins for fully-automated recycling collection, but customers may choose to use them for other home uses.

## 2.6 Other Operating and Maintenance Costs

In addition to the personnel, vehicle, and cart costs discussed, there are other operating and maintenance (O&M) costs that the City will incur as part of the recycling collection operations. Similar to the other O&M costs associated with refuse collection discussed in Section 1.5, the other O&M costs for a single-stream recycling program will consist of fixed costs and variable costs. In addition, O&M costs for the recycling program will also include:

- Recycling processing
- Public education

### 2.6.1 Recycling Processing Costs

Recycling processing costs include the cost to pay a processor to accept and process the recyclable items that the City collects through the new single-stream recycling program. Burns & McDonnell identified the McPherson Area Solid Waste Utility (MASWU) as an entity that would be willing to accept the City's

material and transport the material to a MRF. McPherson, Kansas is about 40 miles south of Salina. The MASWU facility is the closest location where the City's recycling vehicles could deliver its mixed recyclables, which minimizes additional vehicle mileage traveled or the need to contract with an intermediate hauler if the recyclables were delivered to another processing facility farther afield. City recycling vehicles would drive to MASWU's facility in McPherson once they have a full load. Burns & McDonnell recommends the City enter into an intergovernmental agreement with MASWU to process the City's mixed recyclables. The MASWU indicated that the recycling processing rate is approximately \$35 per ton in 2016 dollars, which is reasonable given the current value of recycling commodities and accounting for MASWU having to transport the material to a MRF.

As documented in the cost analysis included in the January 2013 "Community-wide Recycling Program Feasibility Study," it would not be economically viable for the City to build and operate its own MRF. Given the additional challenge posed by the current pricing of recyclable materials in the recycling commodities market and general need for a greater quantity of recycling material collected by the City, it would be more economical for the City to send its mixed recycling material to an existing single-stream MRF. In addition, the lowest threshold at which Burns & McDonnell would expect a City-owned single-stream MRF to become economically viable would be when the quantity of recyclable material collected reached a minimum of 10,000 tons per year. Based on an average of 300 recyclable pounds per household and an estimated 15,330 households in 2019, Burns & McDonnell estimates the City would collect about 2,300 tons per year.

### **2.6.2 Public Education Program Costs**

If the City decides to implement a fully-automated single-stream recycling program, it will be imperative to the success of the collection program to effectively communicate any changes to the City residents through a public education program. In Burns & McDonnell's experience, the ease of participation by residents in a single-stream recycling program has a direct impact on the volume of recyclables generated by the program. Single-stream recycling programs typically generate the highest amounts of recyclable tonnage as compared to other curb-sort or dual-stream recycling programs. However, single-stream recycling programs also tend to have higher rates of contamination, also called residue, which consists of material that residents mistakenly set out but that is not recyclable. Single-stream recycling programs have higher residue rates because the driver cannot visually inspect a cart's contents prior to collection as in source-separated or dual-stream programs. To minimize contamination, communities typically implement a public education program to educate residents of the recycling requirements prior to implementation and during the initial years of a single-stream recycling program. In addition, communities commonly implement enforcement measures to inform residents about the requirements of

the recycling program and acceptable items. Enforcement personnel visually inspect carts for contaminated material. When enforcement personnel identify unacceptable materials, enforcement personnel leave educational information about unacceptable items or communicate directly with residents if needed depending on whether it is a first-time or repeat case.

Burns & McDonnell estimated the processing costs for mixed recyclables based on an average of 300 recyclable pounds per household in FY 2019. The average amount of recyclables collected will typically increase in the first years of a new single-stream recycling program as citizens become familiar with the program and participation increases. By implementing a public education program to educate citizens about single-stream recycling and hiring an education officer, Burns & McDonnell anticipates that the City could increase the recyclable amount collected to 400 pounds per household in FY 2020 and to 500 pounds per household in FY 2021 and subsequent years. Table 2-7 shows the amount that the City would spend on a public education program, including the salary for an education officer.

**Table 2-7: Public Education Program Cost**

<b>Fiscal Year</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
Staff and materials <sup>1</sup>	\$60,000	\$60,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000

1. Includes the salary of an education officer, developing education materials, and distribution of information.

Burns & McDonnell recommends an initial public education program cost of \$60,000 in FY 2019 and FY 2020 and then \$20,000 per year beginning in FY 2021. These program costs include the salary for an education officer for the single-stream program. The City could identify one of the worker staff positions that is no longer needed for the refuse program to fulfill this role. Starting in FY 2021, the public education officer could serve other roles in the City, thereby sharing the salary costs among other programs.

Burns & McDonnell estimated these amounts based on a typical public education program. The amount spent in the early years of a public education program is typically higher because of the greater effort towards publicizing the new single-stream program. Public education strategies to disseminate information could include the following methods:

- On-route public education
- Literature
- Media
- Social media
- Website

Table 2-8 shows the annual processing costs, public education, and the additional O&M costs that were included in the total recycling collection budget.

**Table 2-8: Other Operating and Maintenance Costs**

<b>Cost <sup>1</sup></b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
Processing Costs <sup>2</sup>	\$86,671	\$119,161	\$153,596	\$158,389	\$163,327	\$168,423	\$173,672
Public Education	\$60,000	\$60,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Other Operating Costs	\$26,544	\$27,217	\$28,065	\$28,938	\$29,838	\$30,764	\$31,718
<b>Total</b>	<b>\$173,214</b>	<b>\$206,378</b>	<b>\$201,661</b>	<b>\$207,328</b>	<b>\$213,165</b>	<b>\$219,187</b>	<b>\$225,390</b>

1. All costs include an assumed 2.5 percent inflation rate.

2. Processing costs are based on a rate of \$35 per ton of recyclables processed.

## 2.7 Contributions to Solid Waste Reserve Fund

The proposed changes to the single-stream collection system are not intended to affect the overall allocation of the Solid Waste Reserve Fund among the individual sanitation programs, including refuse, recycling, yard waste, special pickups, and cart work. Burns & McDonnell compared the amount that the City budgeted for the reserve fund to the total sanitation budget for FY 2016. In FY 2016 the reserve fund represented about 22 percent of the total sanitation budget based on approximately \$680,000 in the reserve fund and a total sanitation budget of approximately \$3.1 million. Of the \$3.1 million sanitation budget, the City allocated approximately \$212,000, or about 7 percent, to recycling collection. With the implementation of the new single-stream recycling program, the City would need to build up the value of the reserve fund to cover contingency costs. This increase is intended to cover contingent costs associated with the additional recycling collection vehicles and staff of the new single-stream recycling program. Burns & McDonnell assumed that the City would build up the reserve fund gradually over a period of five years rather than fully funding the reserve fund in one year. Therefore, Burns & McDonnell estimates that the City would need to contribute approximately \$125,000 to the reserve fund by FY 2023 and divided this amount equally over five years. Beginning in FY 2024 the City's contributions are based on the incremental costs necessary to maintain a 22 percent target ratio of the reserve fund to the total sanitation budget.

Table 2-9 shows the annual contributions that the City would need to make to the reserve fund to maintain a 22 percent target ratio of the reserve fund to the total sanitation budget.

**Table 2-9: Direct Costs and Reserve Fund Contributions for Single-stream Recycling Collection**

Reserve Fund	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Contribution Amount <sup>1</sup>	\$24,927	\$24,927	\$24,927	\$24,927	\$24,927	\$2,869	\$2,947

1. Reserve fund contributions are based on maintaining a target ratio of the value of the reserve fund to the total sanitation budget at 22 percent.

## 2.8 Cost to Implement Single-stream Recycling Operation

Table 2-10 summarizes the costs of implementing a new single-stream recycling collection program as described in this section. These costs are based on the City purchasing all capital and implementing a fully-automated single-stream recycling program in FY 2019. Recycling program costs are expected to increase from FY 2019 to FY 2020 as the City increases the amount of recyclable material collected per household resulting in higher processing costs. The cost flattens between FY 2020 and FY 2021 after the City completes the initial public education effort for the new single-stream recycling program. Recycling costs then increase gradually after FY 2021 as a result of inflationary impacts. The monthly cost per household is based on a population growth rate of 0.6 percent per year. The City may need to re-evaluate these costs if there is a significant change in the annual population growth rate.

**Table 2-10: Summary of Single-stream Recycling Collection Costs**

Cost	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Personnel <sup>1</sup>	\$116,451	\$119,363	\$122,347	\$125,405	\$128,540	\$131,754	\$135,048
Fuel	\$34,196	\$35,051	\$35,927	\$36,826	\$37,746	\$38,690	\$39,657
Vehicle Maintenance	\$97,248	\$99,679	\$102,171	\$104,725	\$107,343	\$110,027	\$112,777
Capital Cost – Vehicles	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539	\$153,539
Capital Cost – Carts	\$128,648	\$135,271	\$135,436	\$135,606	\$135,780	\$135,958	\$136,141
Other Operating and Maintenance Cost <sup>2</sup>	\$173,214	\$206,378	\$201,661	\$207,328	\$213,165	219,187	\$225,390
Contributions to Reserve Fund	\$24,927	\$24,927	\$24,927	\$24,927	\$24,927	\$2,869	\$2,947
<b>Total Annual Collection Cost</b>	\$728,223	\$774,207	\$776,008	\$788,355	\$801,040	\$792,024	\$805,499
Households <sup>3</sup>	15,330	15,422	15,515	15,609	15,703	15,798	15,893
<b>Monthly Cost per Household</b>	<b>\$3.96</b>	<b>\$4.18</b>	<b>\$4.17</b>	<b>\$4.21</b>	<b>\$4.25</b>	<b>\$4.18</b>	<b>\$4.22</b>

1. Personnel cost includes base salary, benefits, and overtime costs.
2. Other operating and maintenance cost includes costs such as office supplies, apparel, tools, administration, data processing, and public education, etc.
3. Number of households is based on a population current growth rate of 0.6 percent per year.

The monthly cost per household assumes that the recycling system operates efficiently, which will require the City to implement and adhere to recycling collection policies (i.e., only collecting uncontaminated recyclable material placed in the recycling cart). The 95-gallon recycling cart will provide residents with

significantly more recycling capacity than the current 18-gallon recycling bins used in the subscription recycling program. In addition, the larger recycling capacity will help free capacity in refuse carts as more recyclable material can be collected and as more residents will have access to recycling collection services.

