

# **Solid Waste and Recycling Collection System Automation Options**

## **Problems with the Current System**

Our current manual solid waste and semi-automated recycling collection systems are injury prone, antiquated and labor intensive. Our employees work in traffic; they are subject to back and joint injuries, repetitive motion injuries, slips and falls; and they are exposed to infectious diseases, sharp objects, flying objects, excessive heat, extreme cold, rain, snow and ice. All too often, our household waste collection workers suffer serious, potentially disabling injuries. On average, each of our solid waste collection workers lifts and loads over 8 tons of refuse per day; and each of our solid waste and recycling collectors steps in and out of the truck cab, or on and off the rear running board between 400 and 600 times a day. Nationally, solid waste and recycling collectors are three times more likely to be killed on the job than police officers or fire fighters.

The city's narrow alleys (typically 15' or less in width, and serving about 20% of our customers) have low hanging tree branches, over-head wires, tight corners and numerous side obstructions that make it impossible to serve with fully automated refuse collection equipment. These conditions, along with the very poor pavement conditions of a large portion of our alleys present serious safety and operational challenges for our workers operating our current fleet of rear-loading refuse trucks.

Additionally, problems associated with the use of non-standard, often uncovered resident-owned trash containers, and set-outs of uncontained wastes and trash bags have persisted for over 100 years. Cans can tip and be blown over, and animals often rip into trash bags, creating litter and disease vectors. Rain and snow can enter uncovered containers increasing the weight of collected wastes, resulting in increased disposal costs.

## If We Do Nothing or Implement Changes Poorly

If we don't automate our household waste collection systems to the maximum extent possible, our workers will continue to be at risk of injury, and be exposed to potentially deadly hazards.

Additionally, we won't realize worker and equipment efficiency improvements that will allow us to restore some of the pavement maintenance operations that have been cut-back over the last 14 years due to workforce reductions and budget shortfalls.

If we implement system changes poorly by not providing adequate bulky and yard waste collection options to our customers, incidents of illegal dumping will likely increase.

## Program Goals

1. Improve worker safety by eliminating their exposure to hazards to the maximum extent practicable.
  - Do so without creating excessive burdens on city residents.
2. Increase worker and equipment productivity.
  - Reassign available workers to the Street Maintenance Division
3. Improve solid waste containment by using carts with hinged covers.
  - Improve containment of debris and potentially airborne litter
  - Minimize the amount of rain and snow entering the waste stream reducing landfill disposal costs and preventing the formation of ice in refuse containers.
  - Prevent animal intrusions into refuse containers, and control odor and disease vectors.
4. Provide one adequately-sized solid waste cart to each residence and business served, at no direct cost to the customer
5. Allow customers to rent/procure additional carts
6. Provide city residents adequate bulky waste and yard waste collection and disposal options
  - Prevent increased incidents of illegal dumping.

## **Option 1:** semi-automate solid waste collections city-wide

### Significant features:

- No significant changes to the Recycling collection system
- All collections remain at present locations
- Uses current fleet of rear-loading refuse trucks with retrofit of dual “tippers”
  - Operator exits truck at each stop and wheels cart to the rear of the vehicle where it is mechanically dump into the truck.
- Regularly scheduled collections limited to waste that can be contained in cart
  - Will require restoration of holiday collections
- Requires separate bulky waste handling system
- Can be fully implemented within current capital budget in summer of 2017

### Manpower & Equipment requirements:

#### Solid Waste Collections:

7 routes manned by 1 driver each

7 rear-loaders with dual “tippers” (\$210,000 each)

#### Recycling Collections:

5 routes manned by 1 driver each

5 rear-loaders with dual “tippers” (\$210,000 each)

#### Bulky Waste handling

2 collection workers on average (estimated), can be flexed to meet demand

2 seasonal workers to man drop-off site(s)

1 rear-loader supplemented with existing 5 yard dump truck(s) and front-end loader(s) as needed

Spare Equipment: No change from current fleet

### Advantages:

- Least disruptive option:
  - Minimal customer impacts
  - Relatively easy to implement
- Significant worker safety improvements
  - Eliminates the majority of the hazards exposing workers to the most common types of injuries
- Can be implemented city-wide in the summer of 2017
- Significant efficiency improvements: anticipate reassigning four workers to the Street Maintenance Division to create a joint mastic application crew

## Disadvantages:

- Some worker safety hazards remain
  - Hazards inherent with alley collections remain
  - Workers are exposed to traffic and inclement weather
  - Workers subject to slips, trips and falls; and repetitive motion injuries associated with moving carts and entering/exiting cab
- Requires two more workers and trucks than the fully-automated option

**Option 2:** Fully automate solid waste & recycling systems with all collections performed at curbside (no alley collections)

