

2020 Assessment and Redesign of Residential Solid Waste and Recycling System



Final Report

Prepared by



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TABLE OF CONTENTS

- I. INTRODUCTION AND EXECUTIVE SUMMARY 1**
- II. CURRENT SOLID WASTE PROGRAM ANALYSIS 5**
 - A. Collection Metrics and Finances 5
 - B. Division Finances.....11
 - C. Collection Route Performance11
 - D. Recycling Audits14
 - E. Bulky Waste Collection21
 - F. Yard Waste and Organics28
 - G. Special Collections28
 - H. Current KPI Dashboard30
 - I. Staffing31
 - J. Equipment and Maintenance34
 - K. Education, Outreach, and Public Communications39
 - L. Customer Service39
 - M. Illegal Dumping and Enforcement41
 - N. City Ordinances42
 - O. Community Engagement43
 - P. City Engagement49
- III. COMPARABLE PROGRAMS, MARKETS, & TECHNOLOGIES.....78**
 - A. Comparable Community Survey Summary78
 - B. Recycle Materials Market Analysis87
 - C. Regional MRF Infrastructure99
 - D. Public Recycling Drop-Off Infrastructure106
 - E. Household Rate Analysis.....107
 - F. Recyclables Processing Analysis.....109
- IV. COLLECTION PROGRAM OPTIONS AND FUTURE KPIS.....111**
 - A. Weekly Trash.....111
 - B. Weekly Recycle111
 - C. Bi-Weekly Recycle.....112
 - D. Opt-In Recycling113
 - E. Recyclable Material Acceptance114
 - F. Monthly Bulk – with Appointments117
 - G. Bi-Weekly Bulk – with Appointments.....118
 - H. Weekly Bulk Collection with Appointments119
 - I. Weekly Bulk without Appointments119
 - J. Expanded Drop-offs.....120
 - K. Super Center Drop-offs.....121
 - L. Regional Drop-off System.....122
 - M. Weekly Yard Waste Collection.....123
 - N. Appointment-Based Yard Waste Collection124
 - O. Station-Based Special Material Collection125
 - P. Collection Options Summary126
 - Q. Alternate Solid Waste Management Technologies.....130
- V. CONCLUSIONS AND RECOMMENDATIONS144**
 - A. Collection Program Recommendations.....145
 - B. Best Management Practice Recommendations148
- VI. CITY SUMMARY OF APPROVED RECOMMENDATIONS176**
 - A. Collection Program Recommendations.....176
 - B. Best Management Practices Recommendations.....177

C. Next Steps.....178

Appendix A Recycle Cart Audit Pictures
Appendix B Recycle Stream at Transfer Station Audit Pictures
Appendix C Residential Focus Group Engagement Report
Appendix D Blank Survey Form
Appendix E Survey Summary
Appendix F Unverified Processors and End Users
Appendix G Public Drop-off Locations
Appendix H Sustainability Cleveland Residential Survey Data



I. INTRODUCTION AND EXECUTIVE SUMMARY

The City of Cleveland (City) commissioned this report to evaluate the solid waste and recyclables collection program operated by the Waste Collection Department of the City. The core focus of the Assessment and Redesign of Residential Solid Waste and Recycling System Study (Study) was to fully understand how the City currently operates the program and then develop specific recommendations to improve the program. The City hired GT Environmental, Inc. (GT) to conduct the Study. GT worked with two sub-contractors on parts of the Study including the Maria Heckman Group (MBE/FBE/CSB) for certain field work data collection and Illuminology for the residential focus group process.

The Study includes the following specific tasks that were designed to understand how the City operates and then provide a pathway to develop specific recommendations for improvement:

Task 1 – Information Request

This task included the necessary data and information requests from the City to fully understand how current and past operations occur.

Task 2 – Kick-Off Meeting

A project kick-off meeting was conducted with City management and staff to review the scope of work, information request and goals/objectives of the project. Discussion also included pre-planning for the field work conducted later in the following tasks.

Task 3 – Current Programs and Services Review

A complete review of the Division of Waste Collection operations and programs was conducted for calendar year 2019. Additional historical review was also conducted. The objective of this task was to define how the City currently operated its main programs such as trash, recycle and bulk collection, special materials, and yard waste as well as enforcement, education/awareness, fleet management, staff management, ordinances, and other activities.

Task 4 – Recycle Audits

This task involved a combination of reviewing current recycling practices by residents through cart inspections and visual inspection of recycle truck loads. In addition, a desk top audit was conducted by collecting recycle audit data and information from communities across the United States.



Task 5 – Collection Route Performance

This task involved the evaluation of how trash, recycle and bulk routes are currently operated by the City. Targeted routes were followed to collect key performance and time motion data. In addition, transfer station data was evaluated to understand route efficiencies based on time stamp data from when trucks leave and arrive at the Ridge Road transfer station.

Task 6 – Bulky Waste Collection Program Analysis

The current bulk program was evaluated in this task to understand current and past operations.

Task 7 – Auxiliary Services Review

This task included evaluating current programs for special materials such as household hazardous waste, scrap tires, electronic waste, and yard waste.

Task 8 – Current KPIs

Key performance indicators are a way to understand how individual or overall program performance. KPIs can be compared to other cities or from the City as it improves its programs over time. This section defined the current KPIs for the City for 2019, and an interactive dashboard was created for management to track ongoing progress.

Task 9 – Strategic Planning Session

This task included conducting a strengths-weakness-opportunities-threats analysis with City management, staff, targeted departments, Council leadership and Council as a whole, targeted stakeholders and the Cuyahoga County Solid Waste Management District. The feedback obtained through this process was included in opportunities for improvement and recommendations.

Task 10 – Residential Engagement Process

This task included a focus group process with City residents to obtain their feedback on various recycling and other service-related issues. This section also includes a targeted survey conducted by Sustainable Cleveland.

Task 11 – Recycle Market Analysis and Community Rate Analysis

This task included a review of the commodity markets for common recyclables, the average service charge for residential waste collection services and material recovery processing charges.



Task 12 – Comparable Community Survey and Meetings

This task involved a detailed survey sent to comparable communities to Cleveland from across the United States. The targeted communities were obtained, in part, from the Recycling Partnership and other sources. Various KPIs were collected for comparison to Cleveland.

Task 13 – Collection Program Options

This section presented numerous collection programs and frequency of collection options for consideration of the City. A pro/con analysis was conducted along with financial projections.

Task 14 - Alternative Solid Waste Management Technologies Review

This task involved a summative review of alternate technologies utilized for the management of solid waste.

Conclusions and Recommendations

This report developed conclusions, options for collection services with three unique pathways for service delivery and 90 best management practice recommendations. The pathway options are listed below.

Table 1. Summary of Options

Waste Stream	High Diversion/ High Investment	Mid-Level/ Low Investment	Reset & Re-Build/ Low Investment
Curbside Trash	Weekly Trash	Weekly Trash	Weekly Trash
Curbside Recycle	Weekly Recycle	Bi-Weekly Recycle	Opt-in Recycle or Targeted Recycle
Curbside Bulk	Appointment-Based Bulk – collected by area during the month	Appointment-Based Bi-Weekly Bulk	Appointment-Based Weekly Bulk
Drop-off Recycle	Un-Staffed Recycling Drop-Offs (2)	Super Center Recycling Drop-Offs (staffed)	Super Center Recycling Drop-Offs (staffed)
Curbside Yard Waste	Fall Leaves Curbside for All Areas Seasonal Curbside Weekly Yard Waste and Optional Food Waste in Future	Fall Leaves Curbside for High Generating Areas	Fall Leaves Curbside for High Generating Areas
Drop-off Yard Waste	No Yard Waste Drop-off	Yard Waste Drop-off Included in Super Centers	Yard Waste Drop-off Included in Super Centers



Waste Stream	High Diversion/ High Investment	Mid-Level/ Low Investment	Reset & Re-Build/ Low Investment
Drop-off Special Materials	Station Based Special Materials Collection	Super Center Collection for Special Materials	Super Center Collection for Special Materials
Other Drop-offs	Regional Drop-Off System (City Not the Operator)	Regional Drop-Off System (City Not the Operator)	Regional Drop-Off System (City Not the Operator)

A financial analysis was conducted for each pathway and compared to the current operating budget of the City.

Finally, best management practice recommendations were developed for the following categories.

Table 2. Number of Recommendations

Category	Number of Recommendations
Collection and Routing	3
Recycling Program	8
Commercial Collection	2
Bulky Waste Collection	7
Yard Waste and Organics	2
Special Collections	2
Staffing	11
Equipment and Maintenance	8
Education, Outreach, and Public Communications	22
Customer Service	4
Illegal Dumping and Enforcement	5
City Ordinances	8
Safety	5
Administration	3

All pathway options and best management practice recommendations require the approval from the Administration before the implementation plan can be developed.



II. CURRENT SOLID WASTE PROGRAM ANALYSIS

The Division of Waste Collection operates out of the 3 stations in the City to maximize travel efficiency to local routes. Each station houses collection equipment and the necessary staff for the designated trash and recycle routes. The following is the list of stations:

- Carr Center, Cleveland Waste Collection: 5600 Carnegie, Cleveland 44103
- Ridge Road Transfer Station: 3727 Ridge Rd, Cleveland, OH 44144
- Glenville Station: 10801 Leuer Ave. (Building # 2) Cleveland, Ohio 44108

The Ridge Road Station is also the location of the City’s transfer station and maintenance department for all equipment operated by the Division of Waste Collection. The following sections summarize the various aspects of the current operation.

A. COLLECTION METRICS AND FINANCES

1. Trash and Recycling Collection Overview

The following table summarizes the key aspects of the waste collection program for the City:

Table 3. Trash vs. Recycling Collection Review

	Trash	Recycling
Collection Method	Automated	Automated
Container Size	96-gallon black or grey cart	64-gallon blue cart
Rate	\$8.75/Month	Included in Trash rate
Homestead Rate	50% Discount	Included in Trash rate
Extra Cart Cost	\$50/cart	\$50/cart
Residential Customers	155,000	155,000
Routes	190	139

a. *Trash Collection*

The Division of Waste Collection collects trash by 3 main methods: automated semi-automated or manual based on truck availability, route needs, vehicles on streets, and out-of-cart materials. Many trash routes are serviced by Heil Multipack trucks which allow for automated collection and rear load manual or semi-automated collection on one truck. The automated function of the Heil allows the driver to collect a trash cart by the automated arm lifting the cart contents into the top of the truck and then service out of

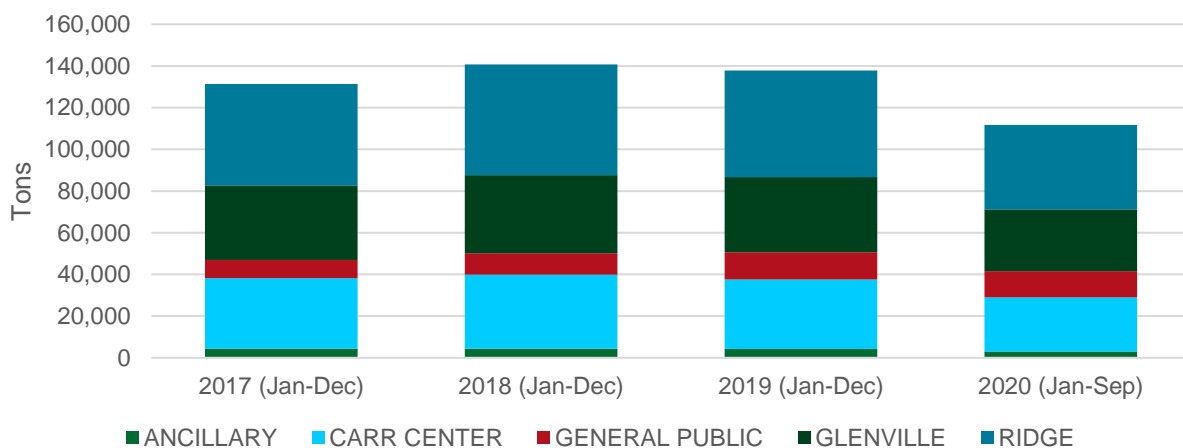


cart materials or bulk in the rear load area of the truck. Additional helpers can also collect out-of-cart materials to be placed in the rear portion of the truck. Parked vehicles can make it difficult to collect via automated and adds time for a helper to move a cart for the automated arm to service a cart. During 2020, special COVID procedures were employed that included additional helpers on some routes.



The following figure depicts the amount of trash collected from each station during 2017-2020 as well as from the public drop-off at the Ridge Road Transfer Station.

Figure 1. Trash Disposed at Ridge Road Transfer Station from Cleveland’s Curbside Collection Program 2017-2020



*Ancillary Trucks collect waste on specific trips not collected during routes from Carr Center, Glenville Station, or Ridge Road depots.

b. Curbside Recycling Collection

The Division of Waste Collection collects recyclables by 2 main methods: semi-automated or automated based on truck availability, route needs, vehicles on streets, and out-of-cart materials. Routes known to have fewer vehicles on the streets are sent with an automated truck with a driver and no helpers. If a cart needs to be moved for the arm, the driver must get out of the truck to move the carts and get back in to service the cart.





Recyclable Materials Accepted:

- Glass
- Paper & Boxes
- Newspaper
- Cartons
- Cans
- Paper
- Plastic Jugs & Bottles

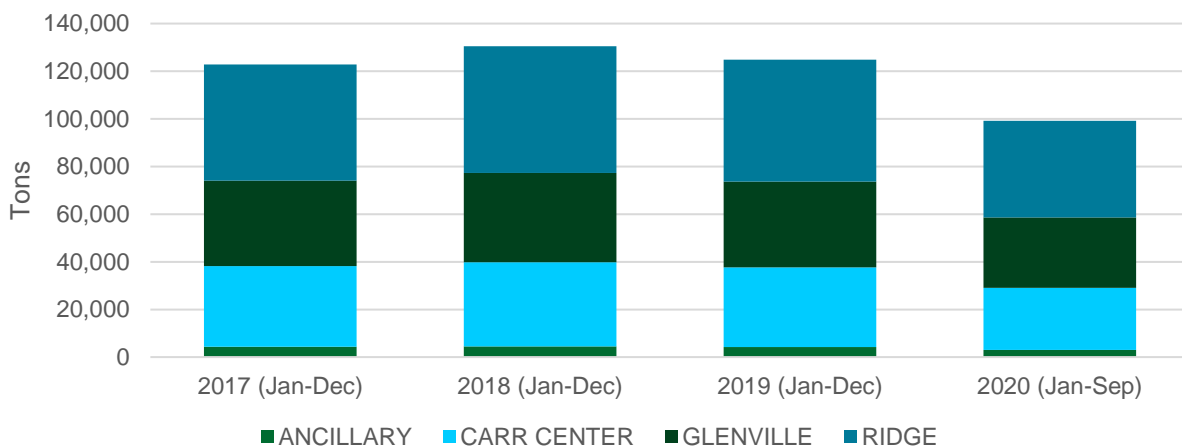
Figure 2. Acceptable Recyclables Found on “Make Cleveland Green” Flyer

Please place the following items in city-issued blue recycling roll carts



The following figure depicts the amount of recyclables collected from each station during 2017-2020 at the Ridge Road Transfer Station.

Figure 3. Recycle Deposited at Ridge Road Transfer Station from Cleveland’s Curbside Collection Program 2017-2020

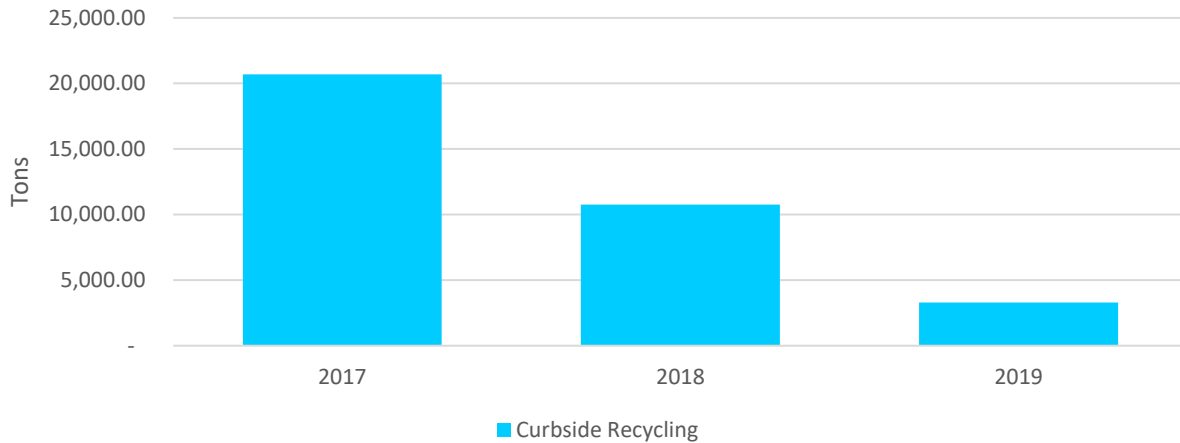


*Ancillary Trucks collect waste on specific trips not collected during routes from Carr Center, Glenville Station, or Ridge Road depots.



Material tons collected from the recycling carts at the curb and delivered to the Ridge Road Transfer Station and the tons reported to the Cuyahoga County Solid Waste District differ. The following figure shows the reported tonnages.

Figure 4. Recycle Reported to Cuyahoga County Solid Waste District for Curbside Collection Program 2017-2019



c. Drop-Off Recycling Collection

The Division of Waste Collection operates two unstaffed recycling drop-off locations for residents to deliver recyclable materials. The City services the front load style boxes from each site and delivers the contents to the Ridge Road Transfer Station. The acceptable materials include:

- Glass
- Paper & Boxes
- Newspaper
- Cartons
- Cans
- Paper
- Plastic Jugs & Bottles



The recycling drop-off locations include:

- East: Recycling containers are located at the corner of East 55th Street and Euclid Avenue for drop-off 24 hours a day.
- West: The Ridge Transfer Station is located at 3727 Ridge Rd. and is open Monday-Saturday from 9am to 3pm

The following figures summarizes the tons of collected recyclables from both drop-off sites for the period 2017-2020 and the drop-off locations:



Figure 5. Recycle Deposited at Ridge Road Transfer Station from Cleveland’s Drop-off Program 2017-2020

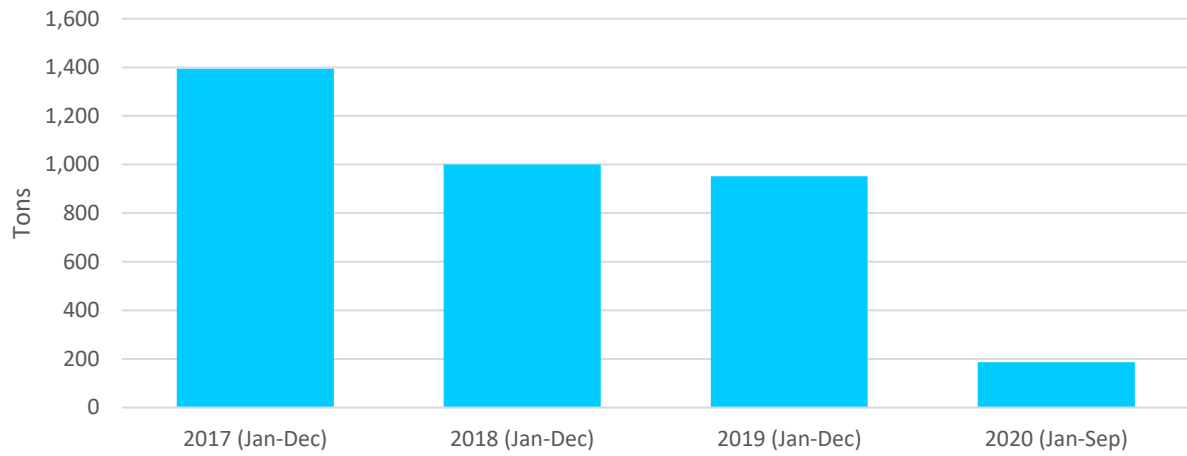
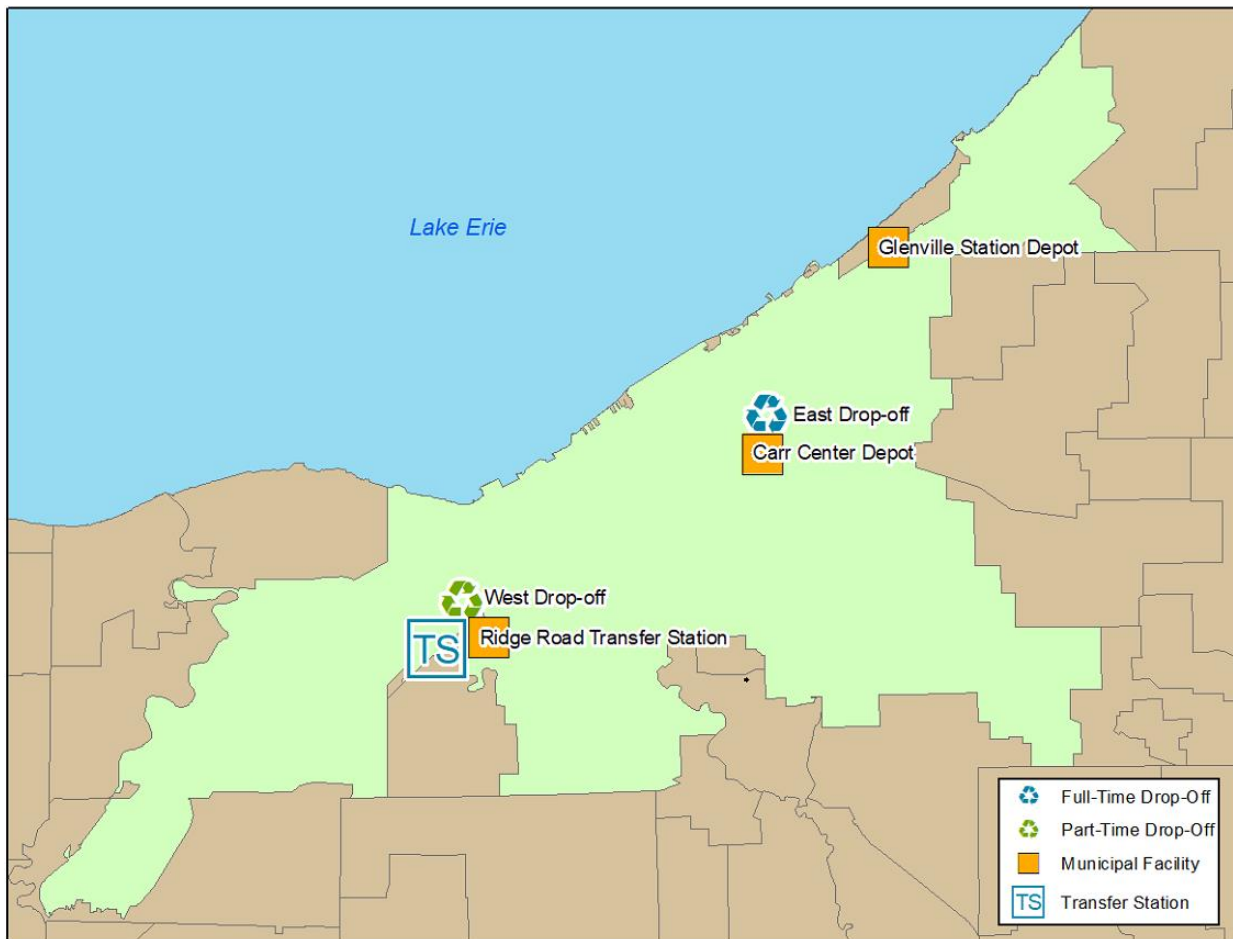


Figure 6. Division of Waste Collection Facilities and Public Recycling Drop-off Locations





d. City Education and Outreach

The Division of Waste Collection communicates with residents on how to participate in the waste and recycling programs through the following mechanisms:

- Information on website:
 - Make Cleveland Greener Flyer
 - Service Advisory Guide
 - FAQs: Waste Collection in the City of Cleveland
 - Cuyahoga Solid Waste District Website
- City Ordinances: Chapter 551
- Residential Waste Collection Service Fee Information Mailer

The following figure shows one of the communication flyers used by the Division of Waste Collection:

Figure 7. 5 Things You Should Know, Found on “Make Cleveland Green” Flyer



Residents can call the City’s 311 hotline to ask questions or report a missed collection. Some residents call the mayor’s action line which must get rerouted and sent to the correct supervisors. The department does not have a call center that specifically receives waste collection calls. These customer service options are discussed in greater detail later in this report.



B. DIVISION FINANCES

The following table summarizes the Division of Waste Collection financial status for calendar year 2019:

Table 4. Division of Waste Collection 2019 Revenues and Expenditures

2019 (Unaudited)	
Revenues	
Service Rate Revenues	\$15,119,294
Miscellaneous	\$145,720
Total Incoming Revenues	\$15,265,014
Subsidy Revenues*	\$15,176,823
Expenditures	
Salaries and Wages	\$11,733,837
Benefits	\$4,966,990
Other Training & Professional Dues	\$8,515
Utilities	\$615,463
Contractual Services	\$8,414,504
Materials & Supplies	\$37,503
Maintenance	\$42,975
Claims, Refunds, Maintenance	\$0
Interdepartmental Service Charges	\$4,622,050
Total Revenues	\$30,441,837

*Remaining revenues needed to cover expenditures.

The City charges each residential unit fee of \$8.75 per month. This fee is collected monthly from the utility bills that also include sewer and water fees. The fee charged for Waste Collection is roughly half the amount needed to cover the cost of the overall Division of Waste Collection budget. The subsidy revenue depicted in the table above comes from the City’s general fund.

C. COLLECTION ROUTE PERFORMANCE

Part of the scope of work for this Study was to gather collection route performance data to better understand how the City currently operates. Performance data was collected by GT during the City’s bulk collection week (September 8, 2020 – September 12, 2020).

GT designed a system and process which was first presented to and approved by the City for the data collection. A specific procedure was developed during this process. The original process, because of COVID concerns, was to ride along with route supervisors behind either trash or recycle collection vehicles to obtain the data. This process was



revised during the field work week to include GT staff riding inside the trash or recycle truck to collect the data.

Teams were stationed at each station (Carr Center, Ridge Road Transfer Station, and Glenville) and were assigned either a trash or recycle route to follow for the day:

- Carr Center, Cleveland Waste Collection: 5600 Carnegie, Cleveland 44103
- Ridge Road Transfer Station: 3727 Ridge Rd, Cleveland, OH 44144
- Glenville Station: 10801 Leuer Ave. (Building # 2) Cleveland, Ohio 44108

Information and data that was collected included the following:

- Start and stop times and mileage for route
- Setouts for trash or recycle
- Time and distance measuring for route performance
- Tons collected
- Other data and information as needed

The following table depicts the trash or recycle routes followed each day:

Table 5. Number of Trucks Followed September 8, 2020 – September 12, 2020

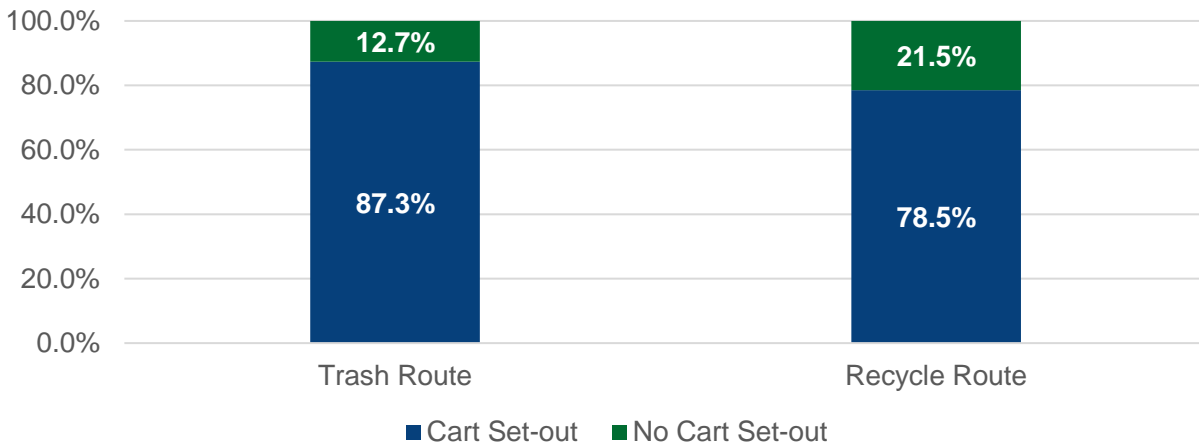
Station	Carr Center		Ridge Road		Glenville Station	
	Trash	Recycle	Trash	Recycle	Trash	Recycle
9/8/2020	1	2	1	1	1	2
9/9/2020	1	2	1	2	1	2
9/10/2020	1	1	1	2	0	1
9/11/2020	1	2	1	2	1	2
9/12/2020	1	2	2	1	0	2

The first 2 days of data collection, staff were partnered with a foreman at the stations and sat as passenger in the foreman’s pickup truck. This caused some gaps in data due to the foreman’s need to attend to other daily duties that the foreman needed to complete. During the last 3 days of data collection, staff were placed in the cab of the collection truck. This limited the type of truck and route that was followed. For example, some trucks have a driver and 2 helpers which did not provide room for staff to observe the routes. Due to lack of consistency during the first 2 days, data from September 10, 2020 – September 12, 2020 are summarized below to present an average.