## **2.9 Future Vehicle Purchases**

Burns & McDonnell has accounted for the purchase of new recycling collection vehicles using debt service over the assumed seven-year vehicle life cycle, and this cost is built into the recycling program costs. Seven years is a standard expected life cycle for frontline fully-automated recycling vehicles. At the end of the seven-year service life as a frontline vehicle, the City will need to purchase additional fully-automated vehicles. Depending on the condition of the vehicles at that time, the City may choose to either purchase the replacement vehicles all in one year, or possibly over a two to three-year period. The City may also wish to purchase a new set of fully-automated vehicles at one time to maintain identical make, models, and features of the fleet. Burns & McDonnell did not include additional contributions to a vehicle replacement fund in the budget. The City could choose to use some of the annual cost savings from implementing the fully-automated system to establish a vehicle replacement fund, or consider issuing debt again at the end of the seven years. If some of the fully-automated vehicles are still in good condition after seven years, then the City could keep those vehicles in service and use the savings (deferred cost) to partially fund the cost of new fully-automated vehicles. If the City purchases the new vehicles using debt service, then the cost of the debt service can be spread over the seven-year life cycle of the new fleet and included as part of the sanitation rate. The City would need to re-evaluate the sanitation rate to determine if any adjustment is needed based on the fully-automated vehicle cost at the time it purchases the replacement fleet.

## **2.10 Milestone for Increasing the Number of Future Routes**

By implementing an every other week single-stream recycling program, the City will significantly increase its capacity for expanding recycling collection as the City population increases. Burns & McDonnell estimates that by ultimately implementing a fully-automated recycling collection program, the City would have a capacity to collect approximately 9,000 recycling carts each week or 18,000 carts over a two-week period. Based on the current population growth rate of 0.6 percent per year, Burns & McDonnell estimates that the City would not exceed its collection capacity over the seven-year planning horizon of this study. However, the City may need to re-evaluate adding a new recycling collection route if the annual population growth rate changes significantly from the projected rate or if there is a significant increase in the number of households with multiple recycling carts.

## 2.11 Facility Needs for Fully-automated Recycling Collection

Currently, the Public Works Department parks the Kann curb-sort recycling vehicle in one of the sanitation building's wash bays. However, fully-automated vehicles typically vary in height from approximately 12.5 feet up to approximately 13.5 feet depending on the chassis and body configuration selected and have a width of 9 feet. The opening for each bay on the sanitation building is just under 12 feet high by 10 feet wide. Therefore, if the Public Works Department prefers to park the fully-automated vehicles inside, the City will need to evaluate whether the existing facility bay openings could be modified to accommodate the additional height of the fully-automated vehicles based on the actual model selected. Alternatively, the City could park the fully-automated vehicles outside the sanitation building or consider constructing a new sanitation building. The cost to modify the existing sanitation building or to construct a new facility is not included in the current financial model for the single-stream recycling collection program.

**Figure 2-4: City Sanitation Building**



The City will also need to identify a temporary staging area where it can receive the 16,550 new recycling carts that will need to be purchased for the single-stream recycling program. A temporary staging area would need to be secure and paved, such as a parking lot at a City facility, park, or school that could be used for several weeks until the carts are distributed to customers. Once the carts are distributed, the Public Works Department can store additional recycling carts in the sanitation building. The current space appears to be adequate as the City would no longer need to maintain a supply of the older style refuse carts or the 18-gallon recycling bins for the curb-sort recycling program. Figure 2-5 shows the current cart storage area within the sanitation building.

**Figure 2-5: Current Cart Storage Area in City Sanitation Building**



### 3.0 PRICING AND MARKET SHARE ANALYSIS

This section includes Burns & McDonnell’s evaluation of the pricing analysis for residential refuse and recycling services based on the cost of service analysis included in Sections 1 and 2. This section also provides an analysis of key market share issues, since the City operates in an open solid waste system, where residents can select their service provider.

#### 3.1 Pricing Analysis and Recommendations

This section includes Burns & McDonnell’s evaluation of the pricing analysis for residential refuse and recycling services based on the cost of service analysis included in Sections 1 and 2.

##### 3.1.1 Rate Comparison and Recommendations

Since the City competes with other service providers, it is important for the City to understand the rate implications associated with a potential change to fully-automated refuse collection and/or single-stream recycling. Table 3-1 summarizes the 2016 rates and services provided. As shown in Table 3-1 the City’s sanitation rate is less expensive than either Salina Waste Systems or Salina Iron and Metal.

**Table 3-1: Residential Rate Comparison**

Service Provider	2016 Monthly Rate	Comments
City of Salina	\$14.70	<ul style="list-style-type: none"> <li>• 95-gallon poly cart emptied weekly at the alley or curb</li> <li>• Will take additional bagged trash (up to 30-gallon bags) and yard waste placed beside the cart</li> <li>• Customers may receive one free return pickup per year and \$12.25 per return pickup thereafter</li> <li>• Will provide optional special pickups for an additional minimum fee of \$23.00 for residential customers or \$46.00 for residential non-customers</li> <li>• Customers who require assistance, may receive walk-in service at no additional charge</li> </ul>
Salina Waste Systems	\$15.00	<ul style="list-style-type: none"> <li>• 90-gallon poly cart emptied weekly, up to ten items (bag, boxes, bundled limbs) per week outside the cart</li> <li>• Customers with more than ten items are required to make Salina waste aware before collection day</li> </ul>
Salina Iron and Metal	\$17.00	<ul style="list-style-type: none"> <li>• 96-gallon poly cart emptied weekly</li> <li>• Will take a couple items beside the cart</li> </ul>

Table 3-2 compares the total monthly sanitation cost per household for five different sanitation program service configurations. In 2016, the City’s sanitation rate was \$14.70 per month per household, which included refuse collection, recycling collection, yard waste collection, special pickups, and cart work services.

**Table 3-2: Monthly Cost per Household for Sanitation Services**

<b>Program Services</b>	<b>Refuse</b>	<b>Recycling</b>	<b>Yard Waste</b>	<b>Special Pickups</b>	<b>Cart Work</b>	<b>Total Cost per Month</b>	<b>Recommended Rate per Month</b>
Current Sanitation Services (Status quo) <sup>1,2</sup>	\$9.92 <sup>1</sup>	\$1.17 <sup>2</sup>	\$3.54	\$1.40	\$1.26	\$17.30	\$17.45
Option 1A: Fully-automated Refuse Collection, Subscription Recycling Collection <sup>2,3</sup>	\$9.19	\$1.17 <sup>2</sup>	\$3.54	\$1.40	\$1.26	\$16.56	\$16.70
Option 1B: Fully-automated Refuse Collection and Co-collected Yard Waste, Subscription Recycling Collection <sup>2,3,4</sup>	\$10.62	\$1.17 <sup>2</sup>	\$ -	\$1.40	\$1.26	\$14.45	\$14.60
Option 2A: Fully-automated Refuse, Single-Stream Recycling Collection <sup>3</sup>	\$9.19	\$3.96	\$3.54	\$1.40	\$1.26	\$19.35	\$19.50
Option 2B: Fully-automated Refuse Collection and Co-collected Yard Waste, Single-Stream Recycling Collection <sup>3,4</sup>	\$10.62	\$3.96	\$ -	\$1.40	\$1.26	\$17.24	\$17.40

1. The status quo refuse collection cost includes the cost of two additional semi-automated refuse collection vehicles, one for a fifth collection route and one for backup.
2. Recycling cost does not include the additional monthly subscription fee for participating residents, currently \$5.40 per month.
3. These costs are based on the sanitation services in the first year of operation (FY 2019).
4. The stranded costs remaining after the elimination of the yard waste program are assigned to the refuse program as customers would commingle yard waste with refuse for disposal.

### ***Status Quo***

Even if the City made no changes to the refuse and recycling programs, it would need to consider increasing the monthly sanitation rate by approximately \$3.00 per month per household to account for additional vehicles and associated personnel. Included in this amount is the cost to purchase the fifth refuse vehicle and a backup vehicle as well as crew staff salaries and benefits, operating and maintenance costs, and fuel costs, which are already required to accommodate the growing number of residents served in the refuse program's current configuration. A sanitation service rate of \$17.30 per month, not including the \$5.40 per month recycling subscription fee for participating residents, would make the City of Salina's sanitation services more expensive than either Salina Waste Systems or Salina Iron and Metal assuming that the competitors did not implement a monthly rate increase. In addition, if the City maintains the status quo, Burns & McDonnell would recommend setting the rate at \$17.45 to delay the amount of time before the next rate increase would be required.

***Options 1A and 1B***

If the City converted the refuse collection program from semi-automated collection to fully-automated collection while maintaining the existing subscription recycling collection program, Burns & McDonnell would recommend a rate of \$16.70 per month (Option 1A). Residents who chose to participate in the subscription recycling program also would need to pay the additional subscription fee, which is currently \$5.40 per month, or more than \$22 per month combined.

The City could reduce the cost of Option 1A by about \$2.10 by eliminating the yard waste program and co-collecting yard waste with refuse (Option 1B). If the City opted to eliminate the yard waste program, Burns & McDonnell would recommend a rate of \$14.60 per month, and residents who chose to participate in the subscription recycling program would pay \$20 per month (sanitation rate plus the \$5.40 per month recycling subscription fee). In either Option 1A or Option 1B, the costs would be significantly higher than the current rates provided by private residential solid waste providers. In addition, as the City's population grows, the cost to operate the manually intensive subscription recycling program would increase. The City would also need to consider replacing the existing recycling vehicle and potentially adding an additional route.

***Options 2A and 2B***

By converting the existing semi-automated refuse collection program to fully-automated refuse collection and implementing fully-automated single-stream recycling, the City could minimize the amount it would need to increase the sanitation rate. As discussed in Section 2.8, the estimated monthly per household cost for citywide recycling will range from \$3.96 - 4.22. City sanitation customers could decide whether they would like to participate in single-stream recycling but would each pay a portion of the cost of the single-stream recycling program. Burns & McDonnell would recommend a rate of \$19.50 per month (Option 2A). By implementing this rate, the City would not be expected to have an increase over the next several years. Another benefit of a \$19.50 per month rate is that it would allow the City to slightly over recover program costs and build its reserve to cover potential, unanticipated costs. The City could minimize the risk of implementing fully-automated single-stream recycling by adopting an ordinance requiring all residential solid waste providers (including the City) to include recycling collection as part of their base services. Additionally, private residential haulers could choose to provide recycling services or request that the City provide the recycling service and pay a fee. If the City decided to implement fully-automated refuse and recycling collection and co-collect yard waste with refuse (Option 2B), the total sanitation rate could be reduced by about \$2.10 per month to \$17.40 per month, which is comparable to the \$17.00 currently charged by Salina Iron and Metal without recycling service. Although either \$17.40 or \$19.50 is more expensive than the current rates charged by private residential solid waste

haulers, the private haulers also would need to increase their rates to implement recycling services or to pay the City to provide recycling services.

The City would periodically need to monitor population growth and re-evaluate rate increases to confirm that the sanitation rate adequately covers the City's sanitation operation costs.