**Significant features:**

- Fully automated side-loaders used city-wide for all collections
  - Driver remains in cab and controls collection arm via joy-stick
- Regularly scheduled collections limited to waste that can be contained in cart
  - Will require restoration of holiday collections
- Requires separate bulky waste handling system as in Option 1
- Implementation schedule within current capital budget: 1/2 of city in summer of 2017; 1/4 in fall of 2018; and 1/4 in fall of 2019

**Manpower & Equipment required to collect all stops at curbside:**

**Solid Waste Collections:**

6 routes manned by 1 driver each

6 fully automated side-loaders (\$252,000 each)

**Recycling Collections:**

4 routes manned by 1 driver each

4 fully automated side-loaders (\$252,000 each)

**Bulky Waste handling**

2 collection workers on average, can be flexed to meet demand

2 seasonal workers to man drop-off site(s)

1 rear-loader supplemented with 5 yard dump truck and front-end loader as needed

Spare Equipment: 2 fully automated side-loaders (\$252,000 each)

**Advantages over Option 1:**

- Safest option, eliminating almost all hazard exposure
- Most efficient option allowing six workers to be reassigned to Street Maintenance Division
  - However, the two additional workers reassigned to the Street Maintenance Division beyond Option 1 aren't sufficient to form a separate pavement maintenance crew

**Disadvantages over Option 1:**

- Most disruptive option:
  - Collections can't be performed in alleys requiring refuse handling procedure changes for about 20% of our customers
  - Major changes required in the configuration/operation of the Public Works Field Office Complex

- Solid Waste Garage won't accommodate taller trucks requiring use of Street Maintenance Garage for heated overnight storage, splitting Street Maintenance Division vehicle storage
- New truck configuration can't be used for current leaf collection system requiring changes to that system
- Requires special placement of carts creating possible conflicts with parked cars
- Equipment Maintenance Garage will need additional mechanic training and spare parts
- Equipment requires more frequent periodic maintenance than current fleet
- Taller trucks may conflict with tree limbs
- Requires three years to implement with \$500,000 increase in 2017 capital budget
- Left sides of one-way streets and 2000-2200 blocks of Kinzie will require semi-automated collection (430 locations total)

**Option Considered, But Rejected:** semi-automating alley collections and fully automating street collections

- Presents almost all of the disadvantages and implementation challenges of Option 2 without eliminating the hazards inherent with alley collections

**Recommendation to Public Works and Services Committee:**  
Choose preferred option and recommend approval to the Common Council

## Option 1 - CIP Budget - Rear Loader Solid Waste System

	Current CIP								Proposed CIP Revisions							
	2015 & 2016		2017		2018		2019		2015 & 2016		2017		2018		2019	
Refuse Trucks (rear-loaders)	\$ 980,500	4 trucks	\$ 504,500	2 trucks	\$ 514,500	2 trucks	\$ 525,500	2 trucks	\$ 1,050,000	5 trucks	\$ -		\$ 840,000	4 trucks	\$ 420,000	2 trucks
Carts	\$ 500,000	9,000 carts	\$ 600,000	9,000 carts	\$ 600,000	9,000 carts	\$ -	no carts	\$ -	defer \$430k to 2017	\$ 1,535,000	27,000 carts	\$ -		\$ -	
<b>Yearly Totals</b>	\$ 1,480,500		\$ 1,104,500		\$ 1,114,500		\$ 525,500		\$ 1,050,000		\$ 1,535,000		\$ 840,000		\$ 420,000	
<b>Total CIP</b>	\$ 4,225,000								<b>Total CIP</b> \$ 3,845,000							

## Option 2 - CIP Budget - Side Loader Solid Waste System

	Current CIP								Proposed CIP Revisions							
	2015 & 2016		2017		2018		2019		2015 & 2016		2017		2018		2019	
Refuse Trucks (side-loaders)	\$ 980,500	4 trucks	\$ 504,500	2 trucks	\$ 514,500	2 trucks	\$ 525,500	2 trucks	\$ 1,512,000	6 trucks	\$ 510,000	2 trucks	\$ 510,000	2 trucks	\$ 260,000	1 truck
Carts	\$ 500,000	9,000 carts	\$ 600,000	9,000 carts	\$ 600,000	9,000 carts	\$ -	no carts	\$ -	use \$500k for trucks	\$ 1,000,000	18,000 carts	\$ 250,000	4,500 carts	\$ 250,000	4,500 carts
<b>Yearly Totals</b>	\$ 1,480,500		\$ 1,104,500		\$ 1,114,500		\$ 525,500		\$ 1,512,000		\$ 1,510,000		\$ 760,000		\$ 510,000	
<b>Total CIP</b>	\$ 4,225,000								<b>Total CIP</b> \$ 4,292,000							

<b>Total CIP Difference: Option 2 - Option 1</b>	\$ -	<b>Total CIP Difference: Option 2 - Option 1</b>	\$ 447,000
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