The following figure depicts the setout rates for the routes followed by material collected:



Figure 8. Cart Setout Rates (September 10, 2020 – September 12, 2020)

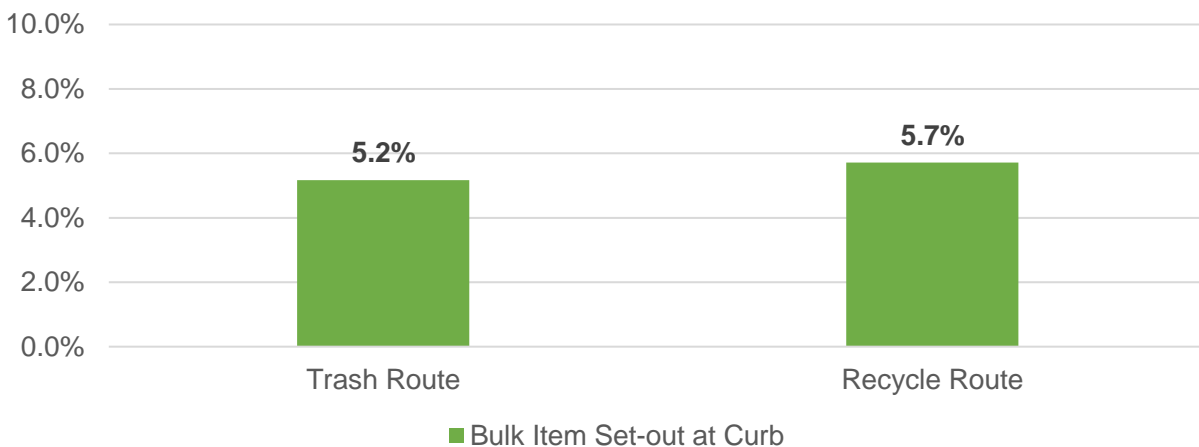


Recycling cart setout rates collected during GT’s analysis in Figure 8 above are higher than normal. The Recycling Partnership surveyed for an average participation rate and found approximately 72% rate across curbside programs of all types. The data collected by GT which shows a high setout rate for recycle may be due to common abuse of the recycling cart by residents using it as another container for trash.

Bulk setout rates represent approximately 5%-6% of all possible setouts:

$$\text{Bulk setouts} \div (\text{cart setouts} + \text{no cart setouts for trash})$$

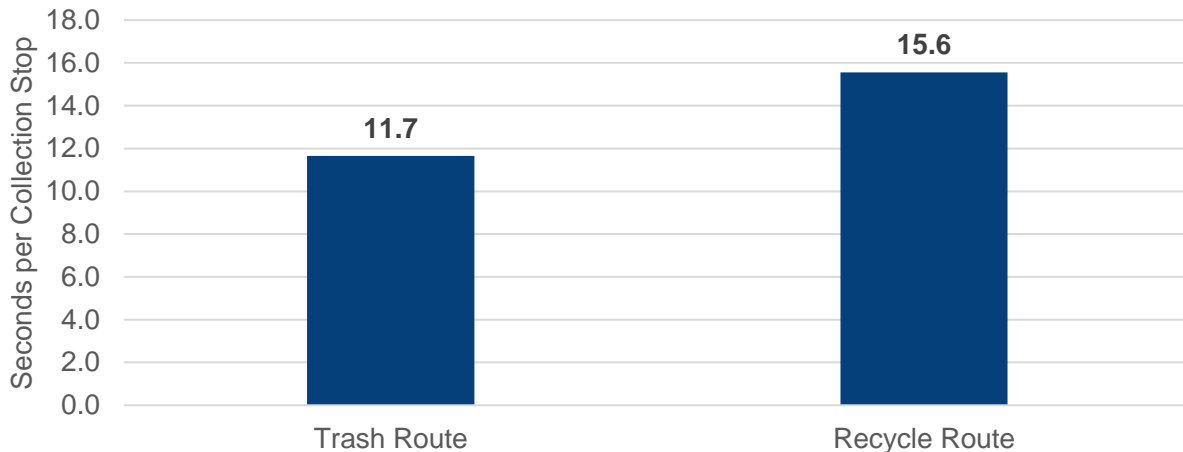
Figure 9. Bulk Setout Rates (September 10, 2020 – September 12, 2020)



The time it takes to service a stop was sampled. A sample was taken on 30 consecutive stops during a route. This provided an average number of seconds per collection stop for both trash and recycle routes. These timed samples begin when the truck stops and ends when the truck starts moving again after the collection. More trash routes have multiple

helpers which may contribute to the lower number of seconds per stop compared to recycling collections.

**Figure 10. Sampled Seconds per Collection Stop
(September 10, 2020 – September 12, 2020)**



Automated collection programs typically take 8 to 15 seconds per stop. If more routes were automated, the average number of seconds it takes to complete a collection would decrease. Many routes in Cleveland are not able to be completely automated due to cars parked in the street blocking the cart and additional waste set outside the collection cart. Under current operations, this often gets picked up by hand.

D. RECYCLING AUDITS

1. Visual Cart Audits

Cart audits were conducted by GT on 626 recycling carts between September 8, 2020 and September 12, 2020. Audits consisted of visually inspecting a cart that was set out



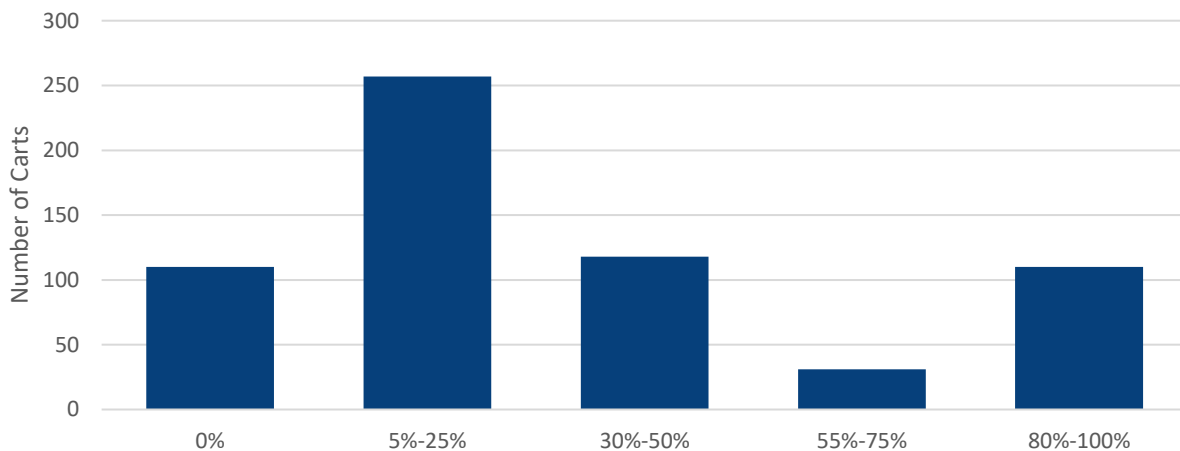
for recycling collection to determine if the resident properly separated recyclables per the established acceptable list for the program. The City’s current ordinance (551.041) states that no person shall set out a container in the recycling program if its contents exceed 2% of regular household waste (i.e., contamination) by volume. The visual assessment determined what was acceptable and not acceptable within each sampled cart. Any unacceptable contents are considered contamination. Unacceptable materials could include normal household

waste/trash or other recyclable materials that are not acceptable in Cleveland’s program.



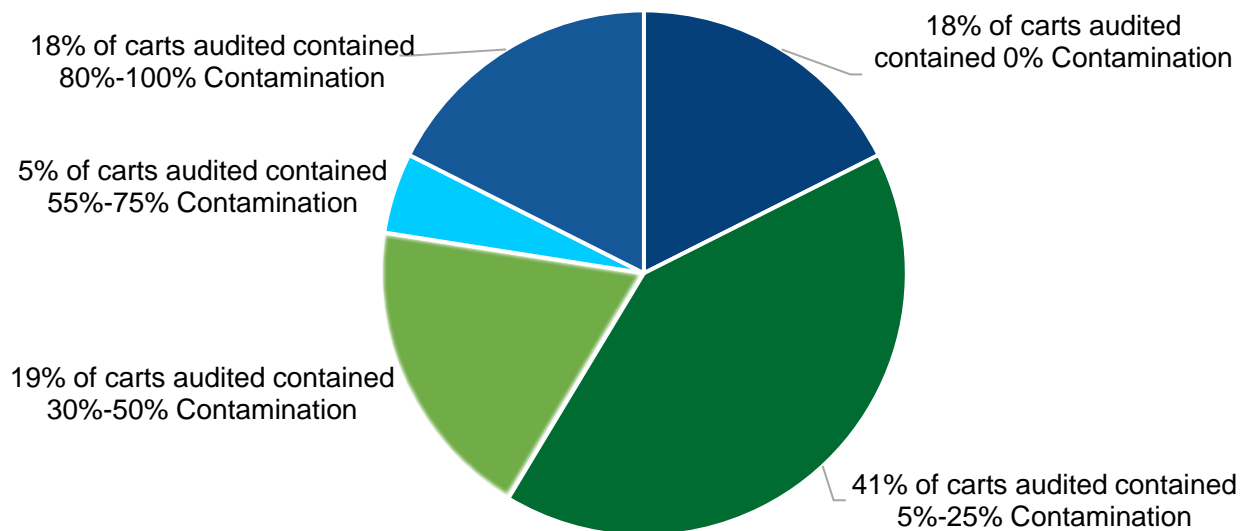
Targeted carts for the visual audit were selected from routes from every service garage (Carnegie, Glenville, and Ridge). An average of 125 carts were audited each day assigning a volume percent of contamination (estimated percentages were assigned in increments of 5%) and the types of contaminants that were found in the carts. **Appendix A** contains a sampling of pictures taken during the cart inspection process. The following figure depicts the range of contamination visually identified during the audits.

Figure 11. Distribution of Carts' Contamination by Volume (Count)



The following figure depicts the same data above but in graphical form:

Figure 12. Distribution of Carts' Contamination by Volume (Percentage)





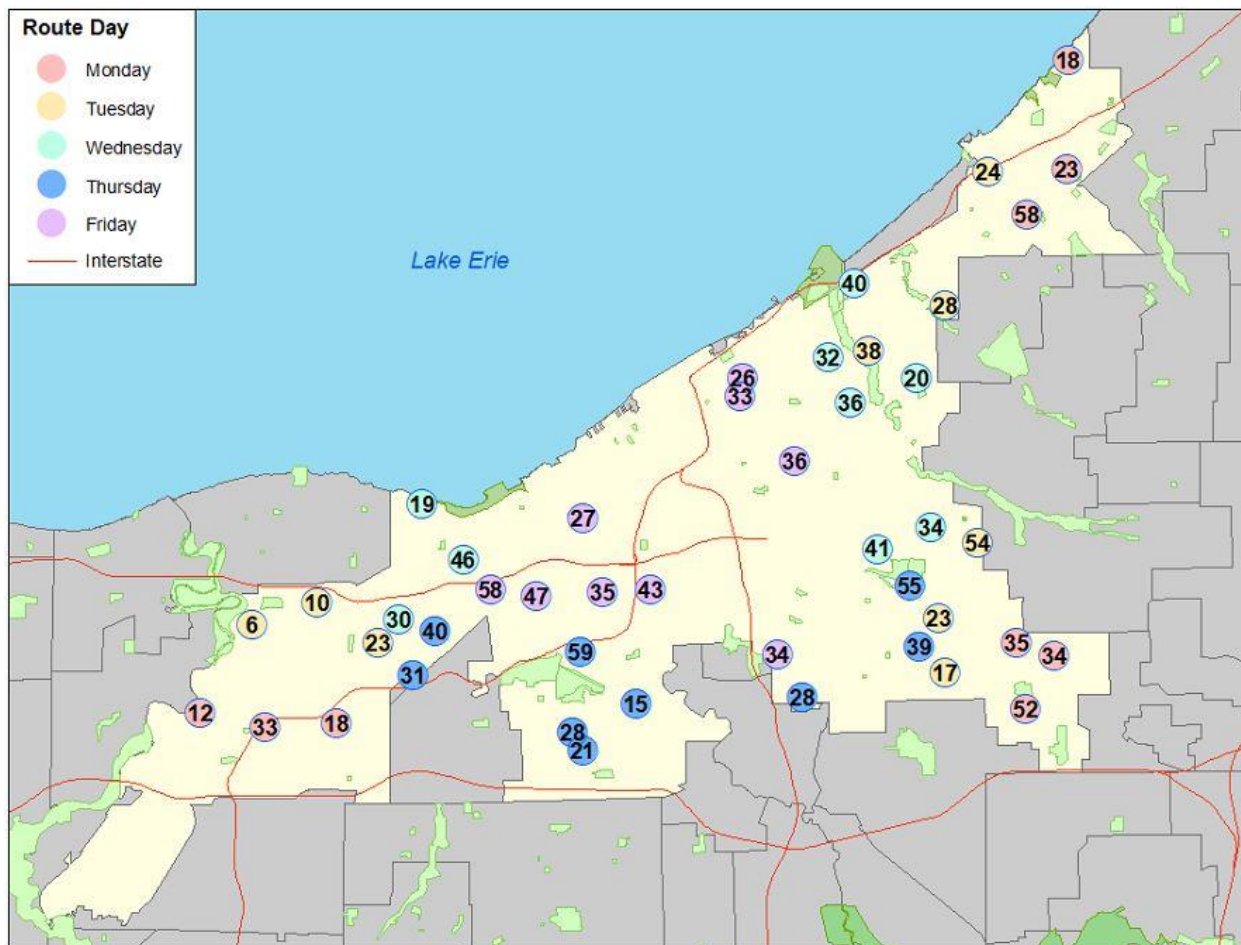
Based on the audit results, less than 20% of the carts inspected would comply with the City’s ordinance. Using a national average of 20-30% contamination as a potential limit, approximately 60% of the carts would be within or under this limit of contamination.

Carts do not have a sticker or educational piece to lead residents to more information on the recycling program. One cart was found during observation week to have a self-taped paper with acceptable materials. Many conversations with residents concluded that residents unaware of acceptable and unacceptable materials in their recycling carts.



The following figure depicts the location of cart inspections by day of audit:

Figure 13. Average Percent Contamination in Cart-Audited Areas



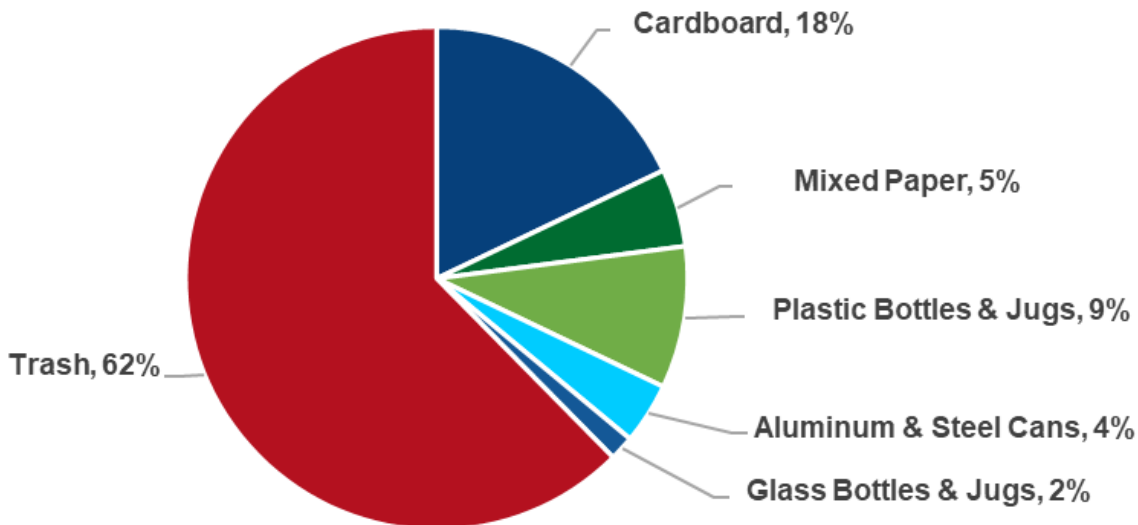
2. Transfer Station Recycle Audits

Visual recycle audits were conducted at the Ridge Road Transfer Station on 79 samples across 9 residential recycling loads between September 8, 2020 and September 12, 2020. Audits consisted of visually inspecting each targeted load that was delivered to the Ridge Road Transfer Station to determine the level of contamination within the load. Contamination is defined as any unacceptable materials, which can include normal household waste/trash or other recyclable materials that are not acceptable in Cleveland’s program.



Samples were taken from routes from Carr Center and Ridge Road stations. Loads were dumped and spread across the transfer station floor and divided into sections for visual assessment. Pictures were taken of each section can be found in **Appendix B**.

Figure 14. Composition of Recycling Stream During Transfer Station Audits



Approximately 62% of materials audited by volume in the recycling stream was considered trash/contamination compared to only 38% of materials accepted by the recycling program. Materials such as non-accepted plastics (yogurt cups, bags, rigid plastics like fans, totes, and buckets, clam shells, etc.), tangles (clothing, hoses, electronic cords, chains), food waste, and other general trash made up a large portion of the trash category. The next largest category was cardboard.



3. Desktop Recycle Audits

Recycling stream characterization data was collected from nine communities (eight metropolitan cities/counties and one suburban community) across the country who have completed manual recycling stream audits in the recent past:

- Austin, TX
- El Paso, TX
- Johnson County, KS (adjacent to Kansas City, MO)
- King County, WA (Seattle)
- Lafayette, CA
- New York City, NY
- Philadelphia, PA
- Phoenix, AZ
- San Jose, CA

All communities' recycling audits consisted of manually sorting samples of the single-family curbside recycling stream (except New York City which collects from all types of residential buildings). All communities analyzed here operate single-stream recycling programs except New York who operates a dual stream system with paper and cardboard separated from metal, plastic, and glass. All audits were conducted between 2014-2018. Five of the audited communities operate their own collection program using City-owned and operated equipment and labor, two communities utilize private haulers, and the two counties audited utilized both since multiple communities were included in their audits.

The table below summarizes the composition of curbside recycling streams in these communities compared to Cleveland.

Table 6. Curbside Recycling Contamination Rates in Other Cities

	Contamination Rate	Recyclable Paper and Cardboard	Recyclable Plastic	Recyclable Metal	Recyclable Glass
Austin, TX	23.4%	50.8%	7.6%	4.5%	13.7%
El Paso, TX	26.3%	62.0%	8.9%	2.8%	-
Johnson County, KS	26.5%	61.0%	8.0%	5.0%	-
King County, WA	12.7%	54.9%	10.3%	4.0%	18.0%
Lafayette, CA	6.7%	53.0%	8.0%	3.0%	29.0%
New York City, NY	14.0%	47.7%	13.8%	10.4%	14.0%
Philadelphia, PA	8.7%	45.3%	12.8%	4.9%	28.3%
Phoenix, AZ	22.9%	52.5%	11.4%	3.9%	9.4%
San Jose, CA	35.8%	42.0%	7.0%	2.2%	5.5%
<i>Average (not including Cleveland)</i>	19.7%	52.1%	9.7%	4.5%	16.8%
Cleveland (Kimble)	61.5%	-	-	-	-
Cleveland (GT Visual Audit)	62.4%	22.9%	9.1%	3.9%	1.6%



Based on this data, the City’s contamination rate is three times higher than the average contamination rate from the data collected in this section.

The table below summarizes materials that are listed as accepted on the communities’ websites.

Table 7. Accepted Materials in Recycling Programs

		Austin, TX	El Paso, TX	Johnson County, KS	King County, WA	Lafayette, CA	NYC	Philadelphia, PA	Phoenix, AZ	San Jose, CA	Cleveland, OH
Paper	Mixed paper	x	x	x	x	x	x	x	x	x	x
	Cardboard	x	x	x	x	x	x	x	x	x	x
	Paperboard	x	x	x	x	x	x	x	x	x	x
	Newspaper	x	x	x	x	x	x	x	x	x	x
	Magazines	x	x	x	x	x	x	x	x	x	x
	Paperback books		x		x		x	x			
	Cartons				x	x	x	x	x	x	x
	Non-foil/glitter wrapping paper	x	x		x		x		x	x	
	Paper cups and plates		x		x		x				
Plastic	#1 PET bottles/jugs	x	x	x	x	x	x	x	x	x	x
	#2 natural bottles/jugs	x	x	x	x	x	x	x	x	x	x
	#2 color bottles/jugs	x	x	x	x	x	x	x	x	x	x
	Plastic bags					x					
	Plastic cups		x		x	x	x		x	x	
	Plastic clamshells						x	x	x	x	
	Plastic tubs	x	x	x	x	x	x		x	x	
	Rigid plastics	x	x				x			x	
	PVC									x	
	Squeezable plastic									x	
	Prescription bottles		x						x		
Metal	Aluminum cans	x	x	x	x	x	x	x	x	x	x



		Austin, TX	El Paso, TX	Johnson County, KS	King County, WA	Lafayette, CA	NYC	Philadelphia, PA	Phoenix, AZ	San Jose, CA	Cleveland, OH
	Steel/tin cans	x	x	x	x	x	x	x	x	x	x
	Scrap metal				x		x			x	
	Small metal appliances						x			x	
	Metal hangers		x				x				
	Pots and pans		x			x	x			x	
	Aerosol cans			x			x	x		x	
	Aluminum foil and trays	x			x	x	x	x	x	x	
Glass	Glass jars	x			x	x	x	x	x	x	x
	Glass bottles	x			x	x	x	x	x	x	x

4. Commercial Collection

The City of Cleveland offers waste collection service to commercial businesses which is professional, reliable, and affordable. Services are available for any need such as a singular weekend project to ongoing commercial collections. Services can be permanent or temporary.

Services Available:

- Permanent and Temporary Roll-Off Boxes: 10, 20, 30 and 40 cubic yards
- Compactors: 30- and 40-yard Front End Load Dumpsters: 2 to 8 cubic yards

The following figure depicts the commercial rates charged by service for commercial entities:



Figure 15. Waste Container Fee Schedule on Website

City of Cleveland Division of Waste Dumpster Fee Schedule		
Dumpster Type	Yards	Cost per Pick-Up
Roll-Off	10	\$242.00
Roll-Off	20	335.00
Roll-Off	30	405.00
Roll-Off	40	476.00
Roll-Off Compactor	40	568.00
Front End Load	2	16.00
Front End Load	4	20.00
Front End Load	6	23.00
Front End Load	8	27.00

E. BULKY WASTE COLLECTION

1. General Information

Bulk items for City residents are picked up during the first full week of the month on residents’ regularly scheduled trash and recycling collection day, providing all residents with bulk item pickup twelve times a year. Bulk collection was temporarily suspended during the height of the COVID-19 pandemic but has since been re-established. Up to 3 bulk items and 4 tires can be placed on the tree lawn the first full week of the month on resident’s regular collection day. The City ordinance for bulk item collection is as follows:

551.05 Special Waste

(a) No furniture, tires, yard waste, bundle of brush, tree trunk or other such special waste shall be routinely collected by the regular waste collectors. Any solid waste, other than furniture, appliances or other such bulk items, that is so large that it cannot be contained in approved containers, shall be securely tied in compact bundles not to exceed one hundred (100) pounds in weight and shall be placed in a location convenient for collection.

(b) Special waste generally includes, but is not limited to, large bulk items such as refrigerators, furniture, mattresses, couches, shelving, fencing, house doors, storm windows, televisions, and bicycles.





The 2015 service guide available on the City website provides the following information for acceptable bulk items that can be placed at the curb during bulk week:

Acceptable Items (3 items only)

- Furniture, mattresses, box springs, couches, shelving, fencing, house doors, storm windows, TV's, and bicycles
- Bundled branches, tree limbs and shrubs (old waste containers may be used to dispose of yard waste only)
- Appliances (stoves, washers, dryers)

Prohibited materials and/or items in the bulk program are not specifically identified for the bulk program. However, the Service Guide identifies prohibitive items for the curbside cart program, and they are follows:

- No hazardous waste, paint cans, oil etc.
- No excessive construction or remodeling debris in the cart
- No concrete, hot ashes, batteries, auto parts, or chemicals

The current bulk item collection program requires significant resources operationally to collect the bulk items while simultaneously providing the weekly service for trash and recycling on the same day. The current bulk item collection program creates uneven demands on the operational staff and equipment when compared to the non-bulk weeks.