### 3.1.2 Financial Impact to Landfill

Operating a landfill involves mostly fixed costs. Therefore, the disposal cost per ton is affected by the annual volume accepted at the landfill. As recycling tonnage is diverted from the landfill, the disposal cost per ton at the landfill will increase. Consequently, the City should continue to budget the same amount of funding for the landfill operations if the City does implement citywide curbside recycling. While there will be some cost decreases from less tonnage going into the landfill from decreased state fees, these amounts are not expected to have a material impact on the disposal costs. The 300 to 500 pounds of recyclables anticipated to be collected per year per household with the implementation of single-stream recycling is an average across all households and takes into account a 77 percent set out rate. Assuming a range of 300 to 500 pounds of recyclables per year per household and a tipping fee of \$34.50 per ton, the cost to the landfill of diverting recyclable material would be between approximately \$78,000 and \$130,000 per year. The City could partially offset this cost by co-collecting yard waste with refuse as discussed in Section 3.2.1.

Since the Landfill operation charges the Sanitation operation for landfill disposal on a per ton basis, the cost allocations to Sanitation will decrease and other landfill customers will need to make up the difference in the form of a slightly higher per ton cost. Table 3-3 shows the per ton cost that the City will charge customers to dispose of waste at the Landfill.

**Table 3-3: Landfill Tipping Fees**

Year	2017	2018	2019
Tipping Fee per Ton	\$33.50	\$34.50	\$35.50

### 3.1.3 Water Customer Accounting

While the City may have a need to increase rates in the future based on inflation or adding curbside recycling, Burns & McDonnell does not expect that these changes would have a material impact on Water Customer Billing since it is recommended that all residential customers be provided with and charged for single-stream recycling, as discussed in Section 3.3.1. There could be additional impacts on the Water

Customer Accounting if the City would implement a recycling rebate program, as discussed in Section 3.3.2

## 3.2 Refuse Market Issues and Recommendations

Should the City decide to move forward with a fully-automated refuse program, Burns & McDonnell would encourage the City to consider the following policy issues and recommendations.

### 3.2.1 Impacts to Current System

If the City implements fully-automated collection, there are several impacts to the current system that should be considered:

- **Exit the alleys:** The City will need to provide collection services at the curb because the alleys are not wide enough for fully-automated collection vehicles to operate in a safe and effective manner. Currently, approximately 85 percent of refuse carts are collected at the curb and 15 percent are collected in the alley, and all recycling bins are already collected at the curb. The City determined that in 2015 there were a small number of residences that only have alley access for sanitation services: seven residential customers with City-provided sanitation services and four residences with privately provided sanitation services. Given that there is a cost to maintain the alleys and the City will not be providing collection services in the alleys, Burns & McDonnell recommends that the City adopt an ordinance prohibiting solid waste and recycling collection by all haulers in the alleys.
- **Yard waste:** While the City presently has a separate yard waste collection program, there is a collection and disposal cost for this operation. If the City implements a single-stream recycling program, there is potential for the City to consider co-collecting yard waste with the refuse. In considering this option, the City will need to weigh the pros and cons of decreasing diversion with lowered costs. Based on the City's FY 2016 Budget, approximately \$640,000 is allocated to the yard waste program, which includes a fee of \$72,765 per year that the City pays Kanza to process collected yard waste. However, some of these costs are indirect costs that are allocated to the yard waste program and would need to be recovered from other collection operations. Therefore, not all of the \$640,000 would be eliminated if the City discontinued the yard waste operation. If the City co-collected yard waste with refuse, it could eliminate approximately \$450,000 in direct costs, but the City would incur a new cost from the additional yard waste material disposed of at the landfill. The new disposal cost is estimated to be \$61,065 per year based on 1,770 tons of yard waste collected per year and a \$34.50 per ton fee at the landfill. The

net savings to the City of eliminating the yard waste program would therefore be approximately \$389,000 annually. The co-collected yard waste material sent to the landfill would offset some of the cost of diverting additional recyclable material from the landfill. The City could use a portion of this amount to purchase additional carts for residents who require an additional refuse cart for their trash and yard trimmings. If the City eliminates the yard waste collection program, the City could consider allowing citizens to dispose of yard waste (grass and leaves) at the landfill without charge as the City currently provides for tree limbs. In addition, private companies have the option to establish yard waste collection sites or provide yard waste collection services for customers.

- **Extra materials outside carts:** One of the benefits of fully-automated collection is the efficiencies gained by having one driver operate the vehicle with a mechanical arm. These efficiencies can be best achieved by minimizing the needs for collecting out-of-cart set-outs. Burns & McDonnell would recommend that the City require residents to place all of their material within their carts (which becomes even more reasonable if the City implements citywide recycling). The City could offer residents the option to request additional refuse carts. Burns & McDonnell would recommend that the City establish a fee for additional refuse carts to cover the incremental costs of the cart and disposal cost. Burns & McDonnell would recommend the fee to be set at 50 percent of the base sanitation rate or \$8.70 per cart (\$17.40 for Option 2B). As an alternative, the City could collect materials outside of the carts for an additional fee, which is typically charged on a per bag basis. Minimizing the need for drivers to exit the vehicles also reduces the potential for injuries. Residential customers also have the option to request an additional cart collection for \$12.75 per extra collection or request a special pickup for \$24.00 per pickup.
- **Special pickups:** Implementing fully-automated collection should not have a direct impact on the City's ability to provide special pickups, as our analysis indicates that the City should have some excess capacity that could be utilized to provide special pickups.

### 3.3 Recycling Rate Market Issues and Recommendations

Should the City decide to move forward with a citywide recycling program, Burns & McDonnell would encourage the City to consider the following policy issues and recommendations.

### 3.3.1 Regulatory Requirement: Universality

As the City is in an open market for collection services, in order to effectively implement recycling and maintain an equal level of competition with the private market, Burns & McDonnell recommends the City adopt an ordinance requiring all residential solid waste providers (including the City) to include recycling collection as a part of their base services if the City decides to implement a citywide recycling program. Implementing a universal recycling program will allow the City to achieve the volume and set-out density needed to maximize efficiency and success of a curbside recycling operations. Additionally, this approach will allow the City to mitigate the potential loss of market share. Participation in the recycling program is not mandatory, but each customer would have the opportunity to receive a recycling cart as part of the monthly sanitation fee.

Private haulers serving the Salina market may have mixed opinions regarding universal recycling services. Smaller haulers may face operational challenges and might not have a location for processing. To ease the potential burden of implementing a recycling program for the smaller, private haulers, Burns & McDonnell recommends that the City include a provision in the recycling processing agreement that allows for other local haulers to piggyback on the City's recyclable processing agreement. It is also recommended that agreement include provisions to require the haulers to deliver recyclable material that meets contamination levels.

If the City of Salina would move forward with a universal recycling program, it would be consistent with efforts implemented by other cities and counties in Kansas to transition recycling from subscription to universal service. For example, the City of Wichita approved a solid waste and recycling program in 2011 that requires all haulers to provide universal single-stream recycling and pay-as-you-throw rates.

### 3.3.2 Variable Rates and Program Incentives

Some communities in the United States have introduced recycling incentive programs as part of their curbside recycling programs. A recycling incentive program is implemented in order to increase participation in the recycling program and capture a greater volume of recyclable material. These programs can be successful with proper public education and community interest. However, it is important to note that including a recycling incentive program can increase the cost of the recycling program by approximately \$0.50 to \$1.00 per household per month. For example, the City of Wichita historically had a recycling incentive program that cost approximately \$1.00 per household per month.

Based on the alternative recycling options projected costs, a recycling incentive program would increase the monthly cost per household to approximately \$5.00. In a public outreach survey of Salina residents

completed by SAIC and Fort Hays University in 2012, residents indicated they were unlikely to support a cost of more than \$4.00 for curbside recycling. By including an additional cost for a recycling incentive program, the monthly cost of curbside recycling becomes financially unattractive to residential customers. In addition, a higher monthly sanitation rate per household would make the City's sanitation program less competitive as compared to local private haulers.

The public outreach survey also measured interest in various recycling incentive programs such as pay-as-you-throw or a rebate program. A pay-as-you-throw system is designed to allow residents to pay a lower refuse rate for disposing of less. In a pay-as-you-throw program, typically, residents have the option to choose between two to three different sizes of refuse carts (e.g., 32 gallons, 64 gallons, and 96 gallons). Smaller refuse cart customers pay less per month, and residents can transition to a smaller refuse cart by recycling more. However, a pay-as-you-throw program requires maintaining a greater variety of cart inventory and operational time to manage and deliver carts to customers. Alternatively, a rebate system is a program that rewards customers who recycle to earn credits on their solid waste bill. For instance, residents can receive a monthly or quarterly rebate if they participate in the program. A rebate system also would have increased costs from data tracking and radio frequency identification (RFID) readers and tags installed on vehicles and collection carts. The results of the public outreach survey show that City residents are more inclined towards a pay-as-you-throw or rebate system rather than a rewards system.

Based on the results of the 2012 public outreach survey, if the City chooses to implement a recycling incentive program, the City should implement a rate structure that reflects a pay-as-you-throw or recycling rebate design rather than investing in a recycling rewards program. The following table summarizes key aspects of the different recycling incentive programs.

**Table 3-4: Recycling Incentive Program**

<b>Recycling Incentive Program</b>	<b>Program Capital Requirements</b>	<b>Advantages</b>	<b>Disadvantages</b>
Pay-as-you-throw	Multiple refuse cart sizes Universal curbside recycling	Associates cost of disposal with high waste generation	City must maintain larger variety of cart inventory and manage rate structure with multiple base rates
Recycling Rebate	RFID reader	Provides opportunity for rate decrease for recycling	City must manage data Rebate will change annually based on commodity pricing
Recycling Rewards	RFID reader	Typically managed by external company Involves local companies	Requires high level of customer involvement and participation

If the City decides to implement fully-automated refuse collection and single-stream recycling collection, then customers would receive a 95-gallon refuse cart and a 95-gallon recycling cart. The 95-gallon recycling cart would offer a significant capacity increase over the 18-gallon recycling bins in the current subscription program. In addition, the larger recycling capacity would help free capacity in refuse carts as more recyclable material can be collected and as more residents would have access to recycling collection services. Residential customers would have the option to request additional refuse or recycling carts but would have to pay an additional fee to cover the cost of the additional refuse cart. The additional fee would help to encourage residents to recycle more material to minimize their waste to avoid needing additional refuse carts.

### 3.3.3 Partner with McPherson Area Solid Waste Utility

On a pilot basis, the City has partnered with the McPherson Area Solid Waste Utility (MASWU) for the MASWU to accept the City's recycling material for processing. The MASWU is then hauling the material to a single-stream material recovery facility. The City is paying MASWU a fee of \$35 per ton, which is a reasonable cost given the current value of recycling commodities. Burns & McDonnell recommends that the City and MASWU enter an agreement that defines the relationship prior to the City implementing single-stream recycling. It is also recommended that the pricing be revisited when the commodity values return to higher levels. However, the City should not expect to realize a significant amount of revenue from the sale of the recyclables, given the transportation and processing requirements incurred by the MASWU.

### 3.3.4 Market Vulnerabilities and Risks

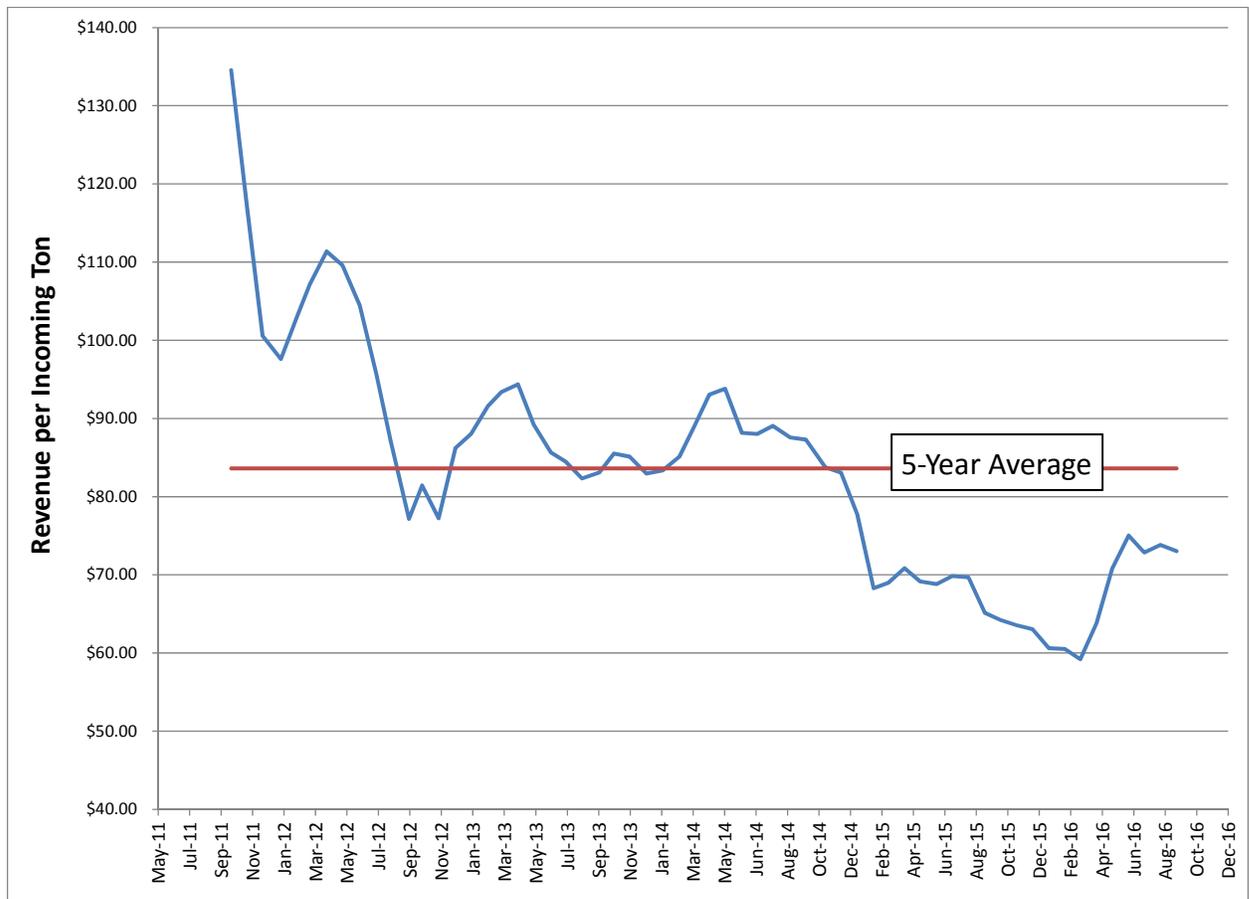
Should the City implement single-stream recycling, there are multiple market vulnerabilities and risks for the City to consider, and these issues have been addressed in this report:

- **Market share:** Since Salina residents are sensitive to the price of recycling, Burns & McDonnell would only recommend that the City implement citywide recycling if the City requires recycling on a universal basis (as discussed earlier in Section 3.3.1).
- **Commodity pricing:** Recycling commodity pricing has been at very low levels for the past several years. Therefore, the financial analysis in this business plan is based on low commodity values, and already accounts for the associated risk.

- Recycling processing:** The City will need to rely on a third party to process its recyclables. It will be important going forward for the City to establish and maintain a positive working relationship with McPherson County.

Table 3-5 shows the high volatility in commodity prices for recyclable materials in North Texas, which is generally representative of the commodity market in the Midwest. The average value during this five-year period was \$84 per ton, and for September 2016 it was \$73 per ton. It may be possible for the City to enter a revenue sharing arrangement with a local MRF depending on commodity pricing, but it is uncertain in the current market. Burns & McDonnell also notes that agreements with MRFs have been shifting from revenue sharing agreements to providing a fee based service, which is a result of low commodity pricing. If commodity values were to increase and become less volatile in the future, then the possibility of a revenue sharing agreement could become mutually beneficial for the City and the MRF.

**Table 3-5: Historical Commodity Values (Weighted Average)**



## 4.0 REFUSE AND RECYCLING IMPLEMENTATION PLANS

This section includes implementation plans to convert the current semi-automated refuse system to a fully-automated collection operation and to implement a single-stream curbside recycling program. This report section includes the specific roles, responsibilities, schedules, costs, and other organizational issues associated with the recycling implementation plan and the automation of the City's refuse routes. Many of the implementation steps to begin fully-automated refuse collection and a single-stream recycling program will be similar. Since the City's decisions to implement fully-automated refuse collection and single-stream recycling are independent, each implementation step is discussed for both programs, so that the refuse collection and recycling program implementation plans can stand alone.

### 4.1 Development of Fully-automated Refuse Implementation Plan

The City's Public Works Department prefers to transition to fully-automated refuse collection beginning in FY 2019. Transitioning the refuse collection operation in one year will allow the City to benefit from the efficiencies of a fully-automated program. The key issues to be addressed in this fully-automated refuse implementation plan include:

- Policy decisions;
- Ordinance development;
- Service implementation;
- Vehicle purchase;
- Cart purchase; and
- Public Education.

Burns & McDonnell discusses the general implementation needs of the City as it relates to each of these issues and describes the specific roles, responsibilities, schedules, costs, and other organizational issues associated with each issue.

The following sections outline the various elements of the implementation plan and the specific implementation steps associated with those elements. In Section 4.4, Burns & McDonnell has provided a Gantt chart summarizing each action item to be completed in sequence over a specific period of time for the fully-automated refuse implementation plan.

Based on the time required to complete each of the implementation steps outlined within this section of the report, Burns & McDonnell would expect a total implementation time needed for the fully-automated refuse program to be a minimum of eight months once the updated ordinance is adopted. Since the City is

only making operational changes to its existing refuse collection system, there are no other state mandated implementation steps required by Kansas State Statute 12-2036.

#### **4.1.1 Policy Decisions**

**Funding Sources for Initial Capital Cost of Fully-automated Refuse Collection:** With the conversion of the City's refuse collection program to an automated collection operation, the City will have an excess of five semi-automated vehicles in its fleet. As discussed in Section 1, Burns & McDonnell recommends the City transfer the five existing semi-automated refuse vehicles to the yard waste and special pickups programs to replace older semi-automated vehicles in its sanitation fleet. Burns & McDonnell recommends the City sell the five oldest semi-automated vehicles to offset the purchase cost of the new fully-automated vehicles. Burns & McDonnell estimated the combined sale price of the five vehicles to be \$87,000 based on an assumed 15 percent of their original purchase price as each vehicle will be more than seven years old at the time of sale in FY 2019. The City could apply the \$87,000 towards implementation costs, debt service payments on the new fully-automated refuse vehicles, or set a portion aside as part of a reserve for the refuse program. Given that the City will also need to purchase 16,550 new refuse carts before implementation of fully-automated refuse collection, Burns & McDonnell recommends that the City issue debt or borrow from other City funds to fund the remainder of these capital purchases.

#### ***Roles and Responsibilities***

This is ultimately a policy decision to be made by the City Manager and the City Commission.

#### ***Timeline***

Burns & McDonnell recommends the City identify the amount that it intends to borrow from other City funds or issue debt to fund the purchase of the five fully-automated refuse collection vehicles and collection carts prior to the ordinance adoption. Cost is a central aspect of public education and outreach, and this policy decision will have a direct impact on the monthly program cost to residents. Burns & McDonnell expects this process could take up to two months for the City to complete.

#### ***Cost***

Burns & McDonnell anticipates the City will incur a minimal cost to address the funding source of the collection vehicles and refuse carts. The total capital cost for the six fully-automated vehicles is about

\$1,777,000,<sup>1</sup> and the total capital cost for 16,550 refuse carts is estimated at approximately \$993,000. The City could apply the \$87,000 towards implementation costs, debt service payments on the new fully-automated refuse vehicles, or set a portion aside as part of a reserve for the refuse program. Any of these options would contribute to reducing the overall cost of the fully-automated refuse program in FY 2019. The City would need to issue debt to fund the total purchase cost of the vehicles and carts. Burns & McDonnell estimates that the financing cost would be approximately \$307,000 per year for seven years for the six fully-automated vehicles combined, which is based on a seven year lifecycle of a fully-automated vehicle. The cost of financing the carts would be approximately \$129,000 per year over a ten-year period, which is based on a ten-year lifecycle for a standard cart. Burns & McDonnell included these costs in the residential household rate.

#### **4.1.2 Ordinance Development**

The City will need to develop an updated refuse ordinance to address key collection and billing issues related to all refuse services. The ordinance will need to address a variety of issues including, but not limited to, the following:

- Required customer service level;
- Billing practices;
- Container storage and placement;
- Set-out rules;
- Prohibited actions and materials;
- Quantity limits; and
- Senior/American Disability Act (ADA) discounts.

#### ***Roles and Responsibilities***

Development of an updated refuse ordinance for a fully-automated refuse collection program will primarily be the responsibility of the City's attorney and/or the City's consultant, with input and cooperation, where appropriate, by the Public Works Department, Finance Department, and City officials.

#### ***Timeline***

Development of the ordinances would be expected to take three to four months to complete. The development of ordinances will need to occur prior to the procurement processes and should be finalized

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<sup>1</sup> This capital cost is calculated assuming a purchase price for a fully-automated vehicle of \$275,000 in 2016 dollars, which Burns & McDonnell inflated for three years based on the City purchasing five fully-automated vehicles in FY 2019.

once the service agreements are officially executed. Adoption of the ordinance by the City Commission would be expected to take no more than an additional two months. The revised refuse ordinance should be officially adopted prior to the start of service.