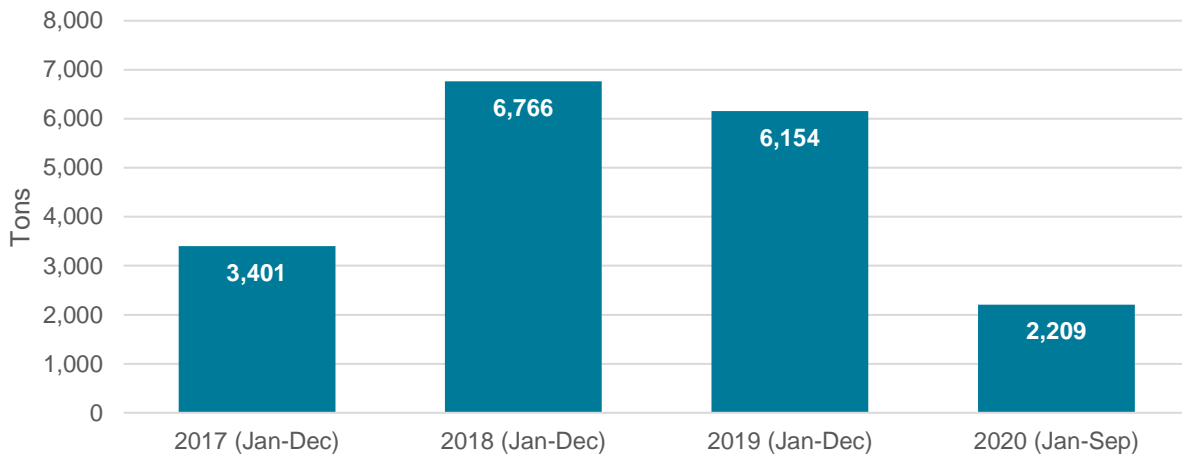
To service bulk items during other weeks of the month, the resident would call the Division of Waste Collection to make special arrangements. The following equipment was observed during bulk week when GT conducted field work activities:

- Rear load trash trucks
- Multi-Pack trash trucks
- Claw trucks
- Dump trucks
- Snowplow trucks
- Salt trucks
- Pickup trucks

The following figure depicts bulk tonnage collected from 2017-2020:

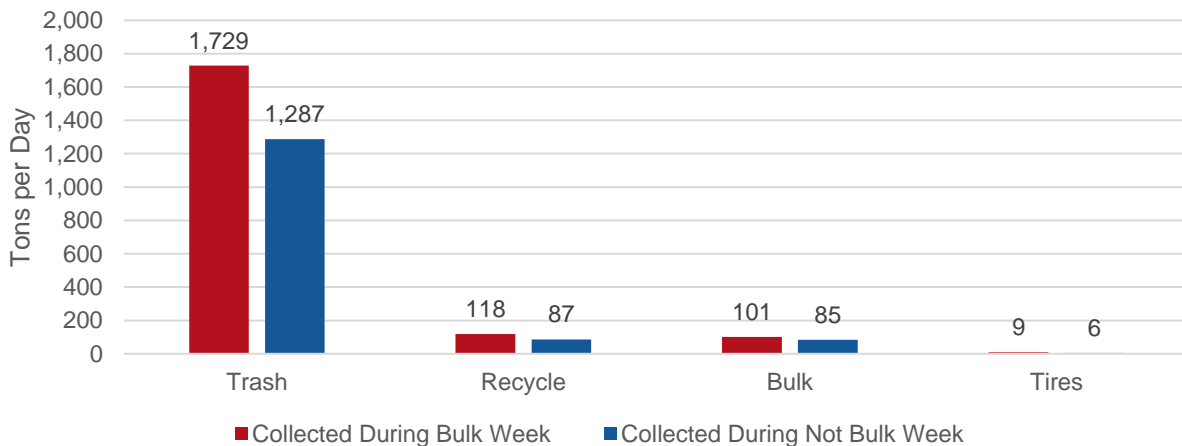


Figure 16. Bulk Waste Collected by a Bulk-Specific Truck and Disposed at Ridge Road Transfer Station from Cleveland’s Curbside Program 2017-2020



The figure above includes all bulk collected for the years indicated as recorded by the scale system at Ridge Road Transfer Station. This estimate includes the bulk collected by the bulk program on the off weeks, but it excludes any bulk collected by the regular trash trucks. The figure below estimates the average incremental tonnage for bulk compared to the other 40 weeks. On average, the bulk week represents a 34% increase in total tons disposed (trash and bulk). The figure below shows 2019 data that was extrapolated from transfer station scale tickets to compare average tons collected per day for a bulk collection week versus a non-bulk designated collection week.

Figure 17. Average Tons Collected per Day During and Not During Bulk Week Collection in 2019



On average, 34% more waste from all streams is collected during bulk week. This increases stress on the staff and equipment during the high-volume weeks. The following table depicts this situation:



Table 8. Average Daily Tonnage of Waste Collected During and Not During Bulk Week Collection in 2019

Waste	Collected During Bulk Week	Collected During Not Bulk Week	Difference
Trash	1,729	1,287	34%
Recycle	118	87	36%
Bulk	101	85	19%
Tires	9	6	45%
Total	1,957	1,465	34%

2. Ridge Road Transfer Station Disposal Options for Bulk

As a supplementary service, residents can haul bulk items to the City-owned and operated Ridge Road Transfer Station. The Transfer Station is located at 3727 Ridge Road and is open Mondays to Saturdays from 9am to 3pm. The City allows residents to dispose up to 4 cubic yards of bulk items, yard waste, and household debris or appliances at no cost 4 times annually. Proof of residency is required in the form of photo ID and current vehicle registration. Trailers must be less than 4x8 feet. The fee for additional dumps (5 or more per year, payable by credit card only) is \$46.61 per ton for solid waste and \$49.29 per ton for bulk waste. Tire disposal fee varies. Refunds are not available.

Prohibited materials and vehicles are identified on the website for the Ridge Road Transfer Station and are as follows.

- Prohibited debris includes brick, dirt, concrete, cinder blocks, auto parts, drums, barrels, hazardous materials, liquid waste, and material violating EPA regulations.
- Prohibited vehicles are large trailers, cargo vans, stake body vehicles, dump trucks, commercial vehicles or those with truck plates, those which are enclosed or have ladder racks, pickup trucks with built-up side boards, and trucks with additional trailers attempting to dump as one load. Refunds are not available.

The Ridge Road Transfer Station brochure does not include a listing of prohibited vehicles or debris. The brochure should be cross referenced with the website to ensure a complete and consistent outreach message.

3. Bulk Customer Service & Outreach

Residents are not required to schedule or notify customer service when placing bulk items at the tree curb for the monthly collection. Residents can call customer service at 216-664-3711 for information on bulk item pickups or to schedule an additional pickup.



The customer service line has an automated attendant that defines the bulk item week as the first full week and provides the next week of pickup. The automated attendant also states that there is a 3-item limit. GT conducted a test call and the automated attendant stated that supplemental pickups are not being scheduled at this time.

The website has some basic information for residents, but the bulk item information is limited and difficult to quickly assimilate. The signage for the bulk item program for the residents at the Transfer Station is “Residential Dumping”.

The bulk service is not clearly identified on the website; however, the website has a table of household items with a detailed description of how to manage the materials, but because it is a long, all-inclusive list, it is difficult to quickly find what you are looking for

There is a service guide available to residents with a link on the website. However, it is dated 2015, and promotes the “One Simple Act” program that has been discontinued. In addition, the bulk program is listed as a second week of the month program which could be very confusing depending on how the weeks fall.

There are no reuse resources such as Goodwill, Salvation Army, or salvage yards for metals. Also, no resources or links are listed for junk removal such as 1-800-Got-Junk or Junk King.

4. Unauthorized Participation in Bulk Item Collection Program

While there are limitations to the bulk item collection program as outlined by the City ordinances, the operations staff generally has a mandate to keep the City clean. The operations staff will pick up all bulk items and other debris including C&D material placed at the tree curb. These materials originate from multiple sources including businesses, landlords, contractors, and from sources outside the City. These sources of debris and waste have been unofficially established into the culture of the bulk waste program because of the City’s goal to collect all material at the curb no matter the source. In effect, DPW is doing a clean sweep throughout the City every month.

The number of unauthorized uses or setouts of the bulk item program was not available. The City only tracks complaints via phone calls from the 311 system and Mayor’s Action Center but does not track the unauthorized bulk setouts that get picked up.

5. Operations

The bulk item collection service is performed for the entire City one week for all routes of the City which causes significant demands on the equipment and labor. This demand is much less for the remainder of the month, creating uneven utilization which is difficult to manage. Currently, the City uses the following vehicles each month.

Table 9. Equipment Utilization



Type of Truck
Front Load
Sideloader
Rear load
Claw Truck
Salt Truck
Pickup Truck
Other

Bulk item collection can be challenging because of the many different types of materials that are collected. In some cases, the material *must* be separated and other cases the materials *should* be separated to limit the cost of disposal. For example, tire collection must be separated from the other materials because whole tires cannot be disposed of at a landfill. Appliances and other metals should be collected separately or should be picked up by a vehicle that can easily deliver and unload the materials. Appliances that contain freon must be managed differently than appliances that do not contain freon.



The automated routes, sideloader & frontload, currently include using a helper to help collect the bulk on the routes that are automated. This effectively eliminates the benefit of the automated route. In addition, the helper would have to travel from stop to stop in the left-hand side of the cab resulting in potential safety concerns when getting out of the truck to help load the bulk. Also, it increases the distance to walk to each stop. Because the Multipack side loaders are used to pick up trash and bulk all metal is mixed with the trash and disposed of the Transfer Station eliminating the opportunity to recycle metals with the bulk program.

Rear-load trucks can be an efficient method of collecting bulk items. The rear-load trucks are especially efficient at collecting materials in alleys. It is estimated that the City has significant alley pickup routes. However, the metals are mixed in with the trash.

The claw truck can safely pickup large items and can load materials into other trucks. When the salt trucks are not needed for winter road maintenance, the City uses the salt trucks in tandem with the claw trucks. The salt trucks meet up with the claw trucks and are loaded by the claw trucks. Once loaded, the salt trucks then transport the materials to the transfer station and then meet up with the claw truck to be reloaded. Often, multiple salt trucks are matched up with the claw trucks to keep the claw trucks in the field loading.



Many employees are borrowed from other duties or assignments to fully staff the bulk item pickup.

6. Maintenance

The uneven utilization of the equipment caused by the bulk pickup program puts a significant burden on the maintenance department. During the bulk collection week, all available and operable vehicles are assigned to pick up bulk items. This uneven utilization puts a burden on the maintenance department because it increases service calls in the field, and it limits the preventative maintenance during the bulk week.

7. Safety

Bulk item collections can be difficult to lift and load in the trucks and present certain physical hazards beyond normal trash collection. Bulk items often require two people to load items safely into the truck. Under the current bulk collection program, the bulk item types and quantities are unknown until the day of collection or upon arrival to the bulk setout. Also, bulk items set out on off-weeks are unexpected and difficult to manage.

The OSHA 300 log was reviewed, and injuries occurring because of loading bulk were identified. Many of the injuries identify large items such as couches, mattresses, large furniture, TV's, and tires. Some of the injuries from bulk items occurred during weeks that were not bulk weeks. The table below provides the quantity of bulk item-related injuries and the number of days off/light duty as identified on the OSHA 300 log.

Table 10. OSHA 300 Log - Identified Bulk Collection Incidents

Year	Injuries	Days Off or Light Duty
2017	4	397
2018	10	94
2019	6	93
2020 through Sept	6	119

The next table includes all injury incidents during bulk week including the above injuries compared to total injury incidents as identified on the OSHA 300 log.

Table 11. OSHA 300 Log - Number of Incidents for Bulk Week vs. Total

Year	Bulk Week Injuries	Total Injuries	Bulk Injury Percent of Total
2017	15	64	23%
2018	30	74	40%
2019	16	62	25%
2020 through Sept	15	39	38%

As the table above shows, the total number of injuries during bulk week exceed 23% for each year except 2017 based on a normal distribution for a 21 work-day month.



The current system of bulk collection is difficult to effectively and safely manage because the quantity and types of bulk items are unknown on the routes.

8. Third-Party Options

Community groups can rent containers from the City for neighborhood cleanups; however, the current program does not promote other resources for reuse, bulk collection services, or neighborhood cleanups. The lack of other alternatives places the full burden of bulk item collection on the Division of Waste Collection. In addition, there appears to be limited, if any, relationship with third party groups for neighborhood cleanups.

F. YARD WASTE AND ORGANICS

Currently all the yard waste collected at the curb is collected with the bulk or normal trash collection. All yard waste collected in bulk or trash collection is landfilled. Branches and brush must be cut into lengths of three feet or less and tied into bundles that do not exceed 24 inches in diameter. All leaves and grass clippings must be contained in bags and there is a limit of no more than 20 bags per week.

The City collects leaves in the fall with a vacuum truck in select high generating neighborhoods, weather-permitting. The collected leaves are sent to a compost facility for processing. These neighborhoods are identified as high leaf-generating neighborhoods.

G. SPECIAL COLLECTIONS

Special collections are an important part of all residential trash and recycling collection programs. These programs provide residents with opportunities to effectively manage items that should be kept out of the solid waste and recycling programs. The following sections outline the special collection programs available to the residents of the City of Cleveland.

1. Electronics

The City provides an electronics drop-off program to residents year around at the Division of Waste Collection located at 5600 Carnegie Avenue. Hours are 9:00am-3:00pm. No TV's are accepted. TV's are not banned from the landfill and can be included in the curbside trash.

Additional vendor resources are included on the website for residents to manage recycling of their electronics. In addition, the Cuyahoga Solid Waste District provides additional resources for residents.



There is an Annual Computer Round-up: Equipment is cleaned and refurbished by a registered third-party and redistributed to local schools and non-profits. If an item is not suitable for refurbishing, components are recycled.

2. Household Hazardous Waste

The City provides a household hazardous waste (HHW) drop-off program to residents the first Friday of every month at the Division of Waste Collection located at 5600 Carnegie Avenue. Hours are 9:00am-3:00pm. No latex paint is accepted.

The City provides the drop-off but aggregates the HHW and delivers it to the Cuyahoga County Solid Waste District Special Waste Center for final sorting and material management.

3. Paint

Residents are asked to dry out their latex paint and include it in their trash pickup.

4. Paper Shredding Service

Paper shredding services are available to residents year around at 5600 Carnegie Avenue. A third-party vendor provides the paper shredding services at this location.

5. Automotive Fluids

Automotive fluids can be recycled by residents through the HHW drop-off program. Also, the City website provides numerous vendors who will accept automotive fluids. Automotive fluid volumes are included in the HHW volumes in Table 12 at the end of this section.

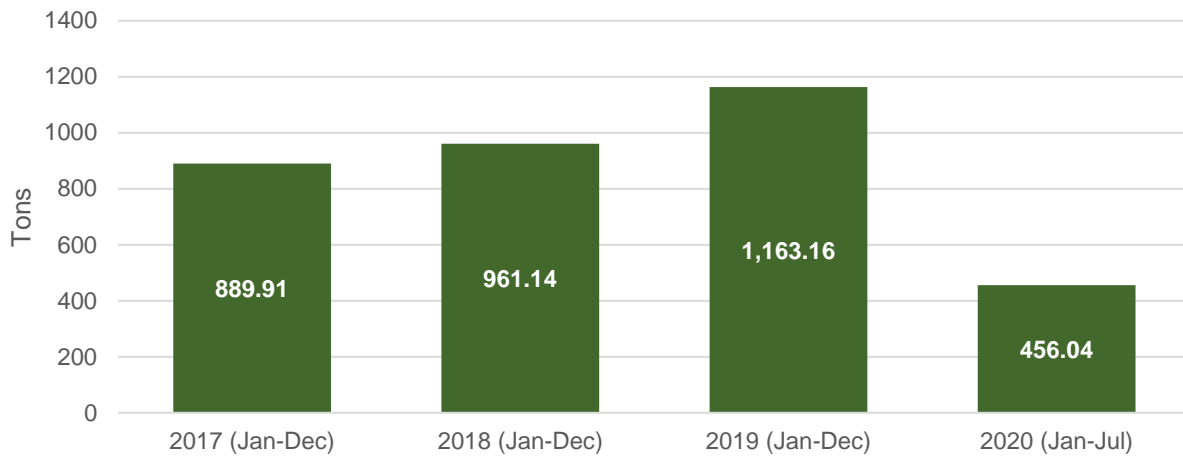
6. Tires

A maximum of four tires can be picked up with the bulk item collection, or remaining tires can be taken to the Ridge Road Transfer Station. A fee is charged for more than 4 tires recycled at the Ridge Road Transfer Station.

The City does offer an annual tire round-up allowing residents to dispose of up to 10 tires for free at the Ridge Road Transfer Station in the fall of each year.



Figure 18. Tire Waste Reported by the City’s Vendor Collected at Ridge Road Transfer Station from Cleveland’s Curbside Program 2017-2020



The following table summarizes the Division of Waste Collection special waste volumes in tons for 2018-2020:

Table 12. Special Waste Volumes in Tons

Type of Special Collection	2018	2019	2020*
Electronics	24.71	28.81	2.20
HHW	20.46	10.91	6.05
Paper Shred	67	65	20**
Scrap Tires	961.14	1163.16	456.04***

* Special Collections were significantly reduced in 2020 due to the COVID-19 pandemic.

** Paper shred tons represent January through September 2020

*** Tire tons represent January through July 2020

H. CURRENT KPI DASHBOARD

GT reviewed all collection metrics including tonnage collected, costs, labor levels, households served and other metrics by collection type (trash, recycle (curbside and drop-off), and bulk). In addition, GT evaluated the current data and information collection processes and capabilities of the City.

The data collected and evaluated under this part of the project is summarized as Key Performance Indicators (KPI) in a summary dashboard (see graphic below). The interactive dashboard is designed for management to see how the current program performs on a regular basis.



Figure 19. Interactive KPI Dashboard

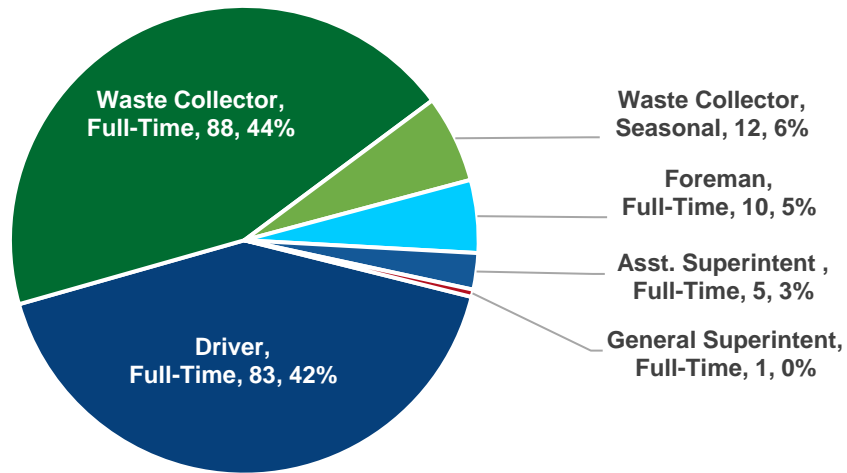


I. STAFFING

The City operates a collection program for trash, recyclables, and bulky waste. The collection program consists of approximately 65-70 routes per day, 5 days a week for these materials. In addition, the City operates a large solid waste transfer station located on Ridge Road. To operate the programs and facility, the following figure summarizes the staffing utilized by the City based on 2018 available data.



Figure 20. Distribution of Waste Collection Employees in 2018



The City hires staff on a full-time and temporary (seasonal) basis using the following procedures:

- Interested individuals complete an application online on the City’s website for positions that are open
- Laborer positions do not require a civil service test
- Open positions are requested by the Division of Waste Collection
- For labor positions, no high school diploma is required
- A list of candidates is provided to the Commissioner of Waste Collection for potential interviews
- Interviews are conducted, and a candidate is selected
- The candidate is provided an employment offer contingent on background and testing analysis and final approval from management
- A PAF hire form is created and is sent for approval
- Upon approval, the candidate is brought in for paperwork and human resource orientation consisting of review of policies and benefits
- No formal training occurs at the division level other than on-the-job training
- Supervisor training was offered in the past
- Part-time or seasonal employees do not follow the same orientation process as full-time employees.

Some seasonal or temporary workers are hired full-time after working for a period of time. Sometimes this process is easier to do than going through a new hiring process which can lead to less-than-desirable employees making it to full-time status. Staffing needs sometimes drives the process of moving seasonal employees to full-time status.

Firing of employees follows a 5-step process for dealing with policy violations including:



- Written warning
- 1 day off without pay
- 5 days off without pay
- 10 days off without pay
- Termination

A triggering event, such as a policy violation, starts the above process. An incident report is completed by the employee supervisor, and then an investigation ensues with documentation. A disciplinary hearing is conducted which includes union representation. A disciplinary review panel recommends an action such as a written warning or days off without pay. This action comes in the form of an outcome letter to the employee. Once the letter is received, the outcome is served on the employee. The union can file a grievance in this process which includes a 4-step process. For each triggering event, the process described above is followed. Employees could be terminated (within or outside of 120-day probation period) and employees are subjected to the 5-step disciplinary process if reported under misconduct.

One of the issues tasked to GT for this study is to determine why there is so much absenteeism in the Division of Waste Collection. The following table summarizes the absenteeism report for 2019 and 2020. Total includes the use of AWOL (absent without leave also has been called no call/no show), call-offs, injury, suspension, sick time, and FMLA:

Table 13. Absenteeism Totals for 2019 and 2020 with Percent of Total Representing Call-offs

	Collectors		Drivers		Foreman		Asst. Supervisor	
	Total Absentee	% Call-off	Total Absentee	% Call-off	Total Absentee	% Call-off	Total Absentee	% Call-off
Jan '19	206	39%	197	56%	12	100%	0	0%
Feb '19	202	45%	163	61%	11	100%	0	0%
Mar '19	191	59%	187	72%	13	92%	3	100%
Apr '19	246	0%	219	0%	22	0%	1	0%
May '19	262	51%	190	47%	12	92%	0	0%
Jun '19	286	44%	235	56%	19	100%	5	100%
Jul '19	256	50%	262	62%	6	83%	4	100%
Aug '19	207	51%	211	62%	10	100%	0	0%
Sep '19	210	46%	243	57%	6	100%	1	100%
Oct '19	241	51%	250	44%	15	100%	2	100%
Nov '19	239	58%	238	47%	22	27%	1	100%
Dec '19	192	72%	238	57%	18	0%	0	0%
Jan '20	442	48%	534	37%	52	15%	4	100%



	Collectors		Drivers		Foreman		Asst. Supervisor	
	Total Absentee	% Call-off	Total Absentee	% Call-off	Total Absentee	% Call-off	Total Absentee	% Call-off
Feb '20	202	57%	262	39%	13	31%	0	0%
Mar '20	330	40%	292	39%	26	100%	2	100%
Apr '20	406	52%	331	52%	25	76%	2	100%
May '20	452	45%	309	47%	8	100%	10	100%
Jun '20	359	60%	320	51%	11	100%	1	100%
Jul '20	433	69%	449	60%	27	100%	10	100%
Aug '20	354	66%	374	55%	27	100%	26	65%
Sep '20	240	59%	281	41%	10	100%	22	9%

As can be seen in the table above, absenteeism is a significant issue facing the Division of Waste Collection.

J. EQUIPMENT AND MAINTENANCE

The City operates 91 trash and recycle trucks to service approximately 65-70 routes (trash and recycle) per day. In the past, the availability of trucks reached a low of 55 which caused enormous difficulties with servicing the established routes. The Division of Waste Collection worked with Fleet Management to improve the communications and reporting on equipment maintenance and availability over the past two years. This effort formed the Waste Stabilization Committee to address the equipment availability issues. As of the production of this report, the availability of trucks has increased to approximately 65-75 per day. The following table summarizes the inventory of trucks for waste collection:

Table 14. Inventory of Trucks for Waste Collection

Code	Year	Make	Body Type	Cart Tipper	Condition
138H173	2005	CCC	New Way Rear	Yes	Fair
138H177	2007	CCC	Load Master Rear	Yes	Fair
138H178	2007	CCC	Load Master Rear	Yes	Fair
138H182	2007	CCC	Load Master Rear	Yes	Fair
138H183	2007	CCC	Load Master Rear	Yes	Fair
138H184	2007	CCC	Load Master Rear	Yes	Fair
138H185	2007	CCC	Load Master Rear	Yes	Fair
138H186	2007	CCC	Load Master Rear	Yes	Fair
15H163	2015	Freightliner	McNeilus	Yes	New
15H246	2019	Freightliner	Heil	Yes	New
15H247	2019	Freightliner	Leach Rear	Yes	New
15H248	2019	Freightliner	Leach Rear	Yes	New
15H251	2019	Freightliner	Leach Rear	Yes	New
15H252	2019	Freightliner	Leach Rear	Yes	New
15H253	2019	Freightliner	Leach Rear	Yes	New





Code	Year	Make	Body Type	Cart Tipper	Condition
15H254	2019	Freightliner	Leach Rear	Yes	New
15H255	2019	Freightliner	Leach Rear	Yes	New
15H256	2019	Freightliner	Leach Rear	Yes	New
15H257	2019	Freightliner	Leach Rear	Yes	New
15H258	2019	Freightliner	Leach Rear	Yes	New
15H259	2019	Freightliner	Leach Rear	Yes	New
15H260	2019	Freightliner	Leach Rear	Yes	New
R-1	2018	International	McNeilus	Yes	Rental
R-3	2018	Peterbilt	Heil	Yes	Rental
R-4	2019	Peterbilt	Heil	Yes	Rental
R-5	2019	Peterbilt	Heil	Yes	Rental
R-6	2018	Peterbilt	McNeilus	Yes	Rental
15H67	2012	Freightliner	Bridgeport Side Loader	No	Good
15H68	2012	Freightliner	Bridgeport Side Loader	No	Good
15H69	2012	Freightliner	Bridgeport Side Loader	No	Good
15H70	2012	Freightliner	Bridgeport Side Loader	No	Good
15H71	2012	Freightliner	Bridgeport Side Loader	No	Good
15H72	2012	Freightliner	Bridgeport Side Loader	No	Good
15H73	2012	Freightliner	Bridgeport Side Loader	No	Good
15H74	2012	Freightliner	Bridgeport Side Loader	No	Good
15H75	2012	Freightliner	Bridgeport Side Loader	No	Good
15H79	2012	Freightliner	Bridgeport Side Loader	No	Good
15H80	2012	Freightliner	Bridgeport Side Loader	No	Good
15H81	2012	Freightliner	Bridgeport Side Loader	No	Good
15H82	2012	Freightliner	Bridgeport Side Loader	No	Good
15H83	2012	Freightliner	Bridgeport Side Loader	No	Good
15H84	2012	Freightliner	Bridgeport Side Loader	No	Good
15H85	2012	Freightliner	Bridgeport Side Loader	No	Good
15H86	2012	Freightliner	Bridgeport Side Loader	No	Good
15H87	2012	Freightliner	Bridgeport Side Loader	No	Good
7H1182	2007	International	Labrie Side Load	Yes	Fair
7H1183	2007	International	Labrie Side Load	Yes	Fair
7H1184	2007	International	Labrie Side Load	Yes	Fair
8H37	2014	Mack	Labrie Side Load	No	Good
8H38	2014	Mack	Labrie Side Load	No	Good
8H39	2014	Mack	Labrie Side Load	No	Good
8H40	2014	Mack	Labrie Side Load	No	Good
8H41	2014	Mack	Labrie Side Load	No	Good
8H42	2014	Mack	Labrie Side Load	No	Good
8H43	2014	Mack	Labrie Side Load	No	Good
8H44	2014	Mack	Labrie Side Load	No	Good
18H26	2014	Autocar	Labrie Side Load	No	Good
18H27	2014	Autocar	Labrie Side Load	No	Good
18H28	2014	Autocar	Labrie Side Load	No	Good
18H29	2014	Autocar	Labrie Side Load	No	Good
18H30	2014	Autocar	Labrie Side Load	No	Good



Code	Year	Make	Body Type	Cart Tipper	Condition
18H31	2014	Autocar	Labrie Side Load	No	Good
18H32	2014	Autocar	Labrie Side Load	No	Good
18H33	2014	Autocar	Labrie Side Load	No	Good
138H187	2015	CCC	Heil Multipack	Yes	Good
138H188	2015	CCC	Heil Multipack	Yes	Good
138H189	2015	CCC	Heil Multipack	Yes	Good
138H190	2015	CCC	Heil Multipack	Yes	Good
138H191	2015	CCC	Heil Multipack	Yes	Good
138H192	2015	CCC	Heil Multipack	Yes	Good
138H193	2015	CCC	Heil Multipack	Yes	Good
138H194	2015	CCC	Heil Multipack	Yes	Good
138H195	2015	CCC	Heil Multipack	Yes	Good
138H196	2015	CCC	Heil Multipack	Yes	Good
138H197	2015	CCC	Heil Multipack	Yes	Good
138H198	2015	CCC	Heil Multipack	Yes	Good
138H199	2015	CCC	Heil Multipack	Yes	Good
138H201	2015	CCC	Heil Multipack	Yes	Good
138H202	2015	CCC	Heil Multipack	Yes	Good
138H203	2015	CCC	Heil Multipack	Yes	Good
138H204	2015	CCC	Heil Multipack	Yes	Good
138H205	2015	CCC	Heil Multipack	Yes	Good
138H206	2015	CCC	Heil Multipack	Yes	Good
138H207	2015	CCC	Heil Multipack	Yes	Good
138H209	2015	CCC	Heil Multipack	Yes	Good
138H210	2015	CCC	Heil Multipack	Yes	Good
138H211	2015	CCC	Heil Multipack	Yes	Good
138H212	2015	CCC	Heil Multipack	Yes	Good
138H213	2015	CCC	Heil Multipack	Yes	Good
138H214	2015	CCC	Heil Multipack	Yes	Good
138H215	2015	CCC	Heil Multipack	Yes	Good
138H216	2015	CCC	Heil Multipack	Yes	Good
140H31	2004	Peterbuilt	Front Loader	No	Poor
8H32	2012	Mack	Front Loader	No	Good
8H33	2012	Mack	Front Loader	No	Good
8H35	2013	Mack	Front Loader	No	Good
7H1135	2006	International	Roll-off	No	Fair
140H37	2012	Peterbuilt	Roll-off	No	Good
140H10	2001	Peterbuilt	Flat bed/Crane	No	Fair
140H45	2018	Peterbuilt	Roll-off	No	New
15H46	2007	Freightliner	Loadmaster rear load Mini Packer	Yes	Poor

The City’s fleet is a mixture of multiple types of trucks, including:

- 22 rear load packers
- 5 rental rear load packers





- 37 side loaders
- 4 front loaders
- 28 multi-pack trucks
- 3 roll-off trucks
- 1 flatbed truck
- 1 mini rear load packer

This diversity in trucks reflects the diversity in collection systems utilized by the City, specifically:

- Automated
- Semi-automated
- Manual
- Hybrid (automated and manual)

Drivers are responsible for conducting pre- and post-trip inspections on the trucks they operate on their shift. The inspections are conducted and documented on paper forms and turned into management. When an issue is found that prevents the use of the truck, it is reported, and a new truck is assigned. The truck with the issue is sent to maintenance to be repaired. Once a truck goes into the maintenance system, it is tracked until made available for service. Daily reports are generated and shared with Division of Waste Collection management on truck availability. For inspection issues that are fluid-related, such as oil or hydraulic fluid, the driver is expected to replenish the fluids from inventory contained at each station.