### *Cost*

The City attorney can develop refuse ordinances for the City, or the City can choose to use a qualified management consulting firm. The estimated cost for this service would be \$10,000 to \$20,000.

## **4.2 Service Implementation**

This section provides the City with an indication of the effort to implement the various services the City may procure as part of the proposed fully-automated refuse collection system. There are two primary drivers in the fully-automated refuse implementation schedule:

- Procurement of collection vehicles and carts; and
- Routing of collection routes.

### **4.2.1 Refuse Collection Vehicles**

Based on conversations with City staff and collection vehicle manufacturers, the delivery of fully-automated collection vehicles is anticipated to take six to nine months from the date the order is placed. The delivery date is subject to both the backlog of the chassis supplier (e.g., Peterbilt, Mack, Crane Carrier) and the body supplier (e.g., Heil, McNeilus, Labrie) at the time the order is placed. As the City currently operates a semi-automated collection operation which will be converted to a fully-automated collection operation, Burns & McDonnell recommends the City receive the fully-automated vehicles one to three months in advance of the fully-automated program start date to allow operators sufficient training time. Table 4-1 summarizes the equipment needs for a fully-automated refuse collection operation.

**Table 4-1: Estimated Number of Refuse Vehicles**

<b>Collection Vehicles</b>	<b>Number of Vehicles</b>
Frontline Quantity	5
Backup Quantity <sup>1</sup>	1
<b>Total</b>	<b>6</b>

1. If the City implements fully-automated single-stream recycling the backup recycling vehicle could be shared with the refuse program.

The City currently maintains multiple models and types of vehicles and has the potential to increase mechanical and operational efficiency by using a similar or the same vehicle throughout the fully-automated refuse and single-stream recycling collection operation.

### ***Roles and Responsibilities***

Developing the vehicle requirements for the fully-automated refuse operation should be the responsibility of the Public Works Department, and more specifically the Sanitation Department. Once the specifications of the vehicles needed are developed, Burns & McDonnell recommends the City's Public Works Department work the City Procurement Office to acquire the most competitive price for the necessary equipment.

### ***Timeline***

A vehicle procurement process can take up to nine months to complete. Burns & McDonnell recommends the City complete the procurement process and receive the fully-automated vehicles one to three months before they are expected to enter service to allow the Sanitation Department sufficient time to test the vehicle and train the driver with the new vehicle. The six fully-automated refuse collection vehicles are expected to enter service in FY 2019.

### ***Cost***

The capital cost of the vehicles required to operate the collection operation is included in the financial analysis provided in Section 1 of this report. Historically, the City has completed vehicle procurements at a minimal cost.

## **4.2.2 Refuse Collection Carts**

Collection carts can typically start being delivered 10 to 12 weeks after the order is placed, followed by another two to six weeks for assembly and delivery to all city residents.

Burns & McDonnell recommends that the City contract with the cart manufacturer to provide for assembly and delivery of the carts. The City would need to provide a secure, paved location where the carts would be staged and stored prior to delivery. The cost for assembly and delivery is typically \$4.00 to \$5.00 per cart, which Burns & McDonnell included in the \$60 per cart purchase cost.

**Cart Purchase:** There will be a need to purchase containers for each existing customer, as well as some additional containers to account for growth. Based on the 2016 customer count of 15,056 and an expected population growth rate of 0.6 percent, Burns & McDonnell recommends the City purchase 16,550 refuse containers to allow for growth and additional containers.

**Quality Cart in a Standard Size:** Burns & McDonnell recommends that the City obtain standard sized carts for refuse services. Having a single size minimizes the actual number of carts that need to be purchased since it eliminates the need to project what size containers customers will select. Burns &

McDonnell recommends that the City use a 95-gallon cart for refuse collection to maximize the volume of material collected from customers.

For residents who require assistance (e.g., senior citizens or ADA), the City could continue to provide the existing walk-in service.

#### **Use Formal Procurement or an Existing Cooperative Purchase Agreement for Purchase of Carts:**

Procurement options for the City to purchase carts include a City-managed procurement process or use of an existing contract for the purchase of carts. For example, there are at least two governmental cooperative purchasing agreements that allow local governments to purchase materials and services (including carts) based on competitive purchasing processes completed by these organizations.

Burns & McDonnell is familiar with cooperative purchasing agreements for carts through the Houston-Galveston Area Council Buy (HGACBuy)<sup>2</sup> and the National Intergovernmental Purchasing Alliance (National IPA).<sup>3</sup> Cities are able to use cooperative purchasing agreements as a contract mechanism to streamline the procurement process and obtain a competitive price. Burns & McDonnell has typically found that the pricing offered through these cooperative purchasing programs is as, or more, competitive than separate procurement processes. It is important to note that the prices listed in these cooperative agreements represent the maximum prices, and can be negotiated.

#### ***Roles and Responsibilities***

The Public Works Department should be primarily responsible for developing the cart specifications needed for the City. Once the specifications of the carts are developed, Burns & McDonnell recommends the City's Public Works Department work with the City Procurement Office to acquire the most competitive price for the necessary quantity of carts.

#### ***Timeline***

The City should identify the container specifications prior to procuring the necessary carts. If the City chooses to use a cooperative purchasing agreement, Burns & McDonnell expects this effort would take no more than two months to complete. Alternatively, if the City chooses to procure carts through a formal City-managed procurement process, Burns & McDonnell expects this effort would take between four and six months.

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<sup>2</sup> The HGAC program is available to local governments throughout the United States.

<sup>3</sup> The National IPA contract for containers was based on a formal procurement process completed by the City of Tucson, Arizona. This procurement process also included a detailed review of container performance.

### ***Cost***

There are few direct costs associated with using an existing purchase agreement. The City would need to define its specifications for the cart to ensure whichever cart selected meets the needs of the City. If the City conducts a formal procurement for the carts, Burns & McDonnell estimates the cost for consultant assistance would be \$10,000 - \$15,000.

### **4.2.3 Refuse Collection Routing**

Each collection route should be planned to collect material in the most efficient manner possible. The City may choose to develop macro-level routes, where only the area to be collected for each route is determined. The City may also use routing software, or other methods, to develop detailed daily routes (also known as micro-level or street-level routing). Burns & McDonnell would expect the routing process to take two to four months, depending on how the City chooses to develop the routes.

### ***Roles and Responsibilities***

Developing the new routes for the fully-automated refuse operation should be the responsibility of the Public Works Department, more specifically the Sanitation Department. The City can choose to use a macro-level routing process or a micro-level routing process involving more computer based routing software. Depending on the routing process the City chooses to use, the City may want to involve the City Planning Department to procure routing software or hire routing consultants.

### ***Timeline***

Burns & McDonnell recommends the City allow four months to complete the routing process. The City could continue to refine routes after vehicles have been received based on feedback from refuse drivers running practice routes.

### ***Cost***

The cost of route development will vary depending on the routing processed used by the City. Developing macro-level routes would involve little to no additional cost. A micro-level routing approach could require the City to procure routing software and/or consultants to develop routes. The cost of routing software and/or a routing study can range from \$20,000 - \$60,000.

## **4.3 Public Education**

Public education will be critical to ensure a successful transition to the proposed fully-automated refuse collection program. There will be a need to develop a systematic approach to notify residents of the City's plans and how it will impact them. For example, the larger size of the fully-automated refuse vehicles will prevent refuse collection from the narrow alleyways and often have limited height

clearances. Therefore, the City should place an emphasis on communicating this reason for why it is requiring citizens to set-out their refuse carts at the curb. The following section presents specific public education action items that will need to be addressed as a part of the implementation process. There will be a need to effectively communicate to all residents the reasons for the change in collection services, the benefits of this change, how it will affect each resident, and the specific timeline over which implementation of the new collection system will occur. As the City moves toward implementation, there will also be a need to communicate with all residents regarding exactly how to participate in the new collection system. These communications would include details such as:

- Specific collection days and times;
- Rules and restrictions regarding set-outs;
- Descriptions of prohibited refuse items; and
- Customer service contact information.

It will be critically important to begin actively educating customers on these specific items well in advance of the new service start date. There are a wide variety of ways to communicate important information. Based on the City's public outreach survey conducted in 2012, the most effective media for the City's residents are:

- Utility bill inserts;
- Newspaper;
- City newsletter;
- Public notices.

There are multiple ways to communicate with the public, but it is important to maximize public education funds to reach the most customers. Burns & McDonnell would like to note the City also has a website that can be updated to reflect programmatic changes. While not all households in the City fall under a Homeowner's Association (HOA), communication with the HOAs is often an effective way to communicate changes to residential neighborhoods. The HOA can then assist in educating its residents as questions arise. The City may consider using a number of different methods for communication with HOAs, including, but not limited to, the following:

- Public meetings;
- In-person visits with HOA groups;
- Phone calls to property managers and HOA officers; and

- Direct mailings.

### ***Roles and Responsibilities***

Public education material should be developed in cooperation with the Public Works Department and City marketing and public relations staff. It is important that materials are accurate, easily understood by residents and consistent with City marketing initiatives.

### ***Timeline***

Outreach to all residents regarding the upcoming collection changes will need to begin as soon as an official decision is reached by the City Commission to move forward with implementation of the proposed fully-automated refuse program. However, the major outreach effort to educate residents on the specifics of participation in the program will need to begin in earnest approximately three months prior to the start of services.