All maintenance and repair activities for trucks are conducted at the Ridge Road Transfer Station. This process has changed from previous maintenance activities occurring at all three stations in the past. The change in maintenance and repair locations has made the maintenance department more efficient and accountable.

The following figure shows an out-of-service report that was current during the writing of this report:



Figure 21. Example of Daily Report of Truck Repair Status and Available Packers (October 7, 2020)

Heil Multipack Packer Repair Status						Working Day	10/7/2020
Code	Reason OOS	Out of Service Date	Status	Location	Estimated Completion		
138H194	Pm service	9/28/2020	Vendor	Best Equipment	TBD		Went to Best on 9/30/2020
138H203	Check grippers, radiator	10/5/2020	Working on / LM	MVM 109	TBD		
138H190	CEL, truck stalling out	10/7/2020	Working on / JV2	MVM 109	TBD		
138H209	Hyd leak, Check grippers	10/7/2020	Awaiting	MVM 109	TBD		
138H204	Check hopper camera	10/7/2020	Awaiting	MVM 109	TBD		
138H192	Check grippers	10/7/2020	Awaiting	MVM 109	TBD		
Automated Packer Repair Status							
18H27	Pm service,	9/11/2020	Vendor	Best Equipment	TBD		Went to Best on 9/25/2020
15H71	Check transmission	9/15/2020	Vendor	WWWilliams	TBD		Went to Williams 10/1/2020
15H73	No start, CEL	9/17/2020	Awaiting	MVM 109	TBD		
15H67	Pm service, PTO cut out	9/28/2020	Vendor	Concord	TBD		Went to CRE on 9/28/2020
15H81	Check turbo and VGT	9/28/2020	Working on / JV	MVM 109	TBD		
7H1184	No Pto	9/30/2020	Awaiting	MVM 109	TBD		
15H79	Body module, packer	10/2/2020	Down for parts	MVM 109	TBD		Module due in today
18H28	Idle pulley and belt	10/6/2020	Down for parts	MVM 109	10/7/2020		Parts due today
8H37	Check engine light	10/6/2020	Awaiting	MVM 109	TBD		
18H29	Crank no start	10/7/2020	Awaiting	MVM 109	TBD		
Rear load Packer w/ Tipper Repair Status							
138H178	Hydraulic leak, chk packer	10/6/2020	Awaiting	MVM 109	TBD		
RG 3	Hydraulic leak, Air leak	10/7/2020	Awaiting	MVM 109	TBD		
Ancillary							
8H32	Pm Service	9/30/2020	Vendor	American National	TBD		Went to AFS 10/1/2020
8H33	Check engine light, brakes	10/2/2020	Awaiting	MVM 109	TBD		
Packer Needs							
Day of Week	Heil Multipack	Automated Packers	Rear load with Tippers	Rear Load without Tippers	Total		
Mon.	26	30	14	0	70		
Tues.	26	28	15	0	69		
Wed.	26	26	9	0	61		
Thurs.	26	28	14	0	68		
Fri.	26	27	14	0	67		
Total In Fleet	28	37	27	0	92		
Currently Available Packers							
Packers Down Today	6	11	1	0	18		
Total Available Today	22	26	26	0	74		
Critical Needs	22	30	15				

Preventative maintenance has also been an issue in the Division of Waste Collection. Preventative maintenance should be performed every 4 months for all trucks. This involves inspections (120 points), oil changes, filter changes and body lubrication. The maintenance department is making progress on moving the fleet to 100% compliance with the 4-month preventative maintenance schedule and hopes to reach this goal by the end of 2020.

Purchasing of new waste collection trucks and equipment is not based on a replacement schedule but rather on highest priorities and available funding. This process has led to vast fluctuations in year-to-year purchases. In addition, priorities in collection has changed from a commitment to automated collection to a transition to semi-automated and manual collection. These changing priorities have resulted in a diverse equipment inventory as depicted in the figure above. The following purchases have occurred over the last three years:

- 2018 – 5 new trucks



- 2019 – 10 new trucks
- 2020 – 5 new trucks

The development of bid specifications for new truck purchases involves the Division of Waste Collection Commissioner, Director of Public Works, and Fleet Director. Drivers and laborers or route supervisors are not included. New technology such as GPS locators are not a part of the specifications for new trucks.

K. EDUCATION, OUTREACH, AND PUBLIC COMMUNICATIONS

The City provided initial education on the new automated single-stream recycling program when each resident received their recycle cart. The education provided included the following:

- Blue recycling cart with instructions (paper copy) taped onto the cart on how to participate
- Updated website information on how the program operates
- Updated ordinances
- Service guide produced and included on the City's website
- Various flyers and/or information sheets produced and included on the website

The City also conducted various public service announcements and included information on how to recycle to the 311 system (311 system was never advertised as a resource for residents).

The City did not employ a recycling coordinator or any other additional dedicated staff for recycling education. The City does have a sustainability office that assists with education and communication regarding recycling.

The City spends approximately \$25,000 per year in education-related expenses for its waste collection program including curbside recycling. This is approximately 0.06% of the City's overall budget for education.

L. CUSTOMER SERVICE

The City has three separate and somewhat disconnected systems available for dealing with customer service. These systems are as follows:

- Division of Waste Collection phone number
- 311 system
- Mayor's Action Center

The following section summarizes each of these systems.



1. Division of Waste Collection

Residents can contact the Division of Waste Collection directly to address concerns and/or complaints. The phone numbers are listed on the City’s website. Specific data on tracking calls is not available.

2. 311 System

This system is designed to field any call on City services across all departments and divisions. The system is not advertised on the City’s website or promoted to residents. Participation from the public has occurred through word of mouth and other non-organized promotions of the system. The system averages 1,000 calls per day, of which most of the calls are related to waste collection. Most of the waste collection calls include the following issues:

- Missed pickups
- Overflowing receptacles
- Containers being left out all the time
- Cart issues
- Large setouts

In 2019, there were approximately 27,000 calls received at the call center and approximately 15,000 calls received in 2020 from January through September. The following table summarizes the calls and issues raised for waste collection and recycling:

Table 15. Percentage of Call Center Reported Concerns in 2019 and 2020 (Jan-Sep)

Reported Concern	Examples	2019	2020 (Jan-Sep)
Cart/Collection Reported Concerns	Missed cart collection, need of new cart, cart damaged, exchange size of cart	42%	59%
Other Trash/Bulk Related Reported Concerns	Schedule bulk pickup or tire pickup, overflowing trash containers in City	15%	6%
Illegal Dumping Reported Concerns	Illegal dumping, vacant lot dumping	4%	1%
Other Reported Concerns	Any other concern, dead animals, tree limbs down, traffic light issue, rental property concerns, police report	39%	34%
Total		100%	100%



The 311 system can also schedule tire pickups, special bulk pickups, and dead animal pickups for residents that request these services. All complaints and/or service requests are forwarded to the Division of Waste Collection to be addressed.

Finally, the 311 staff can communicate to residents on how to participate in the waste, bulk, and recycle programs. Staff has this information available and routinely answers questions on the rules and restrictions of the programs.

3. Mayor's Action Center

Residents can call the Mayor's Action Center (MAC) as an alternative number for expressing concerns. This phone number does cause some conflict with the Division as these calls have to then be sent over to the 311 system and then sent to the Division which adds another step for the City to address the concern. Approximately 20% of the calls to MAC are related to waste collection.

The primary objectives for Mayor's Action Center include:

- Increase customer service by providing direct access to the Mayor's office and connecting citizens with City Services.
- Answer, track, and process citizen suggestions, questions, concerns and service requests.

Calls that are not entered into the 311 system are not tracked by the MAC. The vast majority of calls on waste collection or recycling involve the following:

- Requests for more carts
- Carts are damaged

M. ILLEGAL DUMPING AND ENFORCEMENT

Beginning Aug. 1, 2018, the Division rolled out a minor citation enforcement program for improper waste and recycling setouts. Courtesy warnings were being issued through August 1st of that year. Residents may have seen courtesy notices on the lid of roll carts, along with information on correct setout procedures. Common violations could lead to a \$100 citation. The Division of Waste Collection does not track the number of citations given.

Common reasons that citations are issued:

- Excess waste/recycling outside black/gray/blue cart.
- Trash mixed with recycling in blue cart
- Setting out waste or recycling earlier than 12 p.m. the day before scheduled pickup
- Failure to retrieve carts by 12 p.m. the day after collection



N. CITY ORDINANCES

The City's ordinances covering waste collection are included in Chapter 551 of the Code of Ordinances. The ordinances cover a wide range of rules and participation requirements for the following:

- Waste and recycling containers
- Collection fees
- Setout procedures
- Infractions and fines related to waste collection
- Collection intervals
- Commercial disposal and charges
- Large quantity waste setout requirements
- Other related activities

The ordinances are proposed by the Director of Public Works, Division of Waste Collection management, and/or City Administration.

In a review of the ordinances as a part of this study, there are several ordinances that are either missing key information, are extremely restrictive or there is no ordinance covering key elements of the program, specifically:

- Setout times are not included for the latest time available, only the earliest time which is 12:00 noon on the day preceding regular collection.
- Residents are only permitted to have 2% contamination in their recycle cart
- Residents are only permitted to have 10% recyclables in their trash cart
- No specific recyclables separation requirements or procedures are provided in the ordinances.
- Only broad-based categories of acceptable recyclable materials are included as a definition
- No ordinance for parking restrictions to allow for fully automated collection
- No specific ordinance for multi-family properties and their unique characteristics
- Ordinances allow for out-of-cart setouts which conflicts with automated collection operations

During the engagement process with staff and others, it was determined that special non-written rules are followed by collection workers, specifically:

- No trash or waste shall be left on curb, regardless if ordinances were not followed resulting in the following:
 - ✓ Bulk waste above restricted 3 items is routinely picked up
 - ✓ More than 4 tires per setout is routinely picked up



- ✓ Un-bundled yard waste and bulk materials are routinely picked up
- ✓ Improperly placed carts are serviced by City crews
- ✓ Multi-family housing setouts larger than 4 units are serviced by City crews
- ✓ Non-City customers are serviced unwittingly by City crews and may be knowingly

Finally, scavenging of waste and recyclables is commonly conducted by individuals across the City in clear violation of the established ordinance which restricts scavenging from 8 pm to 7 am.

Research conducted in this study has indicated that a vast majority of key ordinances governing waste collection are not enforced for those residents that do not follow the rules. Enforcement was conducted on a more frequent basis in past years but has since been reduced, especially during COVID-19 but also before the pandemic. This was overwhelmingly stated in most of the engagement sessions conducted with staff and residents during this study.

In addition, the automated program that was rolled out that included single-stream curbside collection was not implemented effectively. The ordinances and their enforcement resulted in the program transitioning to a semi-automated or manual collection program.

Finally, City ordinances will need to be updated, changed and/or created for any new program or initiative that comes from this study and its associated implementation plan.

O. COMMUNITY ENGAGEMENT

1. Focus Groups

A residential engagement process was conducted as a part of this study. Even though the City did not request a residential engagement process in the original RFP for this Study, GT included it as an option. The City decided to include the option in the scope of work for this project. The objective of this limited scale focus group project was to obtain general opinions from residents that covered a wide spectrum of criteria that is discussed below. This initiative was also designed to be a part of the overall due diligence efforts covered from the totality of this report and is not the sole basis for any specific recommendations.

GT sub-contracted with a company named Illuminology to conduct targeted focus groups across the City. The initial plan was to conduct traditional focus groups in person. Because of COVID-19, the focus group process was conducted virtually.

a. Research Objectives



- Primary objectives: Explore residents' recycling attitudes and behaviors, assess recycling opportunities and costs, and evaluate recycling program attributes.
- Secondary objectives: Learn which information sources are best for increasing recycling education, engagement, and participation. Gauge perceptions towards bulk waste collection and abuse of bulk waste collection.

The process began with developing an overall strategy to obtain meaningful input from residents who use the City's waste collection program. Input was targeted to the following resident type:

- Devoted recycler (perceive recycling as extremely or very important and recycle all or nearly all materials)
- Moderate recycler (perceive recycling as somewhat important or recycle some of the materials – do not fall into low level or devoted group)
- Low level recycler (perceive recycling as slightly or moderately important and rarely / never recycle or only recycle some materials)

In addition, the following demographic requirements were included:

- Inner City
- Outer areas of City
- Multi-family or apartment households
- Single family households

Illuminology conducted a screening process to ensure that enough residents were selected for the focus groups that covered the criteria above. The screening process was conducted in September and early October of 2020. Recruitment goals were to identify 8 residents for each recycler category above that also met the demographic requirements. Of the 8 residents selected, a total of between 5-6 per group would participate in the focus groups.

The focus groups were conducted on the following dates:

- October 13th: moderate recyclers
- October 14th: low level recyclers
- October 15th: devoted recyclers

b. Research Method

Illuminology conducted three 90-minute virtual focus groups via Zoom in mid-October 2020, with 6 participants in each group. Participants were Cleveland residents who have



a City of Cleveland recycling bin, and there was a good mix of gender, age, household income, and whether they live closer to downtown or further from downtown.

The following key findings and recommendations were identified by Illuminology. The entire final report from Illuminology is included in **Appendix C**.

c. Key Findings

i. Recycling Knowledge and Attitudes

Participants are unaware of what materials they can recycle and how clean their recyclables should be. This seems to be a major cause of contamination, and it is a source of frustration for residents.

ii. Program Evaluation

- Subscription-based program
 - Pros: Some participants like the idea because they are willing to do their part and/or they feel it would reduce contamination.
 - Cons: Some participants think recycling should be community-wide and see the extra cost as another tax they do not want to pay.
- Weekly curbside pickup: Importance of this varies depending on how quickly their recycling bins fill up.
- Curbside recycling of materials besides paper and cardboard: This is generally important. Participants want to be able to recycle items they use every day such as plastic water bottles and aluminum cans.
- Recycling drop-off locations: Many participants said these are important, but they seem to care more about having a place to drop off bulk items than having materials recycled.

iii. Bulk Waste

Many participants would like to see bulk waste picked up more frequently, and they see many abuses of the system.

d. Recommendations

Educate, educate, educate!



- Residents need to know which materials to recycle and how clean they need to be. Otherwise, contamination will continue to be a concern and residents will continue to be frustrated.
- Residents need to be convinced the recycling is being processed. Some residents are aware that the recycling is not currently being processed and they are skeptical about whether the recycling will be processed moving forward.

2. Community Survey

a. *Development and Distribution*

Sustainable Cleveland (administered by the City of Cleveland Mayor's Office of Sustainability) led the development of a complementary online survey engaging the residents of the City for additional community feedback. Additionally, this information can be used going forward by the City to target specific areas and topics for recycling education based on current knowledge of the system.

The survey was created in the fall of 2020 concurrent to this project by Sustainability Cleveland. During the development, the City looked at other comparable cities and regional cities in Ohio that had similar surveys. GT assisted the City in reviewing questions and suggesting comparable cities. Most of the questions focused heavily on recycling, but some questions included topics on bulk collection and demographics such as zip code. The questions asked were developed to gather more information on residents' past recycling habits, hopes for the future of recycling in the City, opinions, understanding of correct recycling, etc. The survey opened for answers in early December 2020.

The survey was online in the form of a Google Document. Sustainable Cleveland took the lead on distribution of the survey with help from other departments. Sustainable Cleveland had two mailing lists that it used: one created specifically for recycling (300-350 residents) information and the other contact form for the entire Sustainable Cleveland program (6,000+ residents). This survey was emailed to both contact lists early in December, and the link to the survey was posted on social media multiple times, posted on Sustainable Cleveland's blog, and on Sustainable Cleveland's website. Additionally, the survey was distributed by the Mayor's Office of Communications and City Council members. In total, at least 6,300 surveys were sent out. It is important to note that the lists used to submit the survey to residents were derived from interested residents in the program and not random selection of residents that takes into consideration all recycling habits, demographics, income level, race, and other factors. Said a different way, the results from this survey may be skewed to represent residents that are more avid recyclers.



b. Summary of Results

In total, 2,549 responses were recorded from the survey from across 15 wards of the City (40% response rate). The table below summarizes the most common answer for each question regarding waste and how many people responded with that answer. Certain questions allowed for open-ended answers or clarifications to “Other” but have been omitted from this report for brevity purposes. Some questions allowed the resident to select more than one answer, and these questions are marked with an asterisk (*). The full list of tallied answers to the survey can be found in Appendix H.

Table 16. Top Answers from Each Survey Question

Question	Most Common Answer	Count
Have you participated in the past by recycling items curbside?	Yes	2397
If you answered “Yes” to question 1 above, how often do you set out your blue cart?	Weekly	1758
*If you answered “Yes” to question 1 above, what items did you recycle curbside? Select all that apply.	Plastic bottles & jugs	2347
If you answered “No” to question 1 above, why haven’t you participated in curbside recycling? Select all that apply.	Other	98
Do you, or members of your household, take recyclables to a drop-off collection center now?	No	1758
Who is (are) the most frequent recycler(s) in your household?	Everyone recycles	2099
*How does your household typically dispose of plastic grocery bags?	Reuse them for other purposes and then place in trash can	1763
In the past year have you received payment for recycling aluminum, steel, and/or tin cans?	No	2258
About how many recyclables does your household generate for curbside recycling in a week?	More than half of the blue recycle bin is filled with recyclables	706
*What other waste reduction practices do you do at home? Select all that apply.	Use reusable water bottles and coffee mugs	2028
How often do you set out bulk items for collection?	1-2 times/year	839
*What items do you set out for bulk collection? Select all that apply.	Furniture	1606
When your household is unsure whether an item is recyclable, what do you do?	Place the item in the trash	1466
*What are the best sources you have used to find information about recycling? Select all that apply.	Other	1544
Have you ever visited the City of Cleveland Division of Waste Collection and Disposal website?	Yes	1708



Question	Most Common Answer	Count
*What information about waste collection and recycling would you like available when visiting the City of Cleveland website? Select all that apply.	Recycling- Information on what is/is not recyclable in curbside recycling	2203
Would you like having the option of opting in or opting out of recycling?	No	1330
Do you know how much you currently pay for waste and recycling services for your home?	No	1665
How much more would you be willing to pay for curbside recycling per month?	Up to \$5/month	701
Would you separate out your recyclable materials if requested (i.e. separate streams for cardboard and paper, plastics, metal, etc.)?	Yes	2121
How often would you prefer curbside recycling be picked up?	Weekly	1720
Would you be willing to drive to a central location to drop off your recyclable materials?	No	1070
If you answered "Yes" to Question 6 above, how far would you be willing to travel to a central location to drop off recyclable materials?	1-3 miles	555
If you live in an apartment or other household not serviced by the City of Cleveland Division of Waste, would you recycle if the service were made available through your residence?	Not applicable	1769
*Which of the following would encourage you to recycle more? Select all that apply.	Other	2069
How important is it to you that a business you visit frequently has recycling services?	Extremely important	1107
Do you feel it is the responsibility of the City to provide recycling services for residents?	Yes	2410
Why do you recycle at home?	N/A (open ended question)	-
Why do you think recycling is important?	N/A (open ended question)	-

In conclusion, GT’s assessment of the data collected from this survey effort was very helpful in understanding key elements of residents’ behavior and opinions for the waste collection and recycling program. This is especially evident from residents that take the initiative to want to know more about the City programs and Sustainable Cleveland (where most of the mail lists used for the survey came from). The conclusions and recommendations provided later in this report cover the suggestions and/or results of this survey effort along with the focus group initiative and other data gathering efforts conducted as a part of this Study.



P. CITY ENGAGEMENT

Engaging with City leaders, management, and staff was a key aspect of the process to understand the successes and challenges for the trash, bulk, and recycle programs along with ancillary services. GT conducted a strength-weaknesses-opportunities-threats (SWOT) process with the following categories of City personnel or officials:

- Management – managers, supervisors, and administration staff for waste and recyclables collection and sustainability personnel
- Staff – drivers and laborers who collect trash and recyclables
- Human Resources – managers of City employee policies
- Fleet – manager of City equipment and maintenance
- Customer Service – call center and resident engagement
- Leadership – decision makers on City Council
- Cuyahoga County Solid Waste Management District

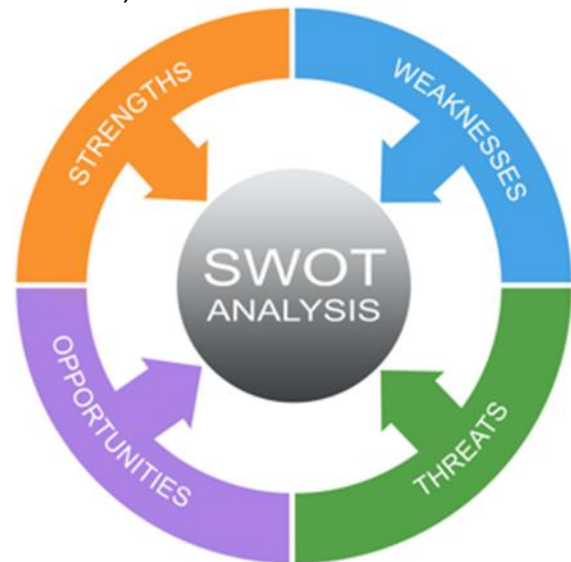
The SWOT process includes collecting information from the City on a variety of topics or aspects of the programs evaluated in this study. The SWOT process is defined below:

Strengths: What is working well with the area of analysis, internal (i.e. positive attributes and factors, tangible performance, value added services)

Weaknesses: What is not working well with the area of analysis, internal (i.e., negative factors, areas for improvement, operational issues, coordination problems, communication)

Opportunities: External to Cleveland program, positive factors (goals, collection system technologies, markets, equipment, service providers)

Threats: External to Cleveland, negative factors, beyond Cleveland control (markets, service providers, upper management, policies, regulations, budgets)



Each person that participated in the SWOT process had the opportunity to provide feedback on each category discussed and how they viewed the merits and areas of concern for each discussion topic from their perspective. GT did not record who provided each comment provided below. The comments were not voted on or prioritized; rather, the goal was to collect feedback from all that desired to provide feedback. This information was used in conjunction with all other aspects of this study to formulate conclusions and ultimately recommendations on improvement and/or new initiatives/programs included later in his report.



The following section summarizes the feedback received in the SWOT process for each group of City personnel and by category/topics covered.

1. Management

GT conducted a SWOT process with management, sustainability, and administrative representatives on October 1, 2020. The following list of key issues was identified through the meeting:

a. Recycling Program (Curbside and Drop-off)

Strengths:

- Everyone has access to recycling
- Designated cart
- Easy to participate
- Inexpensive to resident
- Certain areas residents appreciate the program
- Residential opportunity to dispose/reduce waste/recycling
- Residents see recycling as living a sustainable lifestyle
- Knowledgeable staff
- Weekly recycling

Weaknesses:

- Residents do not clean cart
- Residents not following rules
- Does not have education for rules
- City does not have a good budget for recycling education (\$25,000)
- Does not have outreach program by the division
- Messaging from MRFs have changed
- Challenging to keep up with the changes from MRF messages (materials)
- Recycling contamination has increased (40% to 60%)
- Lack of interest in participation
- Have had to pull carts due to contamination
- Rules of enforcement
- Drop-off program, one site is not staffed and has had illegal dumping
- Participation at drop-off (Ridge)
- 80 drop-offs to 2
- Not enough drop-off sites for residents without curbside or not enough cart capacity
- Charge for additional cart for capacity
- High recyclers may not be able to get another cart due to income
- Additional cardboard/bags of recyclables outside cart



- Residents may jam cardboard/material into cart
- Driver cannot see if additional material is left in the cart with automated truck
- Homeowners vs renters on recycling performance

Opportunities:

- Non-recyclers to have another trash cart in place of recycling cart
- Opt-in/subscription/optional recycling program
- Discount on “proper” recycling/take cart or remove discount if contamination
- Cost to opt-in to recycling for dedicated recyclers/cost for service/commitment
- Variable rate system/volume-based
- Many apartments are lost opportunities for recycling (dumpster or drop-off services)
- Business recycling opportunities to assist with offsetting cost
- City has existing infrastructure (carts)
- Messaging on the carts for materials accepted/branding
- Use data collected for future staffed drop-off sites/supercenters
- Reduce materials at curb and shift other materials that can be collected to a drop-off program
- Changing frequency of recycling curbside collection weekly to bi-weekly/monthly
- Magnetic Recycling sign to identify recycling collection
- Partner with organizations for targeted materials such as cardboard/glass/etc.
- Recycling transfer station with a supercenter
- Recycling program can assist with waste reduction residential education
- Residents are asking for education and build from bottom up/reset the system

Threats:

- Glass does not have a good market/market volatility
- Transportation time/distance
- Limited by one transfer facility
- Limited materials may open up to more contamination

b. Bulk Program

Strengths:

- Up to 3 materials on bulk week (first full week of month)
- Reduction in illegal dumping
- A service for residents that may not be able to disposal of large items otherwise
- Senior have been helped by Dept. of Aging to assist bulk items to the curb
- Residents are allowed 4 stops per year for bulk and charge beyond 4 stops
- Residents can call and schedule bulk pickup during non-bulk weeks



- Bulk offers option for healthier City/residents who may leave items on property

Weaknesses:

- Residents abuse/place more than limit of materials
- Scheduled service calls are not easy for the dept to collect on non-bulk weeks when monthly week is offered
- Non-paying residents abuse program by placing bulk items on curb
- Equipment may be limited for bulk collection depending on trucks available
- Program design does not meet demographics of City (timing of bulk week)
- Frequency of collection
- Staffing for bulk week with longer hours
- Bulk week has seen additional trash on curb
- Mondays with further from station adds up driving time with more materials
- Building materials are set out on curb
- Nonwrapped materials/mattresses/couches/etc. (bedbugs)
- Lack of enforcement with limited staff
- Residents wait to put more bulk materials or place elsewhere
- No funding to assist residents to provide large bags for wrapped bulk items
- Dumping on curb on vacant property or on a paying resident property
- Not having a well-managed bulk by appointment program
- No charge for special setouts
- Homeowner vs renters on bulk setout and whether it is collected or not
- Have a pickup everything on the curb policy regardless of enforcement/staffing/etc.
- "Loose routes" to clean remaining on curb

Opportunities:

- Appointment systems
- Increased frequency of collection
- Fee structure for more collection/above 3 items/cleanouts
- Dedicated crews for bulk
- Bulk truck at each station/reevaluate needs for trucks/equipment (not salt trucks)
- Address ordinances for bulk collection needs
- Reset expectations for council for bulk needs
- Reuse opportunities for residents
- KAB affiliates for assisting cleanups
- Independent/non-profits to work with sustainability/grant funds

Threats:

- Quantity of bulk material



- Markets which leave more appliances on curb (metals)
- Residents may not pay
- Non-paying accounts/not in the system add items to curb (commercial businesses)
- Requirement to collect noncompliance materials (clean the curb)
- Micromanagement

c. Waste Collection and Routes

Strengths:

- Everything gets collected/no trash left behind
- Low fee for residents
- Above and beyond City ordinances to keep City clean
- Flexible to collect late setouts
- Foremen on routes to assist crew
- Reduced/eliminated rodent issues
- Crews with boots on ground to assist other aspects/issue of the City
- Highly visible department

Weaknesses:

- Above and beyond City ordinances to keep City clean
- Staffing and equipment limitations
- Not enough trucks or many trucks needed to collect materials on one road
- Flexible to collect late setouts
- Parking issues
- Lack data on call-backs
- Technology to manage complaints
- No coordinated effort to manage complaints
- Transfer station only on west side
- Heaviest day on the furthest distance (Glenville)
- Not balanced routes
- No service center (basics) for truck near furthest center
- No callback charge
- No integration of charges/fees with current system
- Lack of compliance with ordinances
- Equipment does not match needs of different areas of the City
- Lack of communications with other division (water division/etc. blocked off roads)
- Reliant on ordinances versus power companies to take care of tree issues
- Development affects where carts can be placed (especially winter)
- Union contract difficult for City/management not involved in negotiation with contract



- Attendance with lack of employee for collection
- Bad hires/management not involved in hires/health requirements/hiring practice issue
- No evaluation of employees
- 1 dispatch center with 2 operators

Opportunities:

- New technology to manage/track (cameras, setouts, enforcement)
- One call place/central point of contact for tracking complaints
- Infrastructure for basic truck needs to be serviced
- Callback charge if there is a way to prove not set out at collection time
- Rerouting based on time and tonnage
- Consistent plan when reset/commit to program
- Across the City a semi-automated program
- Involve staff in equipment purchase (motor vehicle maintenance to consult with waste collection)
- Parking ban on waste collection days
- Management level to use new technology/monitor
- Expand dispatch system

Threats:

- City areas cannot be supported by a fully automated program
- Alleys/other street physical limitation that limit type of truck/collection
- Powerlines down/trees
- No parking available other than street in certain areas

d. Equipment and Maintenance

Weaknesses:

- Not a good preventative maintenance program
- Misalignment of needs
- Equipment may be limited for bulk collection depending on trucks available
- Equipment does not match needs of different areas of the City
- Transfer station floods and has destroyed scales before typical end of life period

Opportunities:

- Truck at each station/re-evaluate needs for trucks/equipment (not salt trucks)
- Involve staff in equipment purchase (motor vehicle maintenance to consult with waste collection)
- Re-evaluate replacement program/vehicle replacement strategy



- Equipment replacement fund
- Equipment specification
- GPS Locator

e. Absenteeism and Staffing

Weaknesses:

- Union contract difficult for City/management not involved in negotiation with contract
- Attendance issues which impact the number of employees available for collection
- Bad hires/management not involved in hires/health requirements/hiring practice issue
- No evaluation of employees
- Estimated 30% bad hires
- Pay questions addressed not at division but in downtown office

Opportunities:

- Probation/trial period
- Ability for an ongoing evaluation
- Unify equipment for training and hiring crews
- Accountability on absenteeism

Threats:

- HR not directly in division

f. Education, Outreach and Public Communications

Strengths:

- Tags for violations

Weaknesses:

- Does not have/little education for rules
- City does not have a good budget for recycling education (\$25,000)
- Does not have outreach program by the division
- Messaging from MRFs have changed
- Recycling program can assist with waste reduction residential education
- Residents are asking for education and build from bottom up/reset the system
- Tags are not always effective



Opportunities:

- Recycling coordinator
- Better technology/enforcement system
- Report recycling with reset (online or other methods of communication)
- Enforcement date after reset

g. Ordinances and Non-Written Rules

Strengths:

- Above and beyond City ordinances to keep City clean
- Non-written: No boxes over the weekend

Weaknesses:

- Above and beyond City ordinances to keep City clean
- Address ordinances for bulk collection needs
- Lack of compliance with ordinances
- Staffing for ordinance enforcement/citations

Opportunities:

- Accountability for residents to follow ordinances
- Separate enforcement entity
- Job functions reevaluated/realigned

h. Markets and Circular Economy

Threats:

- Glass does not have a good market/market volatility
- Markets which leave more appliances on curb (metals)

2. Staff

GT conducted a SWOT process with labor representatives (drivers, laborers, and union representatives) on October 1, 2020. The following list of key issues was identified through the meeting:



a. Recycling Program (Curbside and Drop-off)

Strengths:

- Notices of contaminations worked (when implemented)
- Drivers/laborers see contamination when opening lid
- Some people do need weekly recycling collection
- Accepted material list is ok

Weaknesses:

- Ridge Tues and Thurs routes need help
- People do not know what to recycle
- People fill up large recycle carts with trash
- Contamination enforcement takes too long
- Currently not educating people enough, initial education happened 10 years ago
- Not enough people to look through all the carts
- People put bags in recycling
- Weekly recycling causes issues, gives them more opportunity to contaminate
- System not operated as written in ordinances

Opportunities:

- Every other week recycling collection, offset with bulk
- Subscription recycling to free up recycling routes/trucks
- Constantly educating people what to recycle (news, sticker/engraving on cart, mailers, TV, flyers, water bill insert)
- Get rid of recycling altogether
- Only give recycling to people who want it
- Drop-off recycling
- Parking bans (but political issue)
- Commit to and rewrite semi-automated system in ordinances

Threats:

- Different quality of recycling depending on areas
- East side does not recycle as well as west (generally)
- People throw away educational material
- Parking bans will not work because off-street parking not always an option
- Cars are parked on both sides of street
- People will still place items outside of cart no matter what
- Low wires and branches



b. Bulk Program

Strengths:

- Citations for bulk worked
- Residents can schedule additional pickup
- Claw trucks work well (leased)

Weaknesses:

- People exceed bulk limits
- People use bulk program as cleanout program
- Materials not always wrapped
- People have to buy their own bags to wrap mattresses/couches
- City tickets people for incorrect materials, but still picks it up (inconsistent messaging/accountability)
- Leave no trash behind
- Additional cans get thrown away accidentally
- Additional cans are too heavy for laborers
- Additional requested bulk pickups are still a burden and people still place too many items out
- No enforcement of limit
- Drivers/laborers are being asked to do pickups out of responsibilities (i.e., backyard, too many items)
- Claw trucks are not owned
- Need more than one person working claw truck/bulk pickup
- Not enough drivers and not enough trucks
- Routes are not balanced, some are too heavy/too far away
- Bulk items clog up equipment
- Cars block routes/carts/setouts
- When people started having to pay, they took advantage of bulk/extra setouts

Opportunities:

- Purchase additional City cart for trash
- Stick with 3-item limit for bulk items
- Claw trucks work great (not perfect, but better)
- Once per month bulk is enough with claw trucks and enforcement
- Bulk pickup should have its own truck
- Bulk truck follows all trash trucks looking for bulk (like Elyria, not efficient)
- No bulk pickup at all, since open route has to pick items up anyway
- Need more packer trucks



Threats:

- Trucks/equipment break down every day
- People will max out the bulk collection frequency no matter what

c. Waste Collection and Routes

Strengths:

- Residents can purchase additional can (not City cart)

Weaknesses:

- Not balanced (times, tons, distance)
- Routes are not balanced, some are too heavy/too far away from each other
- Not strategically planned routes
- Often taking more than one load to TS
- Too many recycling routes: picking up lots of trash in recycle carts
- Laborers often hand tip carts rather than sideload arm
- Not enough trash routes or too many recycling routes
- Trucks have to go back for late setouts
- Trucks start late
- There are open routes with no trucks assigned, at least 3 per station per day
- Not enough drivers and not enough trucks

Opportunities:

- Automatic trucks only for recycling
- With less/no recycling, more workers available for trash pickup
- Have 2:1 trash to recycling routes, because not everyone uses recycle carts
- Make routes more balanced for times and tons
- Take picture/video of cart setouts for proof of late setouts
- Do not go back for late setouts, enforce no late setouts
- Include drivers and laborers in all decisions: reroutes, new equipment, etc.

Threats:

- Trash routes are too heavy because only half the people actually use recycling carts
- Parking issue with automated system



d. Equipment and Maintenance

Strengths:

- Claw trucks work well for bulk

Weaknesses:

- Only 1 mechanic station
- Drivers do their own basic maintenance
- Basic parts/oil not always available at own depot and have to drive to Ridge
- Trucks being overworked for double-backs/late setouts
- No logbook for issues
- Trucks often go down for the same issue, not keeping track efficiently

Opportunities:

- 20% more trucks than routes
- Labor and driver for all routes
- Take a driver/laborer when buying/picking up trucks
- Each station should have mechanic station and be maintained with material
- Should be second shift mechanic before trucks go out
- Keep track of issues with trucks and double-backs in logbook

e. Absenteeism and Staffing

Strengths:

- Admin/commissioners do interview of personnel

Weaknesses:

- People call off because being overworked, causes more open routes
- Long/difficult routes keep people from wanting to work
- Overworked and burnt out
- Bad trucks
- Drivers do not want to work with bad laborers
- 45%-50% "bad apples"
- Drivers have to make up work for bad workers or called-off workers
- The new employees do not get spread about
- No training program, just throw you in being trained by drivers
- High ups doing hiring
- No face-to-face evaluations
- Sometimes personality issues



- Management might not write up “favorite” employees
- Some weekdays are worse than others

Opportunities:

- New hires should do physical assessment
- Need new training program
- Formal booklet/sit down training
- Specific trainers, not just anyone
- Need evaluations
- Need incentives to work better
- Implement task system – do it and go home (or get paid overtime)
- More accountability/enforcement by management
- Write up every time, not just after many warnings
- Better pay/incentives, hazardous pay
- City could hire within/opportunities to transfer to other City positions later

Threats:

- Not everyone works as well as others
- Now people call off for COVID

f. Education, Outreach and Public Communications

Opportunities:

- Constantly educate people what to recycle (news, sticker/engraving on can, mailers, TV, flyers, water bill insert)

g. Ordinances and Non-Written Rules

Weaknesses:

- Ordinances do not reflect actual operations
- Unwritten rules not in ordinances
- 20 carts at some multifamily homes at multiple buildings, along with out-of-cart materials
- Some single-family houses have 4+ carts too
- Dorm area by Case Western grandfathered in with bunch of carts and loose trash, and other areas like this
- W174th CMHA has a bunch of loose trash (even though they have dumpsters)
- Abandoned houses have trash on curb too
- Too much pressure to leave no trash behind, but that contradicts rules



Opportunities:

- Should not pick up materials when ticketed
- Tell people to take their extra material/building material to transfer station

Threats:

- Abuse of certain rules (i.e., multifamily homes)

3. Human Resources

GT conducted a SWOT process with human resources representatives on October 7, 2020. The following list of key *weaknesses* was identified through the meeting:

- No high school diploma is required for labor positions
- No formal training for positions is conducted
- No formal employee evaluations are conducted
- Supervisors and managers do not always follow rules regarding employee discipline because of low employee availability on a daily basis
- Negative culture in Division of Waste Collection causing employee discontent and absenteeism
- No consistent communication with employees on policies, changes in operation, Division goals and objectives
- Human resources department feels between 5-15% of employees are not high quality. This is in contrast to management that feels 30% are not good employees and from labor who feels 60% are not good employees
- Human resources feels there is abuse in the sick time and call off policies
- Improve culture through training, coaching, communication, support and allowing for upward movement of employees

4. Fleet

GT conducted a SWOT process with the fleet management representative on October 7, 2020. The Fleet Department and Division of Waste Collection conducted a major revision on tracking and reporting on equipment maintenance and available over the past year. These improvements have assisted in freeing up available equipment from a low of 55 trucks to now around 65-75 trucks of the over 90 in the fleet.

The following list of key *opportunities* was identified through the meeting:

- Need improved accountability for equipment usage and reporting
- Implement electronic pre/post trip inspection with data shared back to fleet
- Need to match equipment with service and then stay with the system selected
- Build consensus with workforce on vision and system



- Transition to a scheduled purchasing sequence for equipment replacement
- Standardize maintenance system
- Standardize equipment and move away from CCC trucks as they are not dependable

5. Customer Service

GT conducted an engagement session the 311 and Mayor's Action Center staff on October 12, 2020. The goal of the meeting was to determine how the program operated and what could be improved. The following list of key issues was identified through the call:

Weaknesses:

- The 311 system is not promoted to the general public
- Rules on concerned subjects are not consistent (i.e., bulk setout rules, items out of cart collected/not collected, types of material collected, etc.)
- Little to no enforcement on rules/ordinances
- Approximately 20% of calls received are regarding waste cart issues
 - ✓ Do not have cart
 - ✓ Moved into a new address and needs a cart
 - ✓ Cart is damaged
 - ✓ Cart taken by waste truck
 - ✓ Early/late setouts (cart not collected)
 - ✓ Leave out cart all the time

Opportunities:

- The 311 system could be used as an education and outreach process by allowing residents to ask questions on how the programs operate

6. City Council - Leadership

GT conducted a SWOT process with City Council leadership on October 20, 2020. Input on the existing program operations and ideas for improvement was very important to this study. The following results are summarized from the SWOT process:

a. Waste and Recycling Program (Curbside and Drop-off)

Strengths:

- Simple program, expected and basic
- Core program of municipal government
- In past: Used to be one of the best City departments



- Hardworking commissioner
- Mailings and PSAs

Weaknesses:

- In past: missed streets and collections
- Non-existent recycling program currently
- Many complaints about no recycling
- People think they are paying for recycling, but no current recycling. People believe their payments cover all expenses and are owed service
- Also complained about initial implementation of recycling; confusing, disagreed about carts
- Absenteeism, especially repeat call-offs, burnout
- System based off of past system's operators
- Reports of missed collections from 311
- Reports of damaged containers from trucks/employees
- Some trucks automated, some are semi-automated

Opportunities:

- Short-term and long-term solutions
- No missed collections from people following guidelines as a focus, possibly some exceptions if necessary/possible
- Reinforce time guidelines for setouts to residents
- Clarify time guidelines for setouts in ordinances
- Need to focus on fixing recycling (priority)
- Only supervised drop-offs (or none)
- Develop local markets for recycling

Threats:

- Dumping at unsupervised drop-offs

b. Bulk Program

Strengths:

- Generous for residents, especially compared to other cities
- No extra charges for residents
- Option to go to RRTS for extra bulk 4 times per year
- Regularly scheduled pickups
- Bulk collection provides option for people who cannot take materials to RRTS
- Option to request additional pickup
- Current penalty fee for broken guidelines



Weaknesses:

- Not everyone is able to bring bulk to RRTS
- There is abuse of the bulk collection program by residents
- People setting out more than allowed, place on other people's yard
- Not enforcing the rules of the bulk program, leads into other issues
- Multiple types of truck collections
- Confusing bulk week schedule (which week is it?)

Opportunities:

- Keep current program, but add warnings
- Weekly collection (have done in the past, but might be too much)
- Bulk collected every week to clean up after trash truck
- Other models for bulk collection
- Additional large setout fee as another service

Threats:

- 3 trucks every route weekly may be inefficient (i.e., trash, recycling, bulk)
- Renovation/move out waste
- Cannot always find the responsible party for abandoned properties
- City ends up taking the responsibility for cleanups (should not be)

c. Ordinances and Enforcement

Weaknesses:

- Moratorium on citations has caused abuse of system
- Arbitrary management of recycling contamination citations
- Route supervisors have other responsibilities besides enforcement
- Recycling contamination percentage was difficult for residents, residents did not like it
- No clear way to appeal citations

Opportunities:

- Reasonable and enforceable (able to be done City-wide, fair, consistent) policy for citations/enforcement
- Use tablet for warnings/pictures/sending notes
- Simpler ordinances are best, clear policy and communication
- Enforcement would be beneficial if clear, fair, and able to be enforced
- Need a clear process for appealing



Threats:

- Not enough drivers/labor to look at every single cart and give citations equally

d. Education, Outreach and Public Communications

Strengths:

- 311 is available, and a great idea
- 311 has all the procedures for participation, able to share with residents

Weaknesses:

- 311 not well advertised, could be executed better
- Not a clearly communicated connection between 311, MAC, council, other parties
- Mailings, PSAs, other education before was not enough
- Hard to reach every single person

Opportunities:

- Public education will be imperative no matter the decision, but challenging
- Sticker on carts with recycling instructions
- Do not make people read a lot, use quick messages
- Use current trending media platforms (online, social media), fewer people use cable

e. Waste Collection Fee

Weaknesses:

- Not many people would want to increase fee
- People think they already are paying for recycling
- Council members might not want to implement fee
- People are financially struggling these days

Opportunities:

- Increase fees when things are going well, maybe implement down the road
- Possible fee for subscription recycling

f. Markets and Circular Economy

Weaknesses:

- Low value in mixed material



- People might still contaminate simple materials

Opportunities:

- Paper mills in state
- Focus on one material with value, at least at first (possibly fiber)
- Look at circular economy (collect feedstock and send directly to processor)

Threats:

- No paper mills in region
- Does the City actually benefit from selling materials to other parties?
- Could be complicated to implement reduced acceptable materials

7. City Council-Development/Planning/Sustainability Committee

a. Waste and Recycling Collection (Curbside and Drop-Off)

Strengths:

- City was able to rollout automated cart program
- Drivers do their best to get around obstacles on street
- Carnegie (and other drop off) great resource for dropping off hard to recycle materials, paper shredding,
- Carnegie drop off easy access (drive through)
- City has been able to improve drop offs since the past
- The fact that Cleveland initiated a recycling program
- Most of the time pickups are on time
- Most citizens want recycling to work
- Employees have been working through a pandemic and have been working hard and kept the division running
- Weekly collection of recycling and trash
- Commissioner responsive to every issue, small and big
- Not too many complaints about timeliness of routes

Weaknesses:

- Additional bags/debris outside cart are hard to manage
- Residents are disappointed and angry that recycling is not being recycled
- Residents heard from news station rather than city that recycling had changed
- Biggest challenges include renters who put trash in recycling cart
- 311 number one call is broken carts, broken wheels on cart, crushed carts
- Drivers might be damaging carts – lots of complaints from residents
- Unclear instructions about shredding program



- Residents do not always know when their waste will be picked up (confused about schedule)
- Routes and cart collection timing are inconsistent
- Inconsistent routes cost the city money from overtime pay
- Spending more money for a less efficient program that residents; costs get passed down to residents
- Sometimes management is not promoted fairly/does not have enough leadership/efficiency experience
- Recycling carts are left in street/driveway that can block traffic
- Unsure what the program for recycling for MFH is
- Backlog of black and blue carts – taking too long to get to residents
- Confusing between council/MAC/311 communication for residents and city systems – makes it difficult to keep track of issues
- Waste collection calendar on website is 2018
- Website (solid waste specifically) is out of date, confusing, and sometimes incorrect
- Workers have too much stress
- Too much dumping because there is nowhere to take material after demolition/renovation

Opportunities:

- Have additional sites to drop off recycling
- Better partnership with neighboring communities and county to help program
- Better communication plan to residents
- Better communication plan internally
- Target certain neighborhoods to reimplement recycling first where it was working
- Recycling can provide more jobs
- Task system (used to be task system in city) – would provide more consistency and efficiency for routes and pickups
- Improve (decrease) amount of overtime hours
- Save city money rather than cost the city money
- Train drivers to not damage carts
- Reducing consumption by residents should be priority
- Proper placement of carts in roads/tree lawn
- Deconstruction program to manage demolitions/renovations to hopefully recycle materials
- Need closer opportunities to residents to recycle rather than just Ridge Rd
- Running two trucks down the street – is that efficient? (i.e. trash and recycle even though recycling is just being disposed)
- Payment for residents by turning in cans/bottles for recycling
- Council should be included in implementation plan



Threats:

- Third party recycling is being overflowed from residents/people who want to recycle
- The carts might not be durable enough
- Carts maybe meeting the end of their lifespan
- Climate change is a big issue and worries some residents
- Housing density can have an effect on placement of carts

b. Bulk Program

Strengths:

- Commissioner and management have been very responsive in taking care of issues
- Claw trucks work well
- Bulk collection is very important to residents

Weaknesses:

- Residents might not have transportation capabilities to take bulk to transfer station
 - No vehicles not titled in Cleveland
 - No commercial vehicles
 - No small vehicles (cannot fit materials)
- Illegal dumping sometimes by contractors
- Illegal dumping by residents who cannot discard debris like they used to
- Illegal dumping makes city look bad
- Dumping in vacant lots and throughout city – has been worsening over years
- Dumping problems take too long to clean up
- Residents are dumping so many bulky items that it damages the city's appearance
- As fast as the dumping is cleaned up, more illegal dumps are created
- Daunting task to clean up illegal dumping because it is constant
- Absentee landlords and LLCs are not there to manage/oversee
- Landlords/renters not going to wait a month to dispose of bulk
- Not enough collection for residents, too stressful on workers and equipment
- City spending too much time and money on cleaning up dumping
- Apartment buildings put bulk items out incorrectly (wrong week, not wrapped)
- People unsure about bulk week schedule
- No (or not enough) locations on east side for aluminum can recycling
- Fire stations do not always have bins out for cans
- Residents' actions may damage the city equipment (i.e. overfilled carts)



- Uneven areas/routes' effect on trucks and equipment and labor (some are overworked and affected more than others)
- Not enough places and not enough cost-efficient places to take construction debris
- Illegal dumping is the biggest issue in certain areas

Opportunities:

- Be able to take commercial and out of city vehicles to transfer station for resident bulk
- Bulk truck follows weekly trash collection truck (depending on cost)
- Weekly bulk collection
- Take stress of cleaning up dumping away from drivers/laborers
- Better bulk program will result in less illegal dumping
- Hydraulic lift on back of truck so workers are not straining (like in the past)
- Purchase the right equipment for efficiency and time management
- Contact apartment building owners go after security deposit if break bulk rules
- Need more places to take construction material
- Use innovation to alleviate bulk items – local institutions and universities
- Cleveland could be a leader and innovator by finding new solutions
- Routing management program or software – could measure and alleviate route inconsistencies
- Replacement system, plan, and schedule for equipment and trucks
- Need program for MFH more than 4 units – waste management program, communication program, and/or punitive program

Threats:

- No communities in the nation are able to efficiently run recycling program
- Not really a market for paper and cardboard (for individual residents to recycle for income)
- Some areas are more or less dense or populated
- Trucks have more wear and tear in certain areas of city that are more or less dense

c. Ordinances and Enforcement

Strengths:

- Tickets and fines help to stop excess setouts

Weaknesses:

- Ordinances do not match what is currently being done



- Tickets are difficult to issue due to ordinances not matching operations
- Citations to citizens are not preferred

d. Education, Outreach, and Public Communications

Weaknesses:

- Materials allowed seem to change from time to time and place to place
- Materials allowed is confusing when residents know city is not recycling
- Education has always been confusing for recycling
- City was not consistently educating
- Citizens still do not understand things that are currently being communicated (i.e. bulk schedule)

Opportunities:

- Education component is critical
 - Stickers on the cart
- Citizens want to be educated on recycling topic
- Needs to be clear instructions
- Needs to be consistent basis
- Need professional educator
- Need budget set aside for education
- Mailers 3-5 times per year
- Need incentives and inspiration to recycle
- Marketing and educating people on how and why to recycle
- Educate public on most valuable and high demand materials
- Other ways to advertise when bulk week is
 - Marquee signs
 - Signs on community pages
 - Website
- Council to be included in education plan

e. Markets and Circular Economy

Weaknesses:

- Taxpayers are paying the bill of inefficient markets

Opportunities:

- Bring in innovators and entrepreneurs from institutions and universities to be a part of this conversation
- Develop think tank and create plan for circular economy



- Look at similar cities who are creating circular economies and markets
- There is a larger market for clean separated materials
- Regional or metropolitan approach to recycling, partnerships
- County or regional sorting center
- Put together list of places for individuals to take recycling materials
- Everything manufactured should have a certain percentage of recycled material
- Understand what a privatization of the waste collection program would look like

Threats:

- City cannot control the market
- The pandemic is making the controlling of the market more difficult
- Markets have changed because of China
- The single stream market is an expense not a revenue
- Big process and undertaking to create this type of market and plan

f. Other Notes

- Look at areas we can cut back to save money (duplicates, inefficiencies)
- Possibilities to move money around rather than cutting costs, but there is already competition between departments
- Possibilities to make this department profitable
- Look at past system to potentially go back to

8. Cuyahoga County Solid Waste Management District

GT met with the Cuyahoga County Solid Waste Management District on September 25, 2020 to conduct the SWOT process from their perspective regarding the City's waste collection and diversion programs.

a. Drop-off

Originally over 100 sites, narrowed to Ridge and 55 Street

Strengths:

- Ability for residents to recycle that do not have curbside services (MFH)

Weaknesses:

- No signage, no one monitors the site
- Access is rough
- Un-Manned
- Intimidating to participate at Ridge



Opportunities:

- Staffing of sites
- Enclosed and gated with set hours
- Drop-off program for all materials including special waste
- Bulky waste drop-off
- Should be separate from Ridge Road
- Could reduce illegal dumping
- Take advantage of City properties for sites

Threats:

- Budgets and Bureaucracy

b. Curbside

Strengths:

- Offered Citywide
- Participation is average
- Single stream
- Cart program and automation
- Acceptable material list

Weaknesses:

- Underfunded
- Apathy from management
- Under capitalized
- Not enough trucks
- Maintenance of equipment
- Running as semi-automated even though automated
- RFP and contract procurement are not good for recycling
- No recycling coordinator
- Bad history and public perception, no trust
- No enforcement or why did they receive ticket
- No one person is in charge of recycling for City
- High contamination

Opportunities:

- Need single point of contact for recycling, recycle manager
- Need social media specialist
- Need enforcement



- Implement program for those that desire the program (free subscription preferred), training and agreement required as a part of the subscription
- Prefer pragmatic opportunities versus pie in the sky programs
- Remove low value commodities (glass)
- Simplify to be paper and cardboard only, use drop-off for other specialty materials (metals, plastics).
- Every other week recycling to save cost, create special drop-off program
- No curbside only drop-off but more

Threats:

- Cost of program
- Fluctuating markets
- Politics

c. Bulk Program

Strengths:

- There is a lot of volume, renter driven

Weaknesses:

- Limits to what can be brought to Ridge Road (4 dumps per year per house)
- Not done weekly
- Bad use of trucks (salt trucks)
- Missed pickups

Opportunities:

- Property owner should be responsible for eviction related waste
- Better maximize Ridge for allowing flow of bulk and normal trash, reduce regulations
- Reuse for whole house clean-out materials (furniture)
- Charge for bulky items (subscribe to or appointment system)
- East side transfer station for bulk or solid waste

Threats:

- Abuse by contractors, residents, non-residents
- Cost to City



d. Waste Collection and Routes

Strengths:

- No trash is left behind

Weaknesses:

- Missed pickups
- Routes are inefficient
- Parking
- Enforcement
- Semi-automated pickup for automated routes

Opportunities:

- Re-route City with consideration for parking
- Parking ban for trash day
- Enforcement on excessive setouts
- Operate as an enterprise fund, price at market over time

Threats:

- Politics on no trash left behind

e. Ancillary Services (E-waste, HHW, Tires, Organics)

Strengths:

- They participate on HHW and e-waste and tires roundup

Weaknesses:

- No organic management
- Only open for HHW at Car on 1st Friday of each month
- Requires expertise and additional training
- Regulatory considerations

Opportunities:

- Better access for HHW
- Develop special staffed drop-off sites that include HHW, e-waste, Tires, Appliances, General Recyclables incorporating fees for certain materials



Threats:

- Cost to City
- Contractor abuse

f. Equipment and Maintenance

Strengths:

- Automated equipment

Weaknesses:

- Cart maintenance is lacking
- 65-70 running trucks for 70 routes
- Staffing issues, availability of drivers
- Truck maintenance is lacking

Opportunities:

- Need 84 trucks for 70 routes

Threats:

- Budget and user fee issues

g. Absenteeism and Staffing

Weaknesses:

- Staffing issues

h. Education, Outreach, and Public Communications

Strengths:

- Some resources available
- Open to using District branding materials
- Daily press release from Mayor can have recycling information

Weaknesses:

- No direct communications to residents
- Sustainability tries but are pulled in multiple direction



- No one to answer phone on issues for recycling
- Outdated resource materials need to be cleansed from website
- Website is very difficult to navigate
- Bureaucracy within City to educate is evident
- No signage at facilities or at curb (a good recycler could be identified)
- No effort to try to reach out to residents
- No efforts or programs with City schools to educate children on solid waste

Opportunities:

- Utilizes Sustainability to support but not carry the load of education
- Create separate team for communications that crosses direct and non-direct engagement (social media, website, direct engagement, instructional, phone calls) within the Division of Waste Collection and works with enforcement
- Create enforcement team that works with education team and Waste Collection Manager
- Train Council members on best way to engage residents on solid waste issues
- Community based grass roots education and involvement
- Need to allocate

Threats:

- Too many layers of approvals needed to push messaging out
- Funding needed for new team

i. Markets and Circular Economy

Weaknesses:

- City does not market directly to end users to complete circular economy

Opportunities:

- Working with other cities to aggregate commodities to sell to end users
- Large Midwest presence for end users with established markets and feedstocks

Threats:

- Control of wastes stream and quality of materials



III. COMPARABLE PROGRAMS, MARKETS, & TECHNOLOGIES

A. COMPARABLE COMMUNITY SURVEY SUMMARY

A total of seventeen cities were sent surveys to request information on their solid waste, recycling, bulk, and yard waste collection programs. Cities were targeted if they were known or assumed to have non-subscription collection programs that were operated by the city as well as if they had one or multiple similar characteristics to Cleveland such as demographic make-up, population, region, etc. Twelve of these cities responded to the survey. A blank survey form can be found in **Appendix D**. A complete summary of all answers to survey can be found in **Appendix E**.