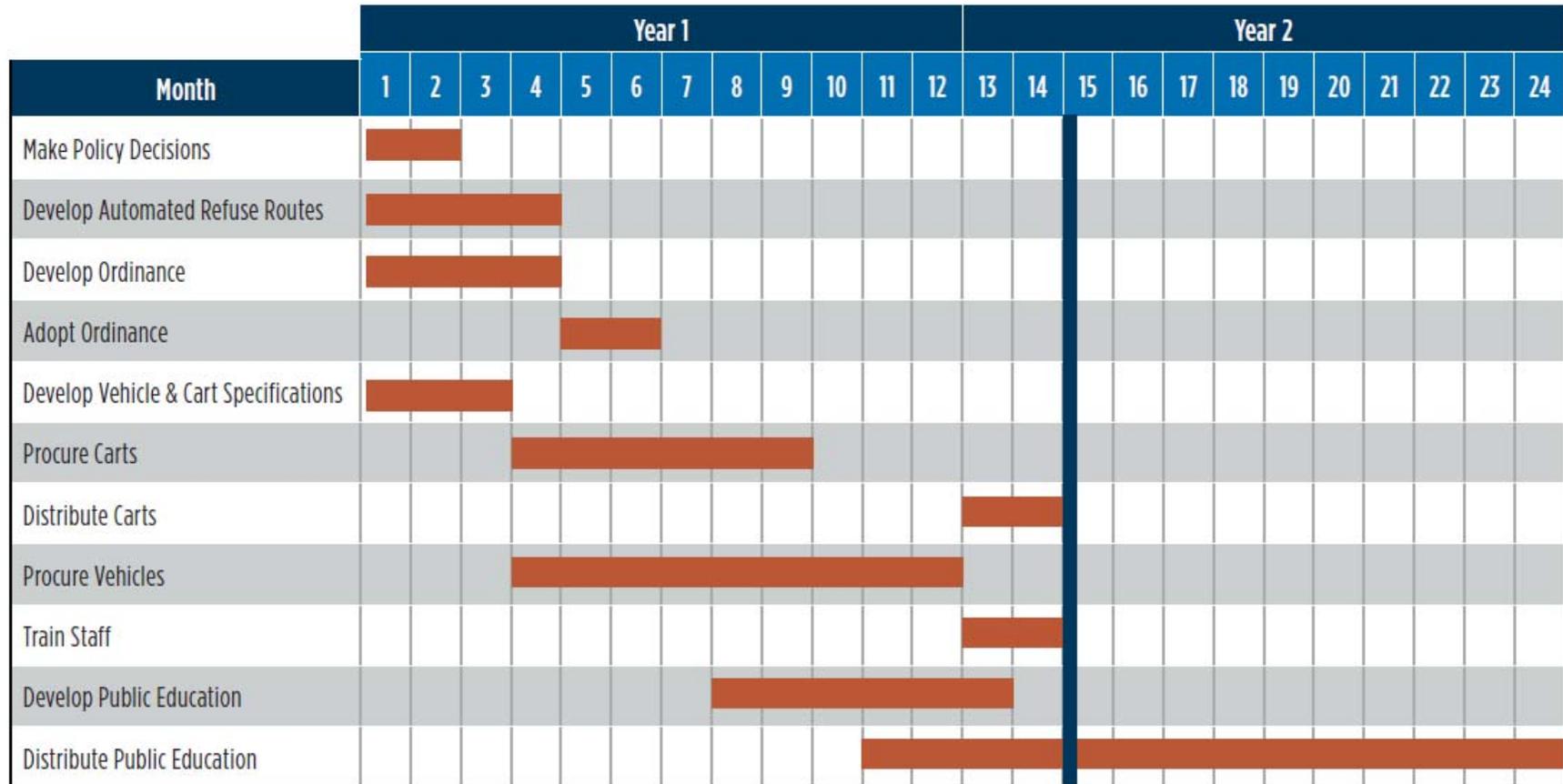
### ***Costs***

The City currently provides public education to its citizens about the existing refuse collection program. Since the fully-automated refuse collection program will replace the existing program, Burns & McDonnell anticipates that the overall impact on the amount that the City typically spends on public education will be minimal and will focus primarily on making sure that residents understand proper cart management and proper cart placement to facilitate collection by fully-automated vehicles. Burns & McDonnell included the public education cost for refuse with the public education cost for single-stream recycling, which includes the cost of an education officer. If the City does not decide to implement single-stream recycling, then the City should consider allocating additional funds to the refuse program for public education.

## **4.4 Transition Schedule for Fully-automated Refuse Collection**

Burns & McDonnell has illustrated the implementation steps needed to transition the semi-automated refuse collection operation to a fully-automated refuse collection operation in the Gantt chart provided in Figure 4-1. This summary timeline assumes that the fully-automated refuse operation will be rolled out all at one time. The schedule provides the City with an understanding of how long each implementation step will take before the fully-automated refuse service can begin. Assuming some tasks can overlap, Burns & McDonnell estimated a minimum timeline of 14 months.

**Figure 4-1: Fully-automated Refuse Implementation Timeline**



**LEGEND**

█ Fully-Automated Refuse Start Date

## 4.5 Development of Recycling Implementation Plan

The key issues to be addressed in this implementation plan include:

- Policy decisions;
- Ordinance development;
- Service implementation;
- Vehicle purchase;
- Cart purchase; and
- Public education.

Burns & McDonnell discusses the general implementation needs of the City as it relates to each of these issues and describes the specific roles, responsibilities, schedules, costs, and other organizational issues associated with each issue.

The following sections outline the various elements of the implementation plan and the specific implementation steps associated with those elements. At the end of this report section, Burns & McDonnell has provided a Gantt chart summarizing each action item to be completed in sequence over a specific period of time for the recycling implementation plan.

Based on the time required to complete each of the implementation steps outlined within this section of the report, Burns & McDonnell would expect a total implementation time needed for the City-wide recycling program to be a minimum of 18 months once the updated ordinance is adopted.

Kansas State Statute 12-2036(g) outlines the state mandated steps required for a municipality that already provides solid waste collection services to add a new recycling collection service. The actions required in this Kansas statute include:

- Hold a public hearing on the proposed plan to provide recycling services;
- Provide 21 days' prior notice of public hearing by publication in the official newspaper of the City;
- Commence recycling collection service 21 days after public hearing if no existing recycling collector formally opposes the new recycling collection system within the 21-day period.
- If an existing recycling collector makes an objection to the new recycling collection system, then the City must comply with the complete requirements of Statute 12-2036, including the 18-month waiting period, or may start the service once the objection is removed, whichever occurs first.

The implementation plan provided by Burns & McDonnell in this section is consistent with the requirements outlined in Statute 12-2036.

#### 4.5.1 Policy Decisions

**Developing City Recycling Rate Goal:** In recent years, a trend has emerged of states, counties, and cities developing recycling rate goals. A City recycling rate goal is an important aspect of a successful recycling program. In Figure 4-2 Burns & McDonnell has proposed potential recycling rate goals for the City based on the City implementing a single-stream curbside recycling program.

**Figure 4-2: Potential Recycling Rate Goal Timeline**



In this recycling rate timeline, Burns & McDonnell based the recycling rate goals on increased recovery through curbside recycling. If the City chooses to implement a more aggressive yard waste program to divert an increased level of organic materials (e.g., yard trimmings, brush, grass, leaves, etc.), the City can revise the recycling rate goals to be more aggressive. Setting a City recycling rate is ultimately a policy decision to be made by the City Manager and City Commission.

#### ***Roles and Responsibilities***

Development of the City's recycling rate goal will ultimately be up to the City Manager and City Commission. Burns & McDonnell recommends the City involve the Public Works Department throughout the development of the recycling rate goals as the Public Works Department will ultimately be responsible for carrying out the work necessary to achieve the recycling goal.

#### ***Timeline***

The time necessary to develop a recycling rate goal is highly dependent on the amount of discussion the City would like to have regarding the recycling rate goals. Burns & McDonnell recommends the City have a finalized recycling rate goal by the second month of the implementation plan process.

#### ***Cost***

The cost of developing a City recycling rate goal is dependent on the amount of staff hours and/or consultant hours the City chooses to use in developing a City recycling rate goal.

**Including Private Haulers in Recycling Implementation and Recycling Contracts:** The City is a competitive market for residential refuse collection. The City competes against private haulers for residential accounts, and the City serves approximately 89 percent of the City. Some private haulers have previously expressed a mixed level of interest in a universal residential recycling program. A private hauler expressed concern about being able to maintain market share with the added requirement to provide City residents with curbside recycling service. To mitigate the loss of any private hauler's market share from implementing universal recycling, Burns & McDonnell recommends that the City offer a public-private partnership to all of the City's private haulers for collection and/or processing of recyclables. For example, the City would extend private haulers with the option for the City to collect recyclables on behalf of the private hauler if they are unable to collect the material, and the City would be compensated accordingly.

In order to provide a smooth transition to the universal recycling program for both the City and private haulers, Burns & McDonnell recommends the City include a "piggyback" clause in the City's recycling contracts, allowing the private haulers operating in the City to benefit from the same contract terms. Examples of contracts that could include "piggyback" clauses include; recycling processing contract, long-haul transport of recyclable material contract, vehicle purchase contract, and cart purchase contract.

### ***Roles and Responsibilities***

The Public Works Department and the City Attorney should jointly be responsible for considering the potential for any private-public contracts, public-private collaboration, or "piggyback" clauses with the City's private haulers throughout the implementation process.

### ***Timeline***

Burns & McDonnell recommends the City communicate to the private haulers the City's interest in collaboration prior to initiating the recycling implementation plan. In the interest of smoothly transitioning the City to a universal recycling program, it is important to invite the private haulers to be involved, when appropriate, during the implementation plan. This policy issue will need to be considered throughout the duration of the recycling implementation plan.

### ***Cost***

Burns & McDonnell anticipates the City will incur a minimal cost, if any, to collaborate with the City's private haulers throughout the recycling implementation process and allow the private hauler to "piggyback" on the City's public-private recycling contracts.

**Funding Sources for Initial Capital Cost of Single-Stream Recycling:** The City has generally set aside an annual budget amount from the solid waste management fund to support the purchase of capital items for the curbside recycling program, such as vehicles and collection carts. The City could apply the approximately \$20,000 per year set aside towards the purchase of the three fully-automated recycling collection vehicles. Given that the City will also need to purchase 16,550 new recycling carts before implementation, Burns & McDonnell recommends that the City issue debt or borrow from other City funds to fund these capital purchases.

### ***Roles and Responsibilities***

This is ultimately a policy decision to be made by the City Manager and the City Commission.

### ***Timeline***

Burns & McDonnell recommends the City identify the amount that it intends to borrow from other City funds or issue debt to fund the purchase of the two fully-automated recycling collection vehicles and collection carts prior to the ordinance adoption. Cost is a central aspect of public education and outreach, and this policy decision will have a direct impact on the monthly program cost to residents. Burns & McDonnell expect this process could take up to two months for the City to complete.

### ***Cost***

Burns & McDonnell anticipates the City will incur a minimal cost to address the funding source of the collection vehicles and recycling carts. The total capital cost for the three fully-automated vehicles is about \$888,000,<sup>4</sup> and the total capital cost for 16,550 recycling carts is estimated at approximately \$993,000. The City could apply the \$20,000 set aside from the solid waste management fund towards the purchase of the three fully-automated recycling collection vehicles. The City would need to fund the remainder of the purchase cost by issuing debt. Burns & McDonnell estimates that the financing cost would be less than \$154,000 per year for seven years for the three fully-automated vehicles, which is based on a seven year lifecycle of a fully-automated vehicle. The cost of financing the carts would be approximately \$129,000 over a ten year period, which is based on a ten year lifecycle for a standard cart. Burns & McDonnell included these costs in the residential household rate.

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<sup>4</sup> This capital cost is calculated assuming a purchase price for a fully-automated vehicle of \$275,000 in 2016 dollars, which Burns & McDonnell inflated for three years based on the City purchasing three fully-automated vehicles in FY 2019.

#### 4.5.2 Ordinance Development

The City will need to update or develop a recycling ordinance to address key collection and billing issues related to all recycling services. The ordinance will need to address a variety of issues including, but not limited to, the following:

- Required customer service level;
- Billing practices;
- Container storage and placement;
- Set-out rules;
- Prohibited actions and materials;
- Quantity limits; and
- Senior/ADA discounts.