The average recycling rate in these cities was 14% annually and ranged from 5-29%. The average recycling contamination rate (excluding one outlier of 69% contamination) was 20% and ranged from 9-29%. The table below provides a summary of this.

Table 17. Surveyed Communities' Contamination Rates

City	Contamination Rate
Cleveland	62%
Canton	Not available
Chesapeake	25%
Dayton	16%
Des Moines	18%
Grand Rapids	18%
Lexington	34%
Louisville	9%
Madison	19%
Memphis	14%
Milwaukee	19%
Nashville	29%
St. Louis	69%

All of the cities had varying challenges in different parts of their collection systems. The most common challenges are alleyways, open dumping, and cars in the streets. Ten out of the twelve cities have active enforcement procedures of guidelines. Each City charges residents differently (per year/month/quarter, per pickup, through taxes, only charged for extra, recycling included/not included, etc.), but the average basic charge per household is \$15.05 per month for collection services.

The three tables below summarize the main key performance indicators for trash, recycling, and bulk for the cities surveyed.



For trash collections, one City had only manual collection, three cities had only automated collection, five had automated collections with some semi-automated collections for certain areas/materials, and three cities had a mix of all three types of collections. All cities use carts for trash collection. Compared to the other cities, Cleveland has a lower trash disposal per household rate. It could be assumed that this is caused from many households in the City using their recycling cart as trash instead.

Table 18. Summary of Comparable Cities' Trash KPIs

City	Number of HH in City	HH with Trash Service	Trash Service Type	Trash Service Frequency	Trash Container	Number of Weekly Trash Routes	Total Trash Tons	Trash Pounds per HH per Year	Trash Cost to HH	Cost per Ton of Disposal
Cleveland	171,632	155,000	NS	Weekly	65-gallon cart	190	137,868.81	1,779	\$8.75	\$46.61
Canton	31,981	25,000	NS	Weekly	95-gallon cart	45	35,992	2,879	\$22.00	\$30.95
Chesapeake	86,878	70,000	NS	Weekly	96-gallon cart	160	60,000	1,714	\$0.00	\$58.00
Dayton	56,520	60,000	NS	Weekly	96-gallon cart	68	51,117.66	1,704	\$13.58	\$38.25
Des Moines	91,045	66,000	NS	Weekly	96-gallon & 64-gallon cart	70	62,428	1,892	\$15.20	\$36.00
Grand Rapids	77,128	45,000	S (open market)	Weekly	32, 64, 96-gallon carts	45	29,800	1,324	\$3.15, \$5.25, \$7.35 per tip	\$63.09
Lexington	128,806	93,790	NS	Weekly	96 & 65-gallon cart	100	Not available	Not available	\$4.50 + taxes	\$19.50
Louisville	252,784	84,000 in Urban Services District	NS	Weekly	95 and 68-gallon cart	105	75,457	1,797	\$8.11 (taxes)	\$32.27
Madison	114,096	71,000	NS	Weekly	65 and 96-gallon carts	75	44,157.72	1,244	~\$19.84 (taxes)	\$50.00
Memphis	254,423	174,954	NS	Weekly	96-gallon cart	360	226,810	2,593	\$29.96	\$24.96
Milwaukee	383,665	181,000	NS	Weekly	96-gallon cart	50	179,510	1,984	\$19.19	\$44.36
Nashville	268,061	140,116 in Urban Services District	NS	Weekly	96-gallon cart	178	179,135.55	2,557	\$0.00	\$39.74
St. Louis	147,076	110,000	NS	Weekly	90-gallon carts, alley	231	143,443	2,608	\$14.00	\$34.94



City	Number of HH in City	HH with Trash Service	Trash Service Type	Trash Service Frequency	Trash Container	Number of Weekly Trash Routes	Total Trash Tons	Trash Pounds per HH per Year	Trash Cost to HH	Cost per Ton of Disposal
					dumpsters 400 gallon					
Average	158,777	98,143	-	-	-	129	102,143	2,006	\$13.63	\$39.90

For recycling collections, one City had only manual collection, five cities had only automated collection, five had automated collections with some semi-automated collections for certain areas/materials, and one City had a mix of all three types of collections. All cities use carts for recycling collection, and some had options for sizes of carts.

The table below shows both recycling tons and *true* recycling tons. True recycling tons is the amount of material that is actually recyclable (i.e., without contamination), whereas the regular recycling tons and rate include any contamination that was included in the recycling stream. Cleveland’s regular recycling pounds per household rate is close to the average of all other cities; however, the true recycling pounds per household rate is much lower than average due to the high contamination rate. Additionally, Cleveland’s true recycling rate is much lower than average because of high contamination.

Table 19. Summary of Comparable Cities’ Curbside Recycling KPIs

City	HH with Recycling Service	Recycling Service Type	Recycling Service Frequency	# of Recycling Routes	Recycling Container	Total Recycling Tons	True Recycling Tons ³	Recycling Pounds Collected per HH per Year	True Recycling Pounds Collected per HH per Year	Recycling Rate ¹	True Recycling Rate	Contam. Rate
Cleveland	155,000	NS	Weekly	139	65-gallon cart	22,648.19 ²	8,606	292	111	14%	5%	62%
Canton	25,000	NS	Weekly	Not available	18-gallon bin	1,706	-	136	-	5%	-	Not available
Chesapeake	Not available	NS	Every other week	80	95-gallon cart	15,000	11,250	-	-	20%	-	25%
Dayton	30,000	S	Every other week	40	32 and 96-gallon carts	6,000	5,040	400	336	11%	9%	16%
Des Moines	66,000	NS	Every other week	35	96 & 64-gallon cart	8,782	7,201	266	218	12%	10%	18%
Grand Rapids	53,000	NS	Every other week	32	64 & 96-gallon carts	6,800	5,576	257	210	19%	15%	18%



City	HH with Recycling Service	Recycling Service Type	Recycling Service Frequency	# of Recycling Routes	Recycling Container	Total Recycling Tons	True Recycling Tons ³	Recycling Pounds Collected per HH per Year	True Recycling Pounds Collected per HH per Year	Recycling Rate ¹	True Recycling Rate	Contam. Rate
Lexington	77,645	NS	Weekly	65	96 & 65-gallon carts	Not available	-	-	-	-	-	34%
Louisville	84,000	NS	Weekly	35	95-gallon cart and 18-gallon bin	11,122	10,121	265	241	13%	12%	9%
Madison	71,000	NS	Every other week	45	65 and 96-gallon carts	17,834	14,446	502	407	29%	23%	19%
Memphis	174,954	NS	Weekly	180	96-gallon cart	14,364	12,353	164	141	6%	5%	14%
Milwaukee	181,000	NS	Monthly	175	96-gallon cart	25,455	20,619	281	228	12%	10%	19%
Nashville	105,198	NS	Monthly	44	96-gallon cart	27,002	19,171	513	364	13%	9%	29%
St. Louis	110,000	NS	Weekly	231	90-gallon carts, alley dumpsters 400 gallon	16,505	5,117	300	93	10%	3%	69%
Average	94,400	-	-	92	-	14,435	10,864	307	235	14%	10%	28%

¹Recycling rate = tons of recycling stream / (tons of trash stream + tons of recycling stream).

²Cleveland’s estimated recycling tonnage is the average of calendar years 2015-2017 because of the recycling program not operating as intended throughout 2018 and 2019.

³True recycling = tons of recycling x (1 – contamination rate %). True recycling represents materials recycled minus contamination.

Four cities had weekly bulk collection, two cities had monthly bulk collection, two cities had only on-call bulk collection, two cities had every other week bulk collection, three cities had on-call bulk collection on top of regular collection, and one City collects bulk three times per year with unlimited material. Most of the other cities have limits as to how much bulk can be placed out per pickup. Some will have residents pay per pickup or per item, other cities require an extra charge for over-the-limit setouts, and some cities give fines for going over the limit.

Cleveland’s total bulk tons and bulk pounds per household are lower than average of the other cities. This may be due to the City collecting bulk/out-of-cart materials on non-bulk weeks that do not get counted or Cleveland may not have collected as much bulk as other cities in 2019.



Table 20. Summary of Comparable Cities' Bulk KPIs

City	Number of HH in City	HH with Bulk Service	Limits to Items	Bulk Service Frequency	Total Bulk Tons	Bulk Pounds per HH per Year	Bulk Cost to HH
Cleveland	171,632	155,000	3 items per pickup	Monthly	6,153.83	79	\$0
Canton	31,981	25,000	2 items per pickup	Weekly	Included in trash	-	\$0
Chesapeake	86,878	70,000	4-foot-wide x 4-foot-high x 10-foot-long	Weekly and on-call, limit of 12 per year, must be pre-scheduled	20,000	571	\$0
Dayton	56,520	60,000	-	Monthly, must be pre-scheduled	7,674.62	256	\$0
Des Moines	91,045	66,000	-	Weekly, must be pre-scheduled	Included in trash	-	\$5 per item
Grand Rapids	77,128	45,000	-	On-call	Included in trash	-	\$30 per item
Lexington	128,806	93,790	-	Weekly, pre-schedule for appliances, sofas, and tires	Included in trash	-	\$0
Louisville	252,784	84,000	-	3 collections per year plus free drop-offs	Not available	-	\$0
Madison	114,096	71,000	-	Every other week	9,396.17	265	\$0, \$10, \$15, \$35 per item fee depending on item
Memphis	254,423	174,954	0.5 cubic yard	Twice per month	142,436	1,628	\$0
Milwaukee	383,665	181,000	-	Weekly for 0-1 cubic yard, and on-call for more than 1 cubic yard	5,258	58	\$0 for 0-1 cubic yard, \$50 for 1-4 cubic yards, \$150 for 4-6 cubic yards
Nashville	268,061	277,903	-	On-call every three weeks, through sheriff	Included in trash	-	-



City	Number of HH in City	HH with Bulk Service	Limits to Items	Bulk Service Frequency	Total Bulk Tons	Bulk Pounds per HH per Year	Bulk Cost to HH
St. Louis	147,076	110,000	3 items per pickup	Monthly	7,799	142	\$0
<i>Average</i>	158,777	108,742	-	-	28,388	429	\$0

1. Focused Interviews

Because of the pandemic and location of the cities selected for in-depth interviews, all were conducted via teleconference. The cities below were interviewed or analyzed for additional in-depth information on their programs: Grand Rapids, Milwaukee, Des Moines, Chesapeake, and Dayton.

a. Grand Rapids, MI

Grand Rapids operates a curbside trash, recycling, yard waste, and bulk collection program. The trash collection program is volume-based with three cart sizes/prices that are charged per tip: 32-gallon carts are \$3.15 per tip, 64-gallon carts are \$5.25 per tip, and 96-gallon carts are \$7.35 per tip. Tips are accounted for using RFID tags on each cart and cameras on each truck. The RFID tags cost the City \$1 per tag and last approximately 10 years. However, it is an open market, and residents may use a private hauling company if they wish; approximately half of the City residents participate in the City-operated program. The City noted that their volume-based program is only successful because of their large overhead budget, updated technology, and detailed plans.

Bulk material is collected weekly on the same day as trash collection. Residents must buy a sticker or tag per item. Drivers will then call in the bulk item when passed on their route.

Curbside recycling is also provided by the City. Household costs are included in taxes, and residents have a choice of two cart sizes: 64-gallon and 96-gallon. Overall, the City has a 19% recycling rate and a 15-20% contamination rate. Different areas of the City have better/worse contamination rates. When drivers see a recycling cart that is clearly being abused and contaminated, they leave a warning of violation. The second time that this is noticed at the same residence, the cart is taken away.

The City has 45 trash routes and 32 recycle routes. Both streams are collected Monday through Friday. The City employs eleven trash collection employees and ten recycling collection employees. Each truck has one employee with no helpers since the routes are automated. However, drivers leave the cab to move carts if needed. One employee is a permanent “helper” who fills in and completes odd tasks daily where needed.



The City is currently undertaking a recycling cart tagging education program using the Recycling Partnership's methodology. A private company did a baseline waste audit and plans to do one after the initiative. The City worked closely with the county MRF on sending out educational mailers before the program. On average, the City spends about \$3 per household on recycling education which includes an annual mailer, neighborhood association meetings, and special programs like the current tagging program.

b. Milwaukee, WI

Milwaukee operates a curbside trash, recycling, yard waste, and bulk collection program. The trash collection program is non-subscription and uses 96-gallon carts. Residents pay \$57.57 per quarter (\$19.19/month) through taxes for trash, recycling, bulk, and yard waste collections. An additional cart is allowed upon request for an additional \$17 per quarter (\$5.66/month).

The City owns two transfer stations in the City which are operated by a third party and also co-owns a MRF with the county which is also operated by a third party. This makes transporting easier and provides drop-off centers for residents to bring additional bulk material, electronics, yard waste, etc. Additionally, the contract with the MRF operator requires that the operator invest \$2/ton of material to the City's recycling educational program. Additionally, because the county also co-owns the MRF, the county assists with other education in the City. The City noted that owning their own facilities provides more control of the programs and costs long-term.

Bulk material is collected weekly on the same day as trash collection. Residents are allowed up to 1 cubic yard per week for free. Additional materials from 1-4 cubic yards cost \$50 for a pickup, and 4-6 cubic yards of materials cost \$150. Residents can also take additional bulk materials to one of the two drop-off centers in the City.

Curbside recycling is also provided by the City. Household costs are included in with trash, and residents again use 96-gallon carts. Overall, the City has a 12% recycling rate and a 19% contamination rate. Areas of the City with more renters often have more contamination. When drivers see a recycling cart that is clearly being abused and contaminated, they leave a warning of violation and notify supervisors. The second time that this is noticed at the same residence, the supervisors will give a fine usually through the mail.

The City's routes are broken into three main areas (similar to Cleveland) and operates approximately 23 trucks per area per day for all collections. Both trash and recycling are collected Monday through Friday. Most trucks are semi-automated with a driver and a helper because 60% of the collections are in alleys. Few trucks are automated with just one driver. Cars in the streets are not an issue since they plan for these areas to be part of the semi-automated routes.



The City employs a recycling program manager who is responsible for reporting, recycling operations, invoices, contracts, partnership with Keep America Beautiful, organics collection oversight, marketing materials, and educational and special initiatives. The City spends about \$160,000 per year on the recycling education/outreach program, and about half of this goes to salaries and wages. Some of the educational initiatives that Milwaukee implements includes:

- Recycling cart tagging program, using Recycling Partnership's methodology
- Social media (best form of interaction and success)
- Mailers that include sections to cut out and place on refrigerator
- Tours of facilities
- Special event participation
- Class/school visits
- Classes for landlords

c. Des Moines, IA

Des Moines operates a curbside trash, recycling, yard waste, and bulk collection program. The trash collection program is volume-based with two cart sizes/prices: 64-gallon carts are \$14.13 per month and 96-gallon carts are \$15.20 per month. An additional trash cart is allowed upon request for an additional \$11.99 per month (64-gallon) or \$13.06 per month (96-gallon) and requires a minimum 6-month commitment. Additional trash bags and boxes under 2'x2'x3' and items under 40 pounds are allowed outside of the cart and require a \$1 tag that can be purchased from the City.

Bulk material is collected weekly on the same day as trash collection but must be called in ahead of time. Residents must buy a \$5 tag per item. Appliances require 7 tags (i.e. cost \$35 per pickup). Additionally, the City holds nine free bulk drop-off days per year.

Curbside recycling is also provided by the City and costs are included in the trash cost. Overall, the City has a 12% recycling rate and an 18% contamination rate. The City's Neighborhood Inspection department is responsible for enforcing correct trash and recycling. If the department sees a violation and it is not cleaned up in a week, they issue a violation. Residents have 21 days to fix. If not cleaned up, City crews will show up to clean the violation and charge the residence \$420 per hour. The cleanup crew is often the "floater" employees described below.

The City has a total of 73 trash routes and 35 recycle routes. Both streams are collected Monday through Friday. The City operates automatic side-load trucks. Helpers are sometimes added to routes known to have issues with the truck getting to carts due to cars and other misplacements. No alleyways are collected on routes. The City employs eight additional employees referred to as "floaters" who will fill in for call-offs, extra helpers, and other random tasks needed each day.



The City is currently undertaking a recycling cart tagging education program using tags, pictures, tablets, and externs. However, the externs were City teachers who were off for the summer, and now the City is relying on drivers to tag carts with obvious high contamination. Additionally, the City sends out an annual mailer to all households.

d. Chesapeake, VA

Chesapeake, VA was also interviewed specifically about their bulk collection program. Residents in Chesapeake are allowed 12 total bulk collections per year. Bulk is usually collected on the same day as regular trash, but it must be pre-scheduled. Residents must submit a request for a pickup via phone or online at least the day prior to the requested pickup. Materials cannot be placed at the curb for collection any earlier than three workdays prior to the regularly scheduled collection day. Residents must request bulk yard waste pickups in the same way, but they have an unlimited number of bulk yard waste pickups (i.e. bags of leaves, bundles of branches). Residents do not pay anything for trash nor bulk collection. However, the City is debating on changing this.

Each bulk setout has a maximum size limit of 4-foot-wide x 4-foot-high x 10-foot-long, and each bulk yard waste setout has a maximum size limit of 4-foot-wide x 4-foot-high x 6-foot-long. Bulk items allowed in the program include appliances, boxes/bags of household dry goods, furniture, mattress/box-spring, patio furniture, small garage clean-out. Items not allowed include hazardous waste, carpet, wood and fencing, construction and demolition debris, manufacturing process debris and loose or dangerous refuse.

The online and phone call bulk waste collection requests are through the City's general Customer Contact Center. Requests through this system specify bulk collection and address (in order to know which route the house is on), are emailed to the City's public works department, and are printed out for routing and scheduling for the drivers at the beginning of the day. The City owns about 10 grappler trucks to collect bulk items scheduled. Drivers who operate grappler trucks are the most trained drivers in the fleet. They can also operate rear load trucks if necessary.

The City does not actively seek out violations to bulk setouts. Instead, they rely on residents to call in violations. When a violation is called in to the main City line, an email gets sent to everyone in the public works department. These emails are printed out by dedicated inspectors. If residents violate the rules and guidelines to this program, the City inspector gives a 48-hour notice to remedy the violation by going to the residence and speaks with the homeowner. If the issue is not remedied within 48 hours, the City may remove the items and charge the responsible party all costs of removal plus an administrative fee of \$100.



e. Dayton, OH

The City of Dayton was identified because it has monthly bulk collection on an appointment basis. Bulk is collected monthly on Fridays across the City of Dayton and must be scheduled in advance.

Residents refer to a map that shows which areas are picked up on each Friday. All residents have one pickup per month. The program has notification parameters for residents which provides the Dayton adequate time to schedule the bulk stops on routes. Also, they request that metal is separated so that a separate route can pick up the metals for recycling.

Dayton requires residents to call in for bulk item collection by 3:00pm the day before collection. In addition, they request that residents who have already scheduled a bulk pickup and want to add items call in for the additional items as well. The bulk collection begins at 6:30am. In effect, Dayton requires residents to identify all items that will be set out. By knowing all items that will be set out, the Dayton can effectively plan for and route the bulk item pickup.

Other criteria required for bulk pickup include:

- Set out bulk items after 3:00pm on the day before scheduled pickup
- Separate metal items (stoves, refrigerators, etc.) from other bulk items
- Remove refrigerator doors
- Loose and small items must be securely contained, bundled, or bagged
- Yard waste (brush, clippings, tree limbs, etc.) must be tied into bundles not larger than 4 feet long and 18 inches in diameter. Bundles are limited to 25 pounds each

Items that are prohibited from collection include concrete, rocks, brick blocks, sand, gravel, grass clippings, or hazardous waste.

B. RECYCLE MATERIALS MARKET ANALYSIS

GT conducted a commodity (recyclables) market analysis of the main recyclable components of the waste stream. Historical recycling statistics were provided by the *Online Commodity Pricing Index* and is based on an average of the low and high mill buying prices reported by buyers and sellers. This index is considered nationally as the most unbiased, independent, and “real-time” benchmark for post-consumer materials commonly collected in curbside recycling programs. The historical prices analyses below represent the average prices in the Midwest area of the United States (OH, IN, MI, IL, WI, MN, IA, MO, NE, SD, ND, MT, WY) and the Canadian territories of Alberta, Saskatchewan, and Manitoba. All prices are represented in dollars per ton. The commodities evaluated include:



- Fiber
 - Newspaper
 - Cardboard and paperboard
 - Magazines
 - Office and ledger paper
 - Mixed paper
- Plastic
 - PET plastic
 - Natural HDPE plastic
 - Colored HDPE plastic
 - Mixed plastic #1-7
- Metal
 - Steel cans
 - Aluminum cans
- Glass
 - Flint
 - Amber
 - Green

1. Paper and Paperboard (Fiber)

The largest component of the municipal solid waste stream is paper and paperboard¹. This includes newspapers, food packaging, tissues, cardboard, office paper, and other paper products like paper plates. The United States Environmental Protection Agency (USEPA) estimates that paper and paperboard make up 25 percent of the solid waste generated. This is an estimated 67 million tons in the US in 2017. Approximately two-thirds of this fiber material was recycled in 2017.

The Ohio Department of Natural Resources (ODNR) completed a waste characterization study of several landfills in Ohio in 2004 (This is the most up-to-date audit report completed for Ohio's landfills). ODNR's study and report concurs with USEPA that paper and paperboard is the largest component of the solid waste stream. The ODNR study identifies paper as an even larger component of the solid waste stream at 41 percent.

The American Forest and Paper Association (AF&PA) stated that paper recycling reached 68.1 percent in 2018 and has more than doubled since 1990. The AF&PA reports that 80% of all paper mills use recycled paper to produce new paper-based products.

a. Newspaper

Three grades of newspaper were analyzed for this report: sorted residential newspaper, sorted clean newspaper, and white news blanks. Sorted residential newspaper (SRNP)

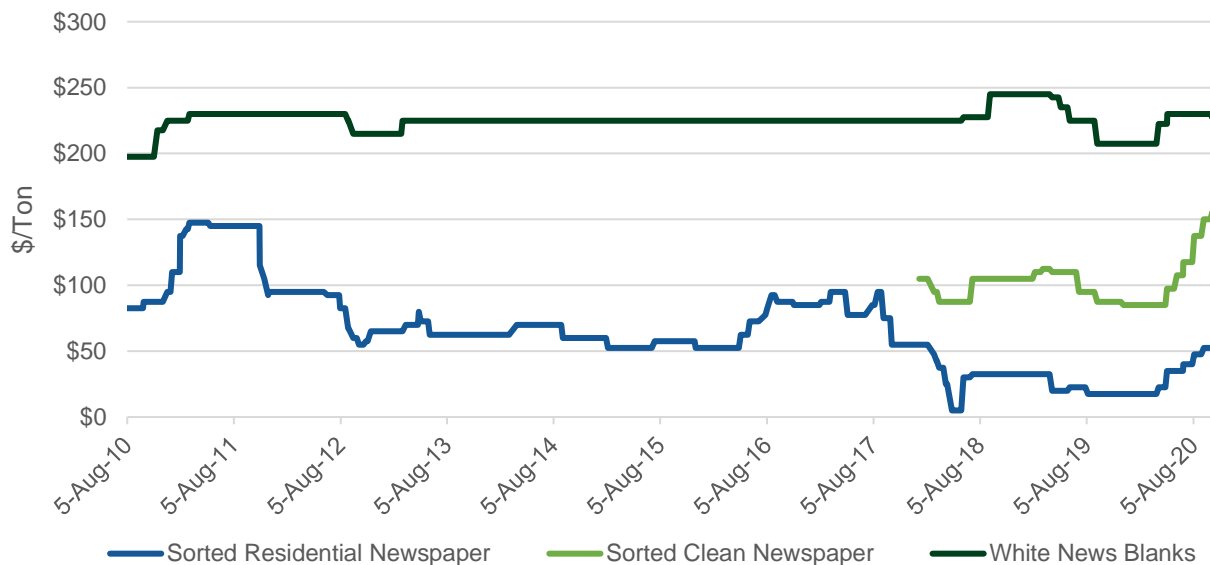
¹ Advancing Sustainable Materials Management: 2018 Fact Sheet, USEPA, November 2020.



consists of “sorted newspapers, junk mail, magazines, printing and writing papers and other acceptable papers generated from residential programs.” Sorted clean newspaper (SCN) consists of “sorted newspapers from source separated collection programs, converters, drop-off centers and paper drives containing the normal percentages of roto gravure, colored and coated sections. May contain inserts that would normally be included in the newspaper in the proper proportions.” White news blanks (WBN) consists of “unprinted cuttings and sheets of white newsprint or other uncoated white groundwood paper of similar quality.”

Though slightly different, these three grades are analyzed alongside one another for this report. Pricing for sorted residential newspaper has ranged from a low of \$5.00 per ton in June 2018 to a high of \$95.00 in August 2017. Pricing for sorted clean newspaper has ranged from a low of \$85.00 most recently in April 2020 to a high of \$155.00 currently. Pricing for white news blanks has ranged from a low of \$197.50 in 2010 to a high of \$245.00 in March 2019.

Figure 22. Historical Newspaper Pricing



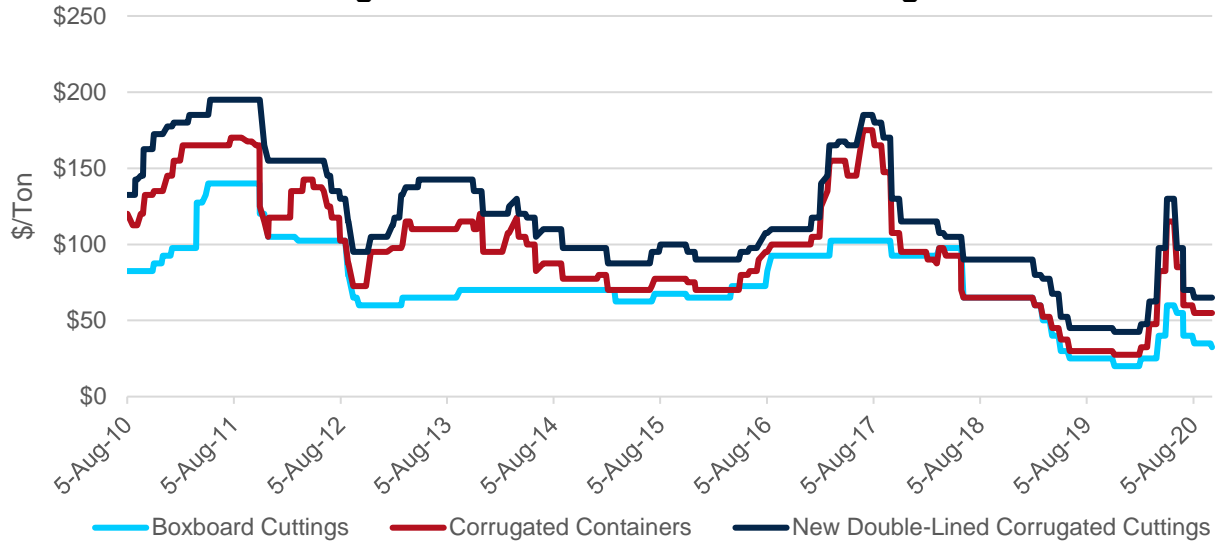
b. Cardboard and Paperboard

Similar to newspaper, three grades of cardboard were analyzed for this report: boxboard cuttings, old corrugated containers (OCC), and new double-lined kraft corrugated containers (DLK). Boxboard cuttings consist of “new cuttings of paperboard used in the manufacture of folding cartons, set-up boxes, and similar boxboard products.” Old corrugated containers consist of “corrugated containers having liners of either test liner or kraft.” Corrugated cuttings consist of “new corrugated cuttings having liners of either test liner or kraft.”



Pricing for boxboard cuttings has ranged from a low of \$20.00 per ton in January 2020 to a high of \$140.00 in 2011. Pricing for old corrugated containers has ranged from a low of \$27.50 most recently in January 2020 to a high of \$175.00 in July 2017. Pricing for corrugated cuttings has ranged from a low of \$42.50 in January 2020 to a high of \$195.00 in 2011.

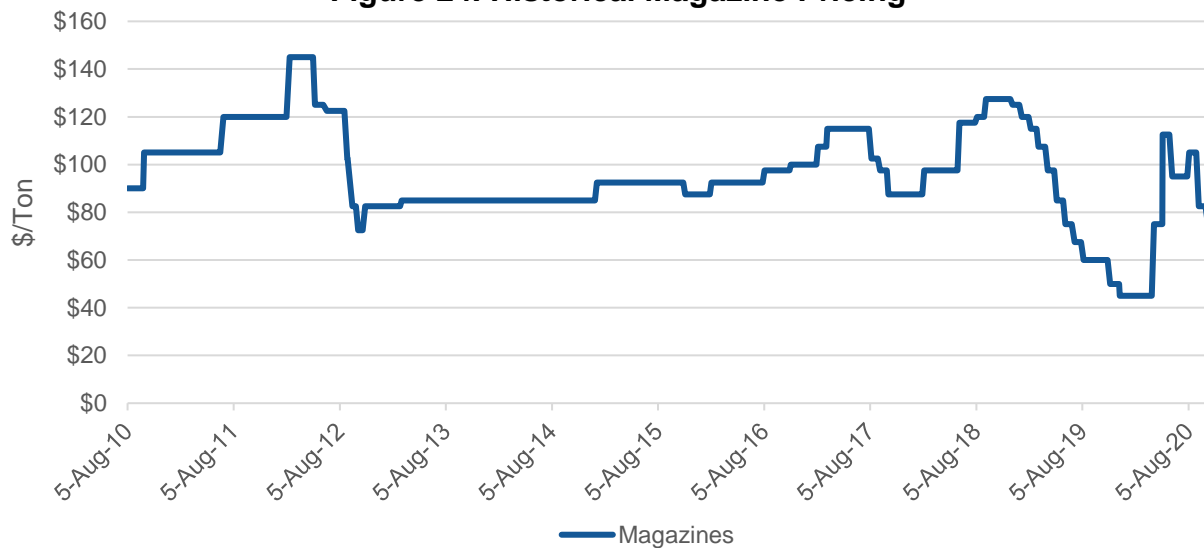
Figure 23. Historical Cardboard Pricing



c. Magazines

Magazines consist of “coated magazines, catalogues, and similar printed materials. May contain a small percentage of uncoated news-type paper.” Pricing for boxboard cuttings has ranged from a low of \$45.00 per ton in March 2020 to a high of \$145.00 in 2012.

Figure 24. Historical Magazine Pricing





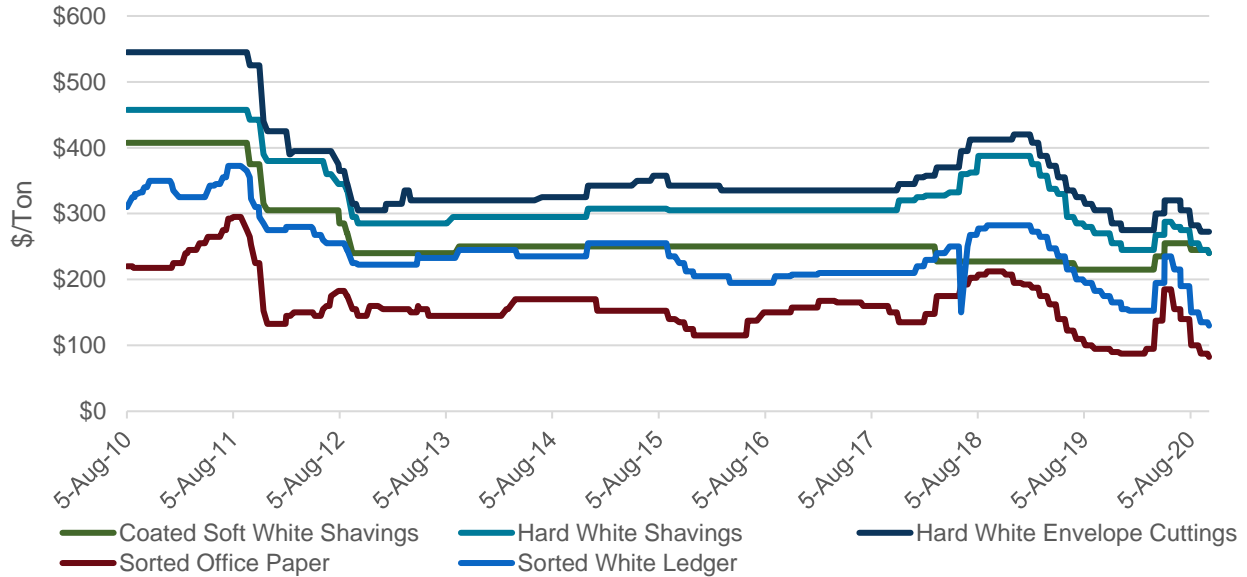
d. Office Paper and Envelopes

Five grades of office paper and envelopes were analyzed for this report:

- Coated soft white shavings (SWS): unprinted, coated, and uncoated, shavings and sheets of white groundwood-free printing paper
 - Minimum: \$215.00 – March 2020
 - Maximum: \$407.50 – 2011
- Hard white shavings (HWS): shavings or sheets of unprinted, untreated white groundwood-free paper.
 - Minimum: \$240.00 – currently
 - Maximum: \$457.50 – 2011
- Hard white envelope cuttings (HWEK): groundwood-free cuttings, shavings, or sheets of unprinted, untreated, and uncoated white envelope paper.
 - Minimum: \$272.50 – currently
 - Maximum: \$545.00 – 2011
- Sorted office paper (SOP): paper, as typically generated by offices, containing primarily white and colored groundwood-free paper, free of unbleached fiber. May include a small percentage of groundwood computer printout and facsimile paper.
 - Minimum: \$82.50 – currently
 - Maximum: \$295.00 – 2011
- Sorted white ledger (SWL): uncoated, printed, or unprinted sheets, shavings, guillotined books, and cuttings of white groundwood-free ledger, bond, writing, and other paper which has similar fiber and filler content.
 - Minimum: \$130.00 – currently
 - Maximum: \$372.50 – 2011



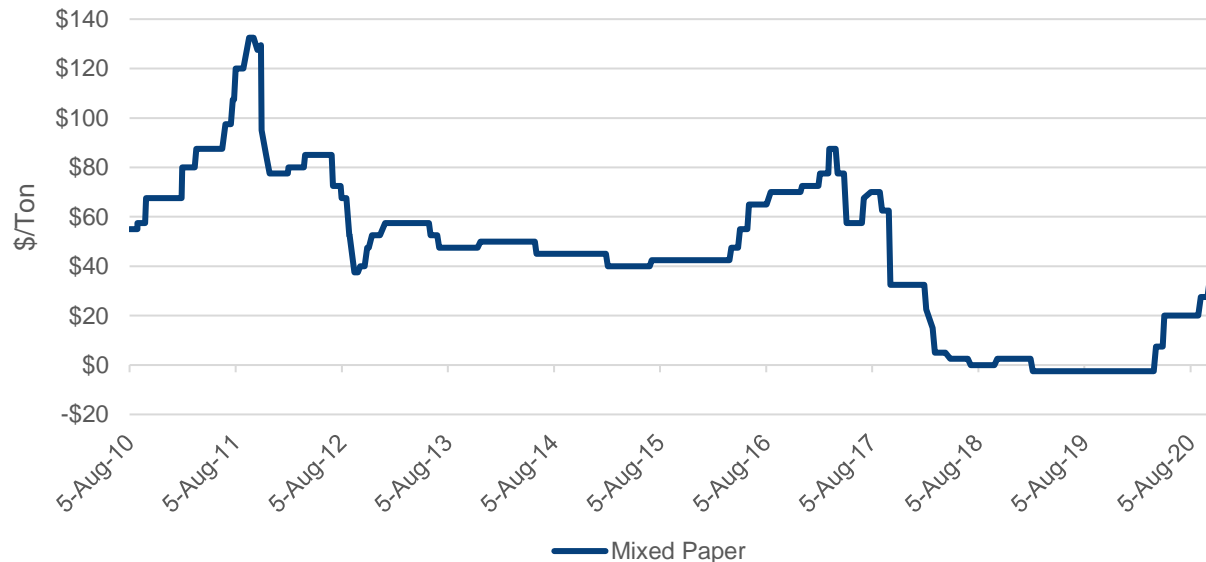
Figure 25. Historical Office Paper Pricing



e. Mixed Paper

Mixed paper consists of “all paper and paperboard of various qualities not limited to the type of fiber content, sorted and processed at a recycling facility.” Pricing for mixed paper has ranged from a low of -\$2.50 per ton in March 2020 to a high of \$132.50 in 2011.

Figure 26. Historical Mixed Paper Pricing





f. Paper Market Summary

The commodity pricing for paper is dependent upon the type, quality, and demand for paper. The historical data shows that pricing can be volatile. As an example, the pricing for cardboard was at a ten year low in January 2020 and has since increased to 10-year average prices. However, the average total fiber prices for the 16 most common grades of recycled fiber has remained fairly steady in the last 10 years. The market can swing quickly which can significantly impact revenues both positively and negatively for a material recovery facility.

2. Plastics

Plastic makes up approximately 13.2% of the municipal waste stream². The United States Environmental Protection Agency (USEPA) estimates that only about 8% of the plastic generated gets recycled, or about 3 million tons per year in the US. ODNR's waste characterization study for Ohio in 2004 indicates plastic is the second largest component of the solid waste stream. Plastic comprises 16% by weight and 25% by volume.

Though only 8% of plastic in the municipal waste stream is being recycled, the American Plastics Council states that 94% of Americans have access to plastic bottle recycling, 90% have access to plastic bag/film recycling, and 60% have access to other rigid plastic recycling.

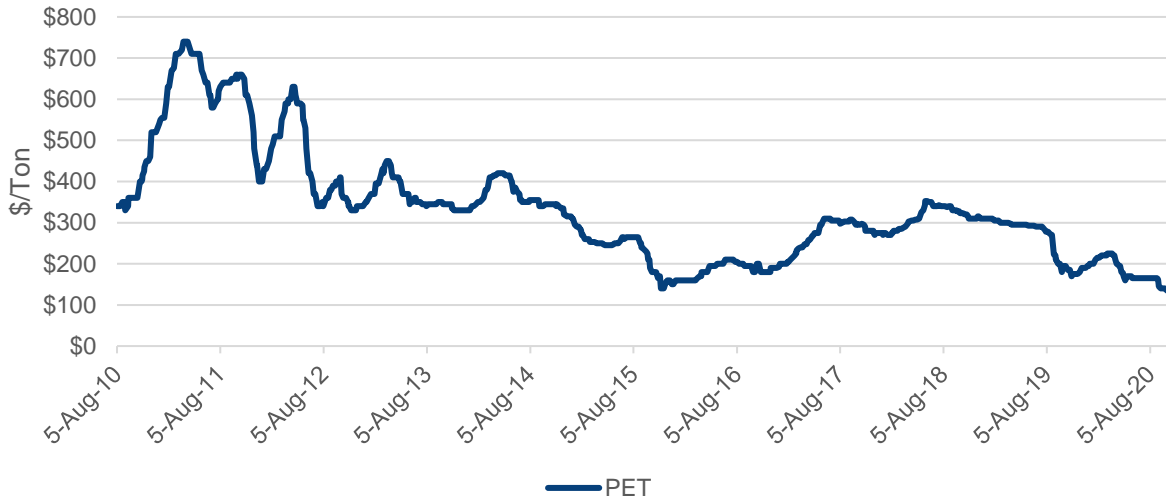
a. PET Plastic

PET plastic consists of "mixed, postconsumer PET food and beverage bottles and jars from curbside collection programs. May include up to 30% green tinted bottles." Pricing for PET plastic bottles has ranged from a low of \$135.00 per ton currently to a high of \$740.00 in 2011.

² Advancing Sustainable Materials Management: 2018 Fact Sheet, USEPA, November 2020.



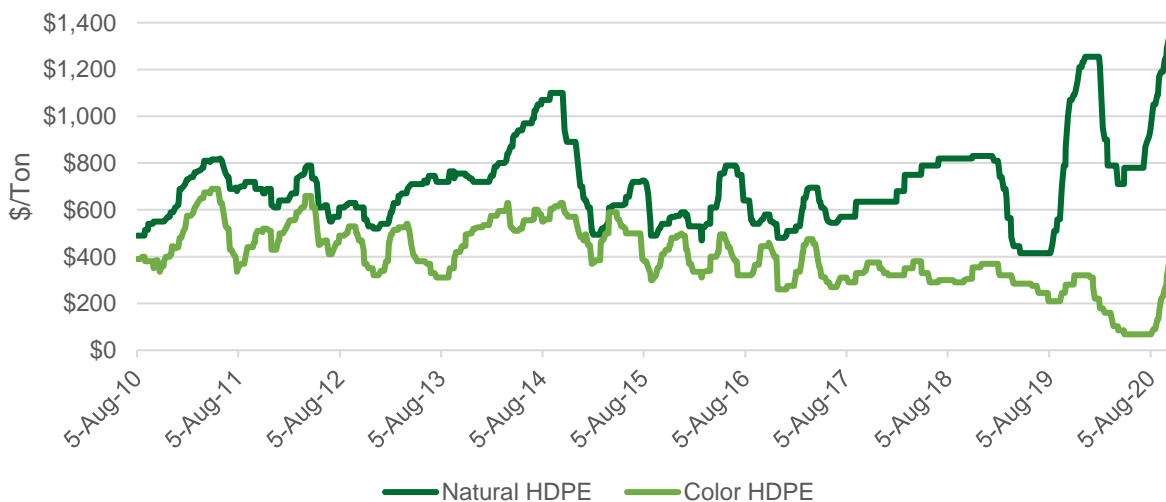
Figure 27. Historical PET Pricing



b. HDPE

HDPE natural consists of “uncolored, postconsumer #2 HDPE containers from household products typically collected in residential recycling programs. Examples include milk, vinegar, or ammonia bottles.” HDPE colored consists of “mixed colored, postconsumer #2 HDPE containers from household products typically collected in residential recycling programs. Examples include detergent, orange juice, and shampoo bottles.” Pricing for HDPE natural bottles has ranged from a low of \$415.00 per ton in August 2019 to a high of \$1,330.00 currently. Pricing for HDPE colored bottles has ranged from a low of \$68.00 per ton in August 2020 to a high of \$690.00 in 2011.

Figure 28. Historical HDPE Pricing



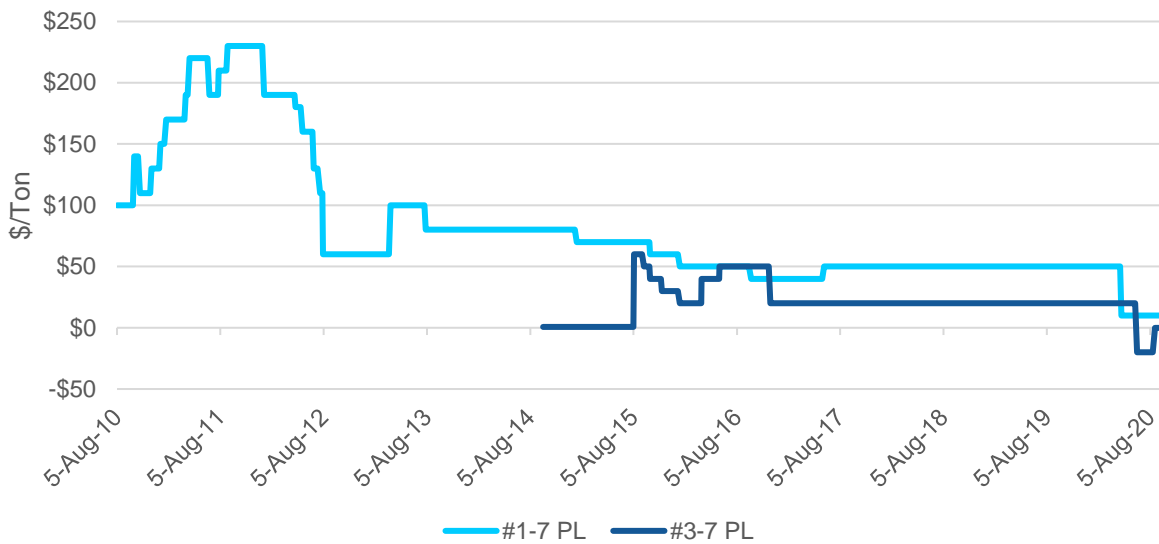


c. Mixed Plastics

Mixed plastics #1-7 and #3-7 are included in this analysis. Plastics #1-7 consist of “PET bottles and HDPE bottles from residential recycling programs in which no positive sorting of any bottles has occurred and only the Mixed Bulky Rigid Plastics have been removed. Acceptable materials include soda bottles, milk jugs, shampoo bottles, yogurt cups, and other food and beverage containers.” Plastics #3-7 consist of “mixed bottles and containers from residential recycling programs in which most of the PET bottles, HDPE bottles, and Mixed Bulky Rigid Plastics have been positively sorted out. This grade may include some PET and HDPE but primarily consists of all leftover plastics materials remaining after they have been picked out. Non-bottle containers may consist of items such as cups, trays, clamshells, and tubs.”

Pricing for #1-7 has ranged from a low of \$10.00 per ton currently to a high of \$230.00 in 2011. Pricing for #3-7 has ranged from a low of -\$20.00 per ton in August 2020 to a high of \$60.00 in 2015.

Figure 29. Historical Mixed Plastic Pricing



d. Plastic Market Summary

The commodity pricing for plastic is dependent upon the type, quality, and demand for plastic materials. Plastics have been more volatile than paper in the last ten years and has continued to decrease reflecting the decreasing price in oil since 2014. The average pricing for the 12 most common grades of plastic was at a ten-year low in July 2020. However, recent pricing shows the market can change direction fast, which can significantly impact revenues both positively and negatively.



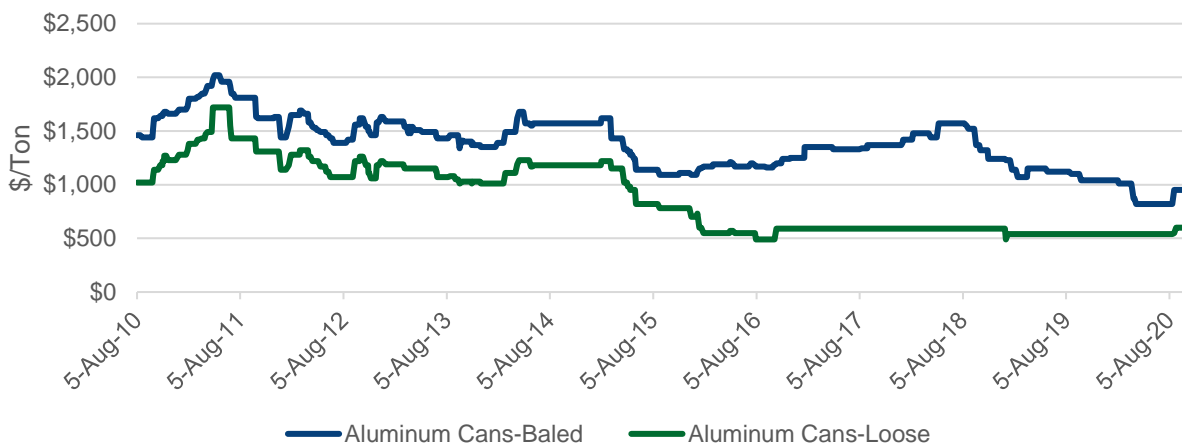
3. Metals (Steel and Aluminum Cans)

The United States Environmental Protection Agency (USEPA) estimates that 9.4% of the municipal waste stream is comprised of metals, but different from plastic, almost half of this material is estimated to be recycled³. ODNR’s waste characterization study for Ohio in 2004 indicates the metals component of the waste stream comprises less than 4% of the total waste stream. Tin food cans and aluminum beverage cans comprise almost 80% of this component, and the total amount of aluminum in this component is more than 50%.

a. Aluminum Cans

Both loose and baled aluminum cans are included in this analysis. Historical pricing for baled aluminum ranged from \$820 per ton in August 2020 to \$2,020 per ton in 2011. Historical pricing for loose aluminum ranged from \$490 per ton in January 2019 to \$1,720 per ton in 2011.

Figure 30. Historical Aluminum Can Pricing



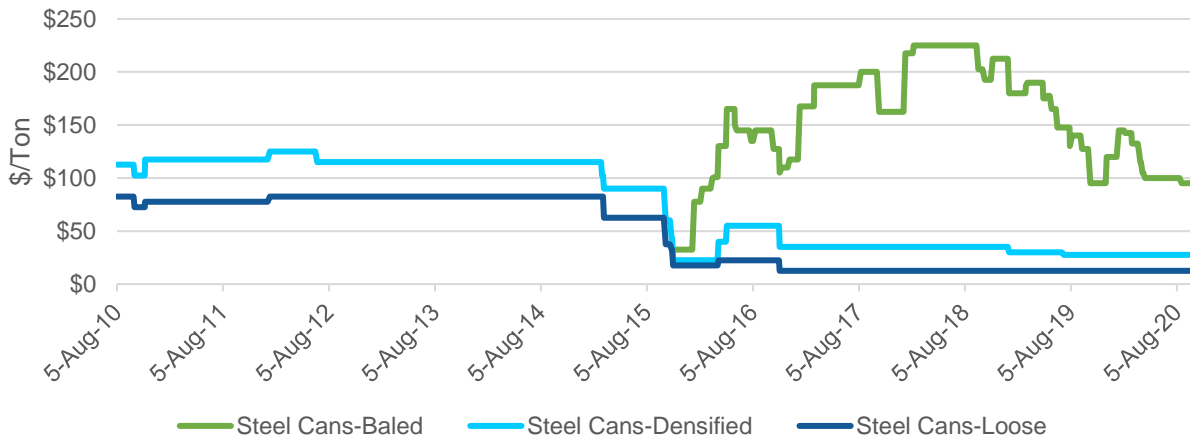
b. Steel Cans

Loose, baled, and densified steel cans are included in this analysis. Historical pricing for baled steel ranged from \$32.50 per ton in January 2016 to \$225.00 per ton in September 2018. Historical pricing for densified steel ranged from \$22.50 per ton in April 2016 to \$125.00 per ton in 2012. Pricing for loose steel cans ranged from \$12.50 per ton currently to \$82.50 per ton in 2015.

³ Advancing Sustainable Materials Management: 2018 Fact Sheet, USEPA, November 2020.



Figure 31. Historical Steel Can Pricing



c. Metal Market Summary

Metals make up less than 10% of the municipal solid waste stream. Although it is a small percentage of the solid waste stream, it has always had a high value when recycled. In the last ten years, the average price for six main grades of metals has consistently been higher than the average grades of other materials. However, prices for metals have also been decreasing in the last ten years, particularly in 2014-2015 when supply began to rise due to decreasing demand internationally.

4. Glass (Clear, Green, and Amber)

Glass is a very high-quality silica sand to which other materials are added. The resulting mixture is called a batch. Some of the other materials included in the batch are salt cake, limestone, dolomite, feldspar, soda ash, and powdered cullet. Cullet is broken glass. It can be left over from a previous batch or from the edges that remain after a batch of glass has been formed and cut to size. Adding cullet helps the batch melt more easily.

Glass is made by melting and cooling the batch. As the batch cools, it becomes solid without forming crystals. Crystals are three-dimensional building blocks that make a substance internally rigid. The lack of crystals makes glass technically a liquid, not a solid. It also makes glass transparent.

The United States Environmental Protection Agency (USEPA) estimates that 4.2% of the municipal waste stream is comprised of glass, and 26.6% of this material is estimated to be recycled⁴. However, glass is much denser than other commonly recyclable materials and does not equally represent the number of items generated and recycled. ODNR’s

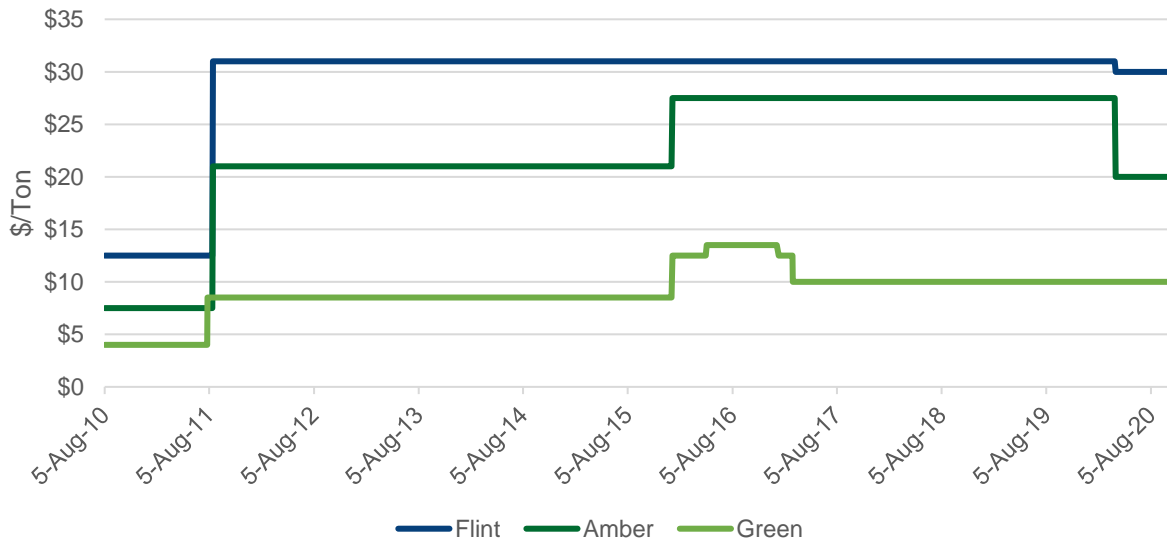
⁴ Advancing Sustainable Materials Management: 2018 Fact Sheet, USEPA, November 2020.



waste characterization study for Ohio indicates the glass component of the waste stream is small and comprises less than 5% of the total waste stream.