There are many existing municipal recycling ordinances that are publicly available and may be of help in developing the framework for the City's ordinance. For example, the North Central Texas Council of Governments developed a "Recycling Ordinance and Building Design Guidelines" report that is publicly available.<sup>5</sup>

##### ***Roles and Responsibilities***

Development of a recycling ordinance will primarily be the responsibility of the City's attorney and/or the City's consultant, with input and cooperation, where appropriate, by the Public Works Department, Finance Department, and City officials.

##### ***Timeline***

Development of the ordinances would be expected to take three to four months to complete. The development of ordinances will need to occur prior to the procurement processes and should be finalized once the service agreements are officially executed. Adoption of the ordinance by the City Commission would be expected to take no more than an additional two months. The recycling ordinance should be officially adopted prior to the start of service.

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<sup>5</sup> [http://www.nctcog.org/envir/SEELT/documents/Final\\_Report-Ordinances\\_Guidelines\\_August\\_2009.pdf](http://www.nctcog.org/envir/SEELT/documents/Final_Report-Ordinances_Guidelines_August_2009.pdf)

**Cost**

The City attorney can develop recycling ordinances for the City, or the City can choose to use a qualified management consulting firm. The estimated cost for this service would be \$5,000 to \$15,000 (or less if combined with the development of the ordinance for fully-automated refuse collection).

**4.6 Service Implementation**

This section provides the City with an indication of the efforts to implement the various services the City may procure as part of the proposed recycling collection system. There are three primary drivers in the recycling implementation schedule:

- Procurement of collection vehicles and carts;
- Routing of collection routes; and
- Access to processing.

**4.6.1 Recycling Collection Vehicles**

Based on conversations with City staff and collection vehicle manufacturers, the delivery of fully-automated collection vehicles is anticipated to take six to nine months from the date the order is placed. The delivery date is subject to both the backlog of the chassis supplier (e.g., Peterbilt, Mack, Crane Carrier) and the body supplier (e.g., Heil, McNeilus, Labrie) at the time the order is placed. As the City would be operating semi-automated recycling collection in the first year of the single-stream recycling program, Burns & McDonnell recommends the City receive the fully-automated vehicles one to three months in advance of the fully-automated program start date to allow operators sufficient training time. Table 4-2 summarizes the equipment needs for a single-stream recycling collection operation.

**Table 4-2: Estimated Number of Recycling Vehicles**

<b>Collection Vehicles</b>	<b>Number of Vehicles</b>
Frontline Quantity	2
Backup Quantity <sup>1</sup>	1
<b>Total</b>	<b>3</b>

1. If the City implements fully-automated single-stream recycling the backup recycling vehicle could be shared with the refuse program.

The City currently maintains multiple models and types of vehicles and has the potential to increase mechanical and operational efficiency by using a similar or the same vehicle throughout the fully-automated refuse and single-stream recycling collection operation. Burns & McDonnell recommends the City acquire the same fully-automated vehicles for the recycling program as those selected for refuse

collection to streamline the City's operational and maintenance knowledge of fully-automated collection vehicles.

### ***Roles and Responsibilities***

Developing the vehicle requirements for the recycling operation should be the responsibility of the Public Works Department, and more specifically the Sanitation Department. Once the specifications of the vehicles needed are developed, Burns & McDonnell recommends the City's Public Works Department work the City Procurement Office to acquire the most competitive price for the necessary equipment.

### ***Timeline***

A vehicle procurement process can take up to nine months to complete. Burns & McDonnell recommends the City complete the procurement process and receive the fully-automated vehicles one to three months before they are expected to enter service to allow the Sanitation Department sufficient time to test the vehicle and train the driver with the new vehicle. The three fully-automated refuse collection vehicles are expected to enter service in FY 2019.

### ***Cost***

The capital cost of the vehicles required to operate the collection operation are included in the financial analysis provided in Section 2 of this report. Historically, the City has completed vehicle procurements at a minimal cost.

## **4.6.2 Recycling Collection Carts**

Collection carts can typically start being delivered 10 to 12 weeks after the order is placed, followed by another two to six weeks for assembly and delivery to all city residents.

Burns & McDonnell recommends that the City contract with the cart manufacturer to provide for assembly and delivery of the carts. The City would need to provide a secure, paved location where the carts would be staged and stored prior to delivery. The cost for assembly and delivery is typically \$4.00 to \$5.00 per cart, which Burns & McDonnell included in the \$60 per cart purchase cost.

**Cart Purchase:** There will be a need to purchase containers for each existing customer, as well as some additional containers to account for growth. Based on the 2016 customer count of 15,056 and an expected population growth rate of 0.6 percent, Burns & McDonnell recommends the City purchase 16,550 recycling containers to allow for growth and additional containers.

**Quality Cart in a Standard Size:** Burns & McDonnell recommends that the City obtain standard sized carts for recycling services. Having a single size minimizes the actual number of carts that need to be purchased since it eliminates the need to project what size containers customers will select. Burns & McDonnell recommends that the City use a 95-gallon cart for recycling to maximize the volume of material collected from customers and allow the City the flexibility to implement an every-other-week collection schedule.

For residents who require assistance (e.g., senior citizens or ADA), the City could continue to provide the existing walk-in service.

**Use Formal Procurement or an Existing Cooperative Purchase Agreement for Purchase of Carts:**

Procurement options for the City to purchase carts include a City-managed procurement process or use of an existing contract for the purchase of carts. For example, there are at least two governmental cooperative purchasing agreements that allow local governments to purchase materials and services (including carts) based on competitive purchasing processes completed by these organizations.

Burns & McDonnell is familiar with cooperative purchasing agreements for carts through the Houston-Galveston Area Council Buy (HGACBuy)<sup>6</sup> and the National Intergovernmental Purchasing Alliance (National IPA).<sup>7</sup> Cities are able to use cooperative purchasing agreements as a contract mechanism to streamline the procurement process and obtain a competitive price. Burns & McDonnell has typically found that the pricing offered through these cooperative purchasing programs is as, or more, competitive than separate procurement processes. It is important to note that the prices listed in these cooperative agreements represent the maximum prices, and can be negotiated.

***Roles and Responsibilities***

The Public Works Department should be primarily responsible for developing the cart specifications needed for the City. Once the specifications of the carts are developed, Burns & McDonnell recommends the City's Public Works Department work with the City Procurement Office to acquire the most competitive price for the necessary quantity of carts.

***Timeline***

The City should identify the container specifications prior to procuring the necessary carts. If the City chooses to use a cooperative purchasing agreement, Burns & McDonnell expects this effort would take no

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<sup>6</sup> The HGAC program is available to local governments throughout the United States.

<sup>7</sup> The National IPA contract for containers was based on a formal procurement process completed by the City of Tucson, Arizona. This procurement process also included a detailed review of container performance.

more than two months to complete. Alternatively, if the City chooses to procure carts through a formal City-managed procurement process, Burns & McDonnell expects this effort would take between four and six months.

### ***Cost***

There are few direct costs associated with using an existing purchase agreement. The City would need to define its specifications for the cart to ensure whichever cart selected meets the needs of the City. If the City conducts a formal procurement for the carts, Burns & McDonnell estimates the cost for consultant assistance would be \$10,000 - \$15,000 (or less if combined with the fully-automated refuse cart purchase).

### **4.6.3 Recycling Collection Routing**

Each collection route should be planned to collect material in the most efficient manner possible. The City may choose to develop macro-level routes, where only the area to be collected for each route is determined. The City may also use routing software, or other methods, to develop detailed daily routes (also known as micro-level or street-level routing). Burns & McDonnell would expect the routing process to take two to six months, depending on how the City chooses to develop the routes.

### ***Roles and Responsibilities***

Developing the new routes for the recycling operation should be the responsibility of the Public Works Department, more specifically the Sanitation Department. The City can choose to use a macro-level routing process or a micro-level routing process involving more computer based routing software. Depending on the routing process the City chooses to use, the City may want to involve the City Planning Department to procure routing software or hire routing consultants.

### ***Timeline***

Burns & McDonnell recommends the City allow six months to complete the routing process. The City can continue to refine routes after vehicles have been received based on feedback from recycling drivers running practice routes.

### ***Cost***

The cost of route development will vary depending on the routing processed used by the City. Developing macro-level routes would involve little to no additional cost. A micro-level routing approach could require the City to procure routing software and/or consultants to develop routes. The cost of routing software and/or a routing study can range from \$20,000 - \$60,000 (or less if combined with fully-automated refuse collection routing costs).

#### 4.6.4 Hire Recycling Staff

With the automation of the refuse collection program, the City has the option to transfer existing workers to the single-stream recycling program or to hire additional staff from outside the City. Collection staff will need to be identified prior to the start of the collection operation to allow drivers to complete necessary City training and fully-automated collection training once the City purchases the fully-automated vehicles. Burns & McDonnell recommends the City hire collection staff one month to two weeks prior to starting the recycling collection operation. Table 4-3 provides the level of collection staff the City will need to operate an automated single-stream collection program.

**Table 4-3: Estimated Number of Recycling Personnel**

Personnel <sup>1</sup>	Total Required
Driver	2

1. A worker/driver or driver/specialist could provide additional backup support when a regular driver is unavailable.

#### *Roles and Responsibilities*

Hiring recycling drivers should be managed by a combination of the Public Works Department and the City's Human Relations Department. If the City pursues automating the refuse operation, the City can consider transitioning current workers to recycling drivers.

#### *Timeline*

To ensure that recycling drivers have sufficient training operating the fully-automated vehicles and are able to become comfortable with the recycling routes, Burns & McDonnell recommends the City begin hiring staff one to two months prior to the recycling implementation date.

#### *Cost*

Burns & McDonnell anticipates the cost to hire and train the recycling staff needed would be minimal to none.

#### 4.6.5 Recycling Processing

Once recyclables are collected curbside in the City, they must be taken to a facility designed to accept the mixed recyclables. Burns & McDonnell identified the McPherson Area Solid Waste Utility (MASWU) as an entity that would be willing to accept the City's material and transport the material to a Material Recovery Facility (MRF). McPherson, Kansas is about 40 miles south of Salina. The MASWU facility is the closest location where the City's recycling vehicles could deliver its mixed recyclables, which minimizes additional vehicle mileage traveled or the need to contract with an intermediate hauler if the

recyclables were delivered to another processing facility farther afield. Burns & McDonnell recommends the City enter into an intergovernmental agreement with MASWU to process the City's mixed recyclables.

### ***Roles and Responsibilities***

The City Manager and City Attorney will be responsible for negotiating the terms of the intergovernmental agreement with MASWU. Burns & McDonnell recommends the City involve the Public Works Department throughout the development of the intergovernmental agreement as the Public Works Department will ultimately be responsible for carrying out the work according to the agreement.