Historical pricing for flint glass ranged from \$12.50 per ton in 2011 to \$31.00 per ton in March 2020. Pricing for amber glass ranged from \$7.50 per ton in 2011 to \$27.50 per ton in March 2020. Pricing for green glass ranged from \$4.00 per ton in 2011 to \$13.50 per ton in January 2017.

Figure 32. Historical Glass Pricing



a. Glass Market Summary

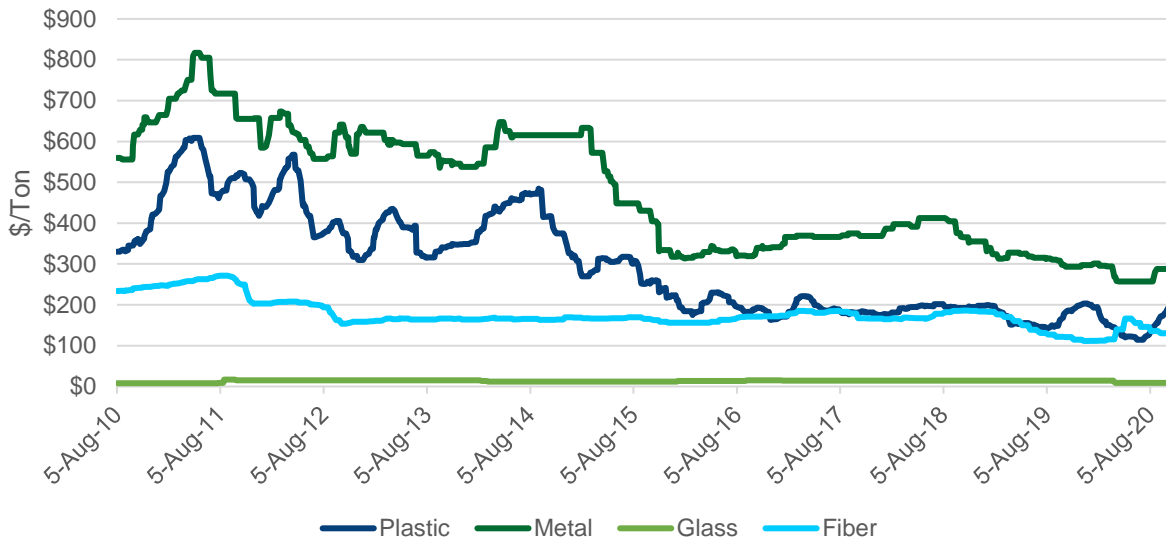
Glass makes up less than 5% of the municipal solid waste stream. Glass pricing has always been impacted by the ability to separate glass by color. Additionally, the average price for four main grades of recycled glass has consistently been lower than other recycled materials. The collection of glass in multi-material recycling programs also can cause contamination problems for other materials such as mix grades of paper.

5. Market Summary

This analysis reviewed the historical pricing of twenty-six commodities (grouped generally into fiber, plastic, metals, and glass) that are commonly collected and processed by material recovery facilities. The historical trends provide a ten-year picture of pricing for each commodity. The market pricing for each commodity changes over time at different rates. Several of the commodities had wide price range swings in one year. Other commodities traded in narrow ranges for many years before increasing or declining significantly. Pricing differences can also be reflected in how the product is processed (baled or loose) and if transportation costs are included. There is no one answer to the markets. Markets will be up and down over time.



Figure 33. Historical Market Pricing Summary



C. REGIONAL MRF INFRASTRUCTURE

GT has identified the regional infrastructure relating both to material recovery facilities (MRFs) and the secondary materials market that could potentially serve the City of Cleveland. The information that has been gathered provides an overview of the “who/what/where” of MRFs within Cuyahoga County and two counties out, as well as a summary description of the region’s markets for recyclables. GT sought information on the regional recyclable market from solid waste management districts, Ohio EPA, private processors/haulers, and/or local governing entities. The regional recyclable market analysis includes several specialized processing facilities and end users in the area, listing name, location, and material focus. These specialized processors and end users handle specific commodities, such as scrap metals or fiber only; the facility might accept other products as well but not the entire range of commonly collected recyclables.

1. Multi-Material MRFs

In summary, there are twelve multi-material MRFs within the specified region. Seven of these MRFs are privately owned and operated, and five of the MRFs are publicly operated by either solid waste districts or communities. Capacity and access for Cleveland to use the MRF may vary by facility.

Figure 34 shows a map of the region which displays the approximate locations of the identified multi-material MRFs. It is followed by Table 21, listing the twelve MRFs and providing summary information about each.



Figure 34. Multi-Material MRFs

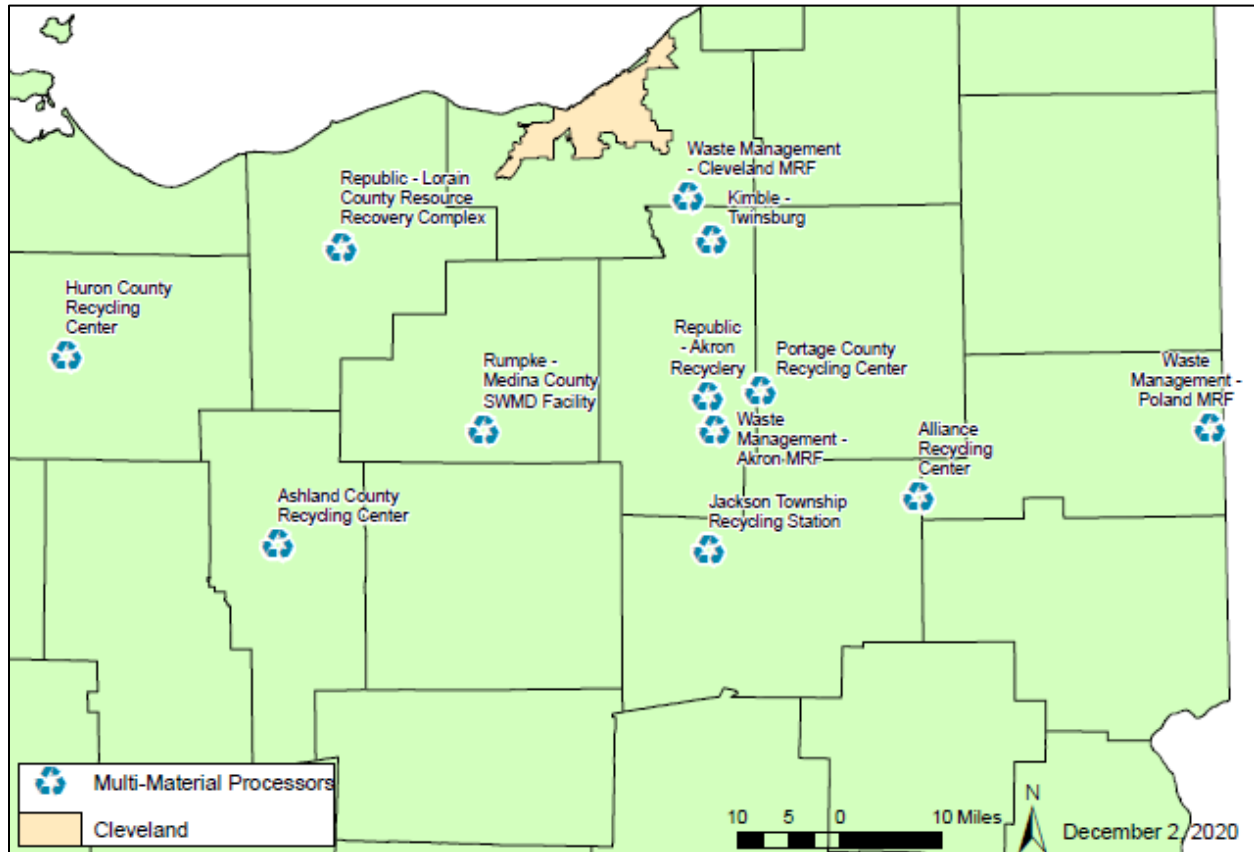


Table 21. Multi-Material MRFs

Facility Name	Address	City	State	ZIP Code
Republic - Lorain County Resource Recovery Complex	43650 Oberlin Elyria Rd	Oberlin	OH	44074
Republic - Akron Recyclery	964 Hazel St	Akron	OH	44305
Rumpke - Medina County SWMD Facility	8700 Lake Rd	Seville	OH	44273
Waste Management - Akron MRF	1535 Exeter Rd	Akron	OH	44306
Waste Management - Cleveland MRF	7450 Oakleaf Rd	Oakwood Village	OH	44146
Waste Management - Poland MRF	5505 Center Rd	Poland	OH	44456
Kimble - Twinsburg	8500 Chamberlain Rd	Twinsburg	OH	44087
Ashland County Recycling Center	1270 Middle Rowsburg Rd	Ashland	OH	44805
Huron County Recycling Center	2413 Townline Rd, 131 W	Willard	OH	44890



Facility Name	Address	City	State	ZIP Code
Portage County Recycling Center	3588 Mogadore Rd	Kent	OH	44240
Alliance Recycling Center	15969 River St SE	Alliance	OH	44601
Jackson Township Recycling Station	5717 Wales Ave NW	Massillon	OH	44646

2. Secondary Materials Market

GT identified a total of 67 companies specializing in certain materials that are potentially accessible to Cleveland. These are specialized material processors, brokers, mills, and other end users that are in the business of buying recyclable materials. The information is presented in a series of tables, starting with a summary of the findings followed by one for each category of commodities that are handled. Additionally, **Appendix F** includes a list of other potential processors and end users in the region or used by other entities in the region that were not verified for this project; these unverified processors were found through GT partners and using business SIC codes commonly involved in the recycling process.

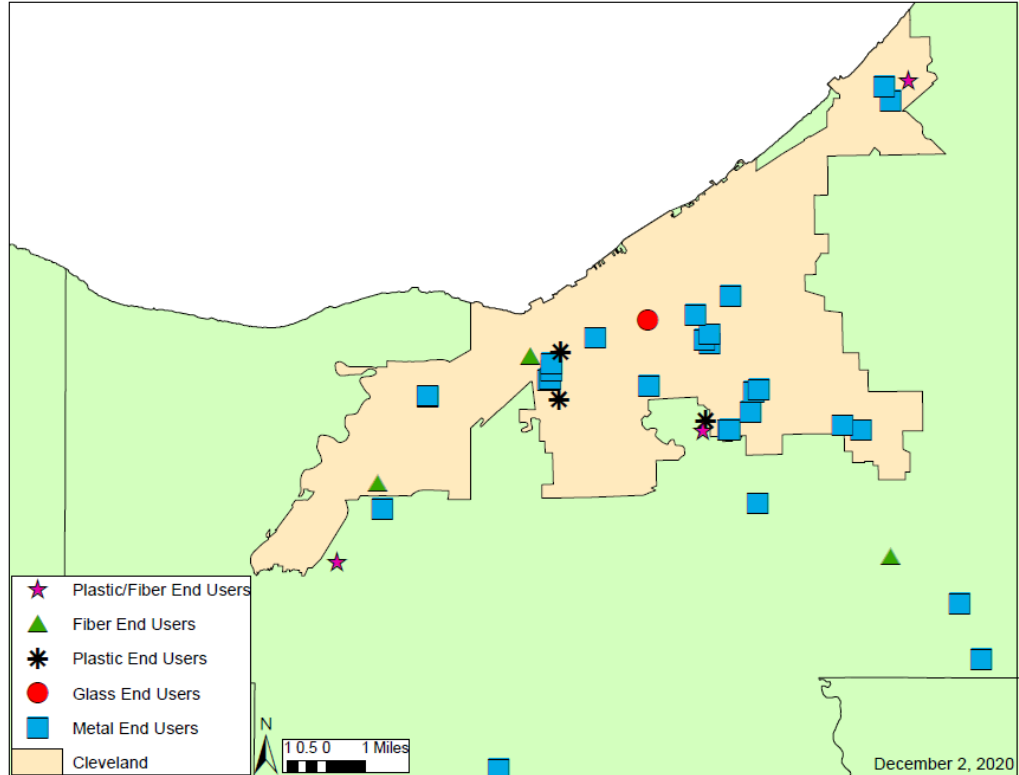
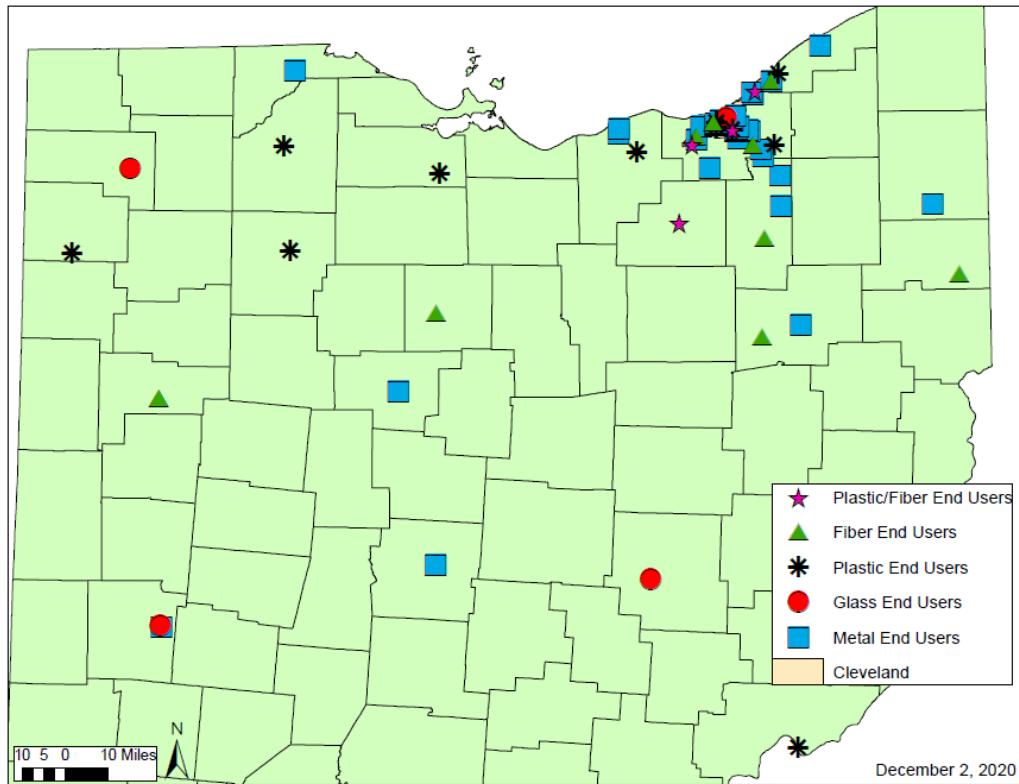
Table 22 presents the total number of organizations identified in each commodity category within the identified region. Figure 35 shows all identified companies by accepted material in both a whole view of Ohio and a zoomed-in view of Cleveland.

Table 22. Summary of Specialized Materials Processors

Commodity Category	Number of Companies Identified
Fiber/Paper	13
Metals	39
Plastics	15
Glass	4
Total	67*

*Four companies accept both fiber and plastic.

Figure 35. Specialized Material Processors and End Users



*a. Fiber/Paper*

In the fiber/paper category, 13 companies have been identified and are listed in Table 23 and are displayed on the map in Figure 35. Of those, 9 are within a 50-mile radius of Cleveland, including four within the City. Four others are in more distant parts of Ohio. Included in the fiber/paper category are brokers, processors, and mills that handle old corrugated cardboard (OCC), old newspaper (ONP), old magazines (OMG), mixed or sorted office papers, paperboard/chipboard, telephone books, and various mixed paper streams.

Table 23. Specialized Fiber Processors and End Users

Company Name	Address	City	State	ZIP Code
Amware Recycling	19100 Holland Rd	Brook Park	OH	44142
Associated Paper Stock	11510 South Ave	North Lima	OH	44452
Advanced Fiber	100 Crossroads Blvd	Bucyrus	OH	44820
Caraustar Industries	7960 Lorain Ave	Cleveland	OH	44102
Extreme Green Recycling	18460 Syracuse Ave	Cleveland	OH	44110
Gateway	4223 E 49th St	Cleveland	OH	44125
Greif	787 Warmington Rd SW	Massillon	OH	44646
Medina Recycling Inc	370 Lake Rd	Medina	OH	44256
Northcoast Inc. Recycling Specialists	1305 Lloyd Rd	Wickliffe	OH	44092
Pratt Industries	602 Leon Pratt Drive	Wapakoneta	OH	45895
River Valley Paper	120 E Mill St	Akron	OH	44309
Royal Oak Recycling	16065 Industrial Ln	Cleveland	OH	44135
Westrock	16645 Granite Rd	Maple Heights	OH	44137

b. Metals

This category includes brokers and processors of aluminum cans and scrap, steel cans and scrap, bronze, copper, brass, cast iron, tin, lead, other non-ferrous metal, other ferrous metal, auto parts, and white goods. GT has identified 39 such companies that are potentially accessible to Cleveland. They are listed below in Table 24 and are displayed on a map in Figure 35. 33 are within a 50-mile radius of Cleveland and 6 are located in other areas of Ohio.

Table 24. Specialized Metal Processors and End Users

Company Name	Address	City	State	ZIP Code
A & B Metal Recycling	3049 E 55th St	Cleveland	OH	44127
Aaromet Metals Recycling LLC	3208 West 63rd Street	Cleveland	OH	44102



Company Name	Address	City	State	ZIP Code
Able Alloy	3500 West 140	Cleveland	OH	44111
Advance Iron and Metal Co.	7007 Quincy Ave.	Cleveland	OH	44104
Aetna Metal Recycling	8300 Aetna Rd	Cleveland	OH	44105
All American Recycling Company	441 E 21st St	Lorain	OH	44052
All City Recycling	17149 Saint Clair Ave	Cleveland	OH	44110
All Scrap Salvage	3550 W 140th St	Cleveland	OH	44111
American Metal Recycling	13170 York Rd	Cleveland	OH	44133
American Scrap Mart	3335 W 65th St	Cleveland	OH	44102
Bedford Metal Recycling	144 Northfield Rd	Bedford	OH	44146
Berea Metals & Recycling	5201 W 164th St	Cleveland	OH	44142
Broadway Scrap Metals, Inc.	8202 Broadway Ave	Cleveland	OH	44105
Carbon Plate Steel Products	4250 E 68th St	Cleveland	OH	44105
Eastside Metals	16800 S. Waterloo Rd.	Cleveland	OH	44110
Ferrous Processing and Trading Co.	8550 Aetna Road	Cleveland	OH	44105
Franklin Iron and Metal	1939 E 1st St	Dayton	OH	45403
I. Schumann Co.	22500 Alexander Rd.	Bedford	OH	44146
IH Schlezinger	1041 Joyce Ave	Columbus	OH	43219
JB I Scrap Processors	2925 E 55th St	Cleveland	OH	44127
Lakeside Metals Inc.	15000 Miles Ave.	Cleveland	OH	44128
McMahan's Wrecking	3378 West 65th St	Cleveland	OH	44102
Metallic Resources	2116 Enterprise Pkwy	Twinsburg	OH	44087
Miles Alloy, Inc.	13800 Miles Ave	Cleveland	OH	44105
National Material Recycling Company	3651 Broadway	Lorain	OH	44052
Niles Iron & Metal	45 W Federal Street	Niles	OH	44446
North Coast Ferrous Supply Inc	8200 Old Granger Rd	Cleveland	OH	44125
Painesville Recycling	83 Stage Ave	Painesville	OH	44077
PSC	4226 E 71st St	Cleveland	OH	44105
Recycle-it LLC	414 Burbank	Toledo	OH	43607
Regency Technology	4550 Darrow Rd	Stow	OH	44224
S. Slesnick Co, Inc.	927 Warner Road Se	Canton	OH	44707
Scrapcom, Inc.	3301 Monroe Ave.	Cleveland	OH	44113
Sims Brothers	1011 S Prospect St	Marion	OH	43302
Tyroler Scrap Metals, Inc.	5227 Sweeney Ave	Cleveland	OH	44127
Victor Metals	29309 Clayton Ave	Wickliffe	OH	44092
Weingold Scrap Svc	3455 Campbell Rd	Cleveland	OH	44105
Westside Metals	6400 Stock Ave	Cleveland	OH	44102
Wilkoff & Sons Co.	2700 E. 47Th Street	Cleveland	OH	44104



c. Plastics

This market category includes end users/manufacturers, brokers, and processors of such plastic materials as:

- Polyethylene terephthalate (PETE, #1)
- High-density polyethylene (HDPE #2)
- Polyvinyl chloride (V or PVC, #3)
- Low-density polyethylene (LDPE, #4)
- Polypropylene (PP, #5)
- Polystyrene (PS, #6)

GT has identified 15 such companies that are potentially accessible to Cleveland. They are listed below in Table 25 and are displayed on the map in Figure 35. Ten are within a 50-mile radius of Cleveland and 5 are located in other areas of the state. The other 23 are in areas beyond, in the eastern United States.

Table 25. Specialized Plastic Processors and End Users

Company Name	Address	City	State	ZIP Code
Amware Recycling	19100 Holland Rd	Brook Park	OH	44142
Blue Ocean Plastics, LLC	5500 Walworth Ave	Cleveland	OH	44102
Buckeye Industries, Cleveland	33851 Curtis Blvd.	Eastlake	OH	44095
Container Compliance Corporation	5151 Denison Ave	Cleveland	OH	44102
Evergreen	202 Watertower Dr	Clyde	OH	43410
Extreme Green Recycling	18460 Syracuse Ave	Cleveland	OH	44110
Gateway	4223 E 49th St	Cleveland	OH	44125
Green Innovations	6075 Cochran Rd	Solon	OH	44139
Green Line Polymers	12370 Hancock Co. Rd.	Findlay	OH	45840
Haviland Plastics	119 W Main St	Haviland	OH	45851
Medina Recycling Inc	370 Lake Rd	Medina	OH	44256
Mondo Polymer Technologies	27620 State Rte. 7	Reno	OH	45773
Ohio Polymers and Recycling Inc	860 Taylor St	Elyria	OH	44035
Phoenix Technologies	1098 Fairview Ave	Bowling Green	OH	43402
Tymex	5300 Harvard Ave	Cleveland	OH	44105

d. Glass

The glass commodity category includes glass containers (clear and colors), plate/window glass, windshields, CRT screens and lighting glass.



Glass is the weakest market category of materials commonly collected in curbside and drop-off recycling programs. Only four organizations are identified. There is only one company identified that takes container glass within the 50-mile radius surrounding Cleveland. The next closest is in Zanesville, Ohio – approximately 140 miles away. The Recycling Partnership’s 2020 State of Curbside Recycling Report indicates that “glass has also seen a steady trend toward elimination in curbside recycling program” and “there is still a gap in the deployment of glass processing in MRFs around the country.”⁵

The companies identified in the glass category are listed below in Table 26 and are displayed on a map in Figure 35.

Table 26. Specialized Glass Processors and End Users

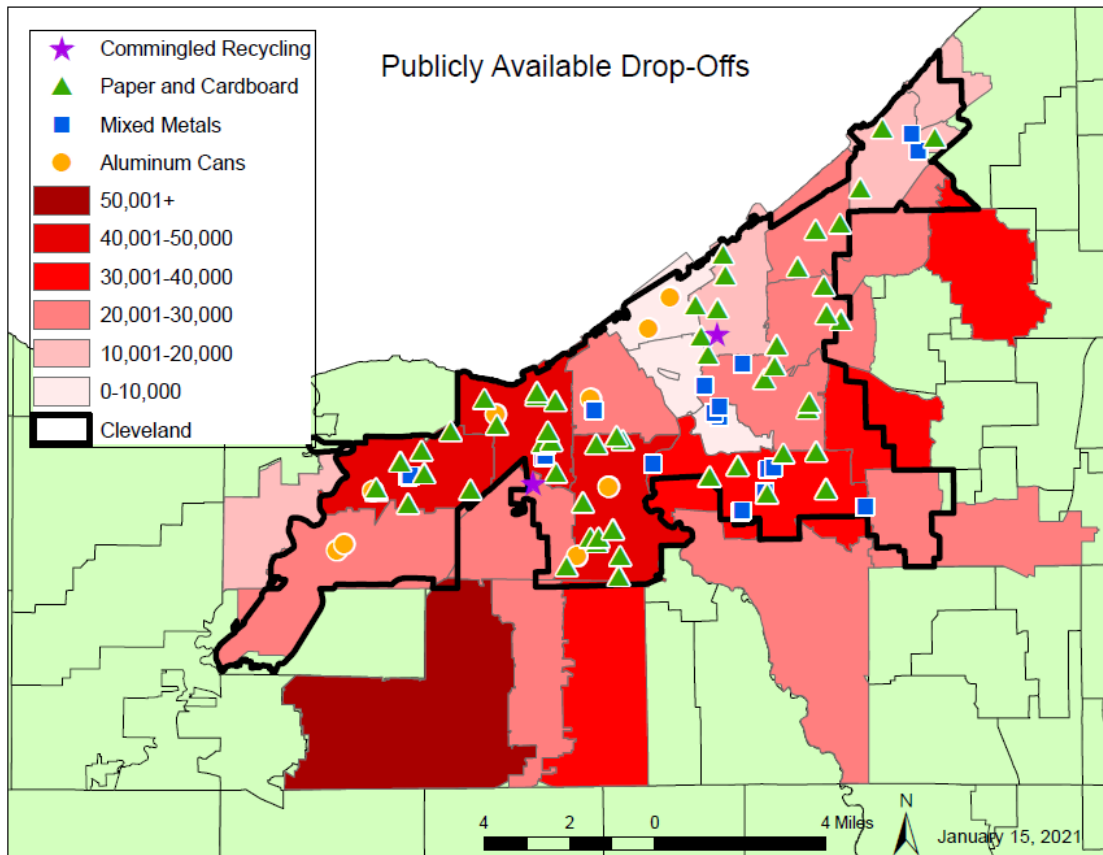
Company Name	Address	City	State	ZIP Code
Johns Manville	925 Carpenter Rd	Defiance	OH	43512
Owens Illinois	1700 State St	Zanesville	OH	43701
Rumpke	1932 E Monument Ave	Dayton	OH	45402
Strategic Materials	2323 W 3rd St	Cleveland	OH	44113

D. PUBLIC RECYCLING DROP-OFF INFRASTRUCTURE

A publicly available recycling drop-off analysis was conducted to determine the available locations where City residents have the opportunity to recycle common materials. These locations include local and regional sites operated by private, public, and not-for-profit entities. The following map depicts the approximate location of the recycling drop-off sites and what type of material is accepted along with population by zip code according to the 2020 US census. The complete list of the sites is included in **Appendix G**.

⁵ The Recycling Partnership, 2020 State of Curbside Recycling Report, February 13, 2020.

Figure 36. Publicly Available Drop-offs



E. HOUSEHOLD RATE ANALYSIS