### ***Timeline***

It is anticipated that negotiating an intergovernmental agreement would take approximately six months. Burns & McDonnell recommends the City begin the negotiating process with MASWU at least six months prior to the single-stream recycling implementation date.

### ***Cost***

Based on discussions with MASWU, Burns & McDonnell determined the processing cost is about \$35 per ton of mixed recyclables.

## **4.7 Public Education**

Public education will be critical to ensure a successful transition to the proposed recycling program. There will be a need to develop a systematic approach to notify residents of the City's plans and how it will impact them. Similar to the refuse collection program, the City will need to emphasize that it is requiring citizens to place their recycling set-outs at the curb instead of the alleyways because of the size of the collection vehicles and narrow alleys. The following section presents specific public education action items that will need to be addressed as a part of the implementation process. There will be a need to effectively communicate to all residents the reasons for the change in collection services, the benefits of this change, how it will affect each resident, and the specific timeline over which implementation of the new collection system will occur. As the City moves toward implementation, there will also be a need to communicate with all residents regarding exactly how to participate in the new collection system. These communications would include details such as:

- Specific collection days and times;
- Rules and restrictions regarding set-outs;
- Lists and descriptions of recyclable and non-recyclable materials; and
- Customer service contact information.

It will be critically important to begin actively educating customers on these specific items well in advance of the new service start date. There are a wide variety of ways to communicate important information. Based on the City's public outreach survey conducted in 2012, the most effective media for the City's residents are:

- Utility bill inserts;
- Newspaper;
- City newsletter;
- Public notices.

There are multiple ways to communicate with the public, but it is important to maximize public education funds to reach the most customers. Burns & McDonnell would like to note the City also has a website that can be updated to reflect programmatic changes. While not all households in the City fall under a Homeowner's Association (HOA), communication with the HOAs is often an effective way to communicate changes to residential neighborhoods. The HOA can then assist in educating its residents as questions arise. The City may consider using a number of different methods for communication with HOAs, including, but not limited to, the following:

- Public meetings;
- In-person visits with HOA groups;
- Phone calls to property managers and HOA officers; and
- Direct mailings.

### ***Roles and Responsibilities***

Public education material should be developed in cooperation with the Public Works Department and City marketing and public relations staff. It is important that materials are accurate, easily understood by residents and consistent with City marketing initiatives.

### ***Timeline***

Outreach to all residents regarding the upcoming collection changes will need to begin as soon as an official decision is reached by the City Commission to move forward with implementation of the proposed recycling program. However, the major outreach effort to educate residents on the specifics of participation in the program will need to begin in earnest approximately three months prior to the start of services.

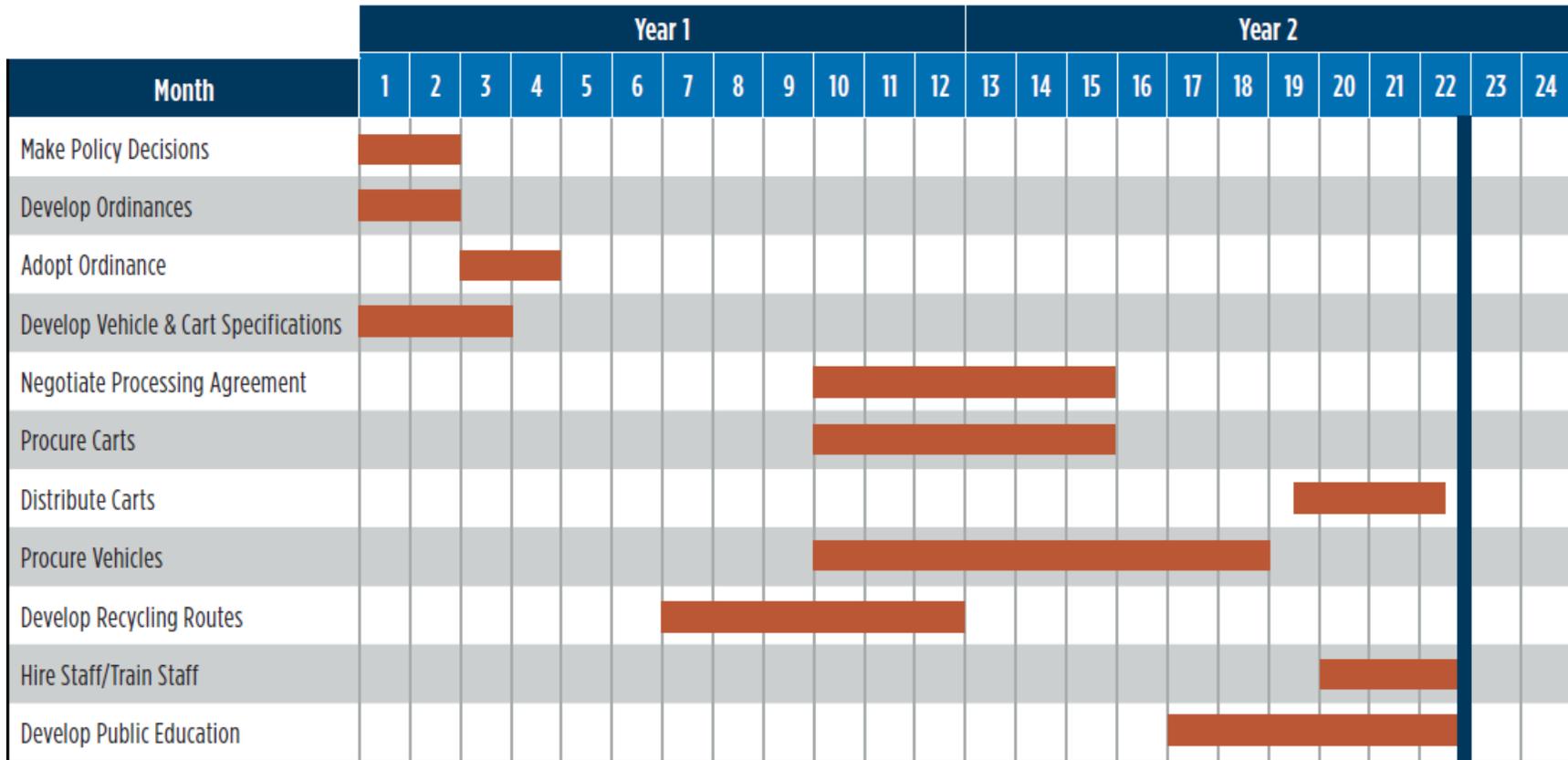
***Costs***

In Section 2, Burns & McDonnell discussed the annual cost of \$60,000 per year for FY 2019 and FY 2020 and then \$20,000 per year beginning in FY 2021 to fund recycling public education and the salary of the education officer. Burns & McDonnell anticipates the City would need to allocate more funds towards public education in the first years for the development and distribution of public education materials. Burns & McDonnell anticipates that the City could reduce its public education cost to \$20,000 per year in FY 2021 as residents become familiar with single-stream recycling. This cost has been included in the financial analysis in Section 2. The public education cost is included in the monthly residential rate.

**4.8 Summary of Recycling Implementation Schedule**

The schedule shown in Figure 4-3 summarizes the timeline discussed in the recycling implementation sections. This summary timeline assumes that the new single-stream recycling operation will be rolled out all at one time. The schedule provides the City with an understanding of how long each implementation step will take before the recycling service can begin. Assuming some tasks can overlap, Burns & McDonnell estimates a minimum timeline of 18 months after the City ordinance is updated.

**Figure 4-3: Recycling Implementation Timeline**



**LEGEND**

█ Curbside Recycling Start Date

## 4.9 Potential Funding Sources

Government incentives, whether at the federal, state, or local levels, can potentially provide financial benefits for a variety of solid waste and recycling projects. These funding sources are often provided on a competitive basis, and are not specific to municipal refuse and recycling collection programs. If a project can secure additional funding, it will typically allow for a reduction in the capital and/or operating costs, which could reduce the household rate charged to residents.

### 4.9.1 Private Funding Sources

While there are various potential private funding sources, this section describes the Recycling Partnership and Closed Loop Fund.

#### The Recycling Partnership

The Recycling Partnership (Partnership), formerly the Curbside Value Partnership, is an industry-funded national recycling nonprofit with the goal to improve curbside residential recycling in the United States. The Partnership provides resources for communities (4,000 or more households) starting programs with recycling carts or switching from bins to carts. To accelerate the local level adoption of recycling best management practices, the Partnership uses highly leveraged grants coupled with technical assistance. The Partnership published a notice in February that it plans to release its annual cart grant announcement for 2017.

For 2016, the Partnership grants offered were for:

- Cart procurement: \$7.00 per cart delivered up to \$500,000
- Education and outreach implementation: \$1.00 per household up to \$50,000
- Access to technical assistance and the CARTs campaign materials valued at \$139,000

**Example:** In 2015, the Recycling Partnership awarded a grant for residential recycling carts to the City of Santa Fe. The grant dollars assisted Santa Fe with purchasing new recycling carts. Additionally, Santa Fe received assistance with a customized public education campaign and with technical planning that supported the cart deliveries to its 29,000 households.

#### The Closed Loop Fund

The Closed Loop Fund (CLF) was created to increase recycling rates and is funded by consumer goods companies and retailers. The CLF provides zero interest loans to municipalities and low interest loans to private companies. The goal for CLF provides zero interest loans to municipalities and low interest loans

to private companies. The goal for CLF is to invest \$100 million in recycling infrastructure from 2015 to 2019.

**Example:** The Closed Loop Fund is investing in conversion from dual to single stream recycling collection systems in Quad Cities, Iowa, and Portage County, Ohio, both important Midwest markets for recycling. The loan will aid in the purchasing of new recycling carts and trucks, making it easier for citizens to recycle and significantly increase recycling rates.

#### 4.9.2 State Grant/Funding Programs

Burns & McDonnell reviewed grant/funding programs available from the Kansas Department of Health and Environment (KDHE) on the Bureau of Waste Management's Waste Reduction, Public Education, and Grants website.<sup>8</sup> Kansas provides a variety of grants including Waste Tire Grants, Green School Grants, and Household Hazardous Waste Grants. Currently, there are no grant opportunities open that would be available to the City's proposed fully-automated refuse and single-stream recycling programs.

#### 4.9.3 Federal Grant/Funding Programs

Burns & McDonnell reviewed grant/funding programs available from the U.S. Government published online <http://www.grants.gov>, including departments such as the U.S. Environmental Protection Agency.<sup>9</sup> Currently, there are no grant opportunities open that would be available to the City's proposed fully-automated refuse and single-stream recycling programs.

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<sup>8</sup> [http://www.kdheks.gov/waste/about\\_grants.html](http://www.kdheks.gov/waste/about_grants.html)

<sup>9</sup> <http://www.grants.gov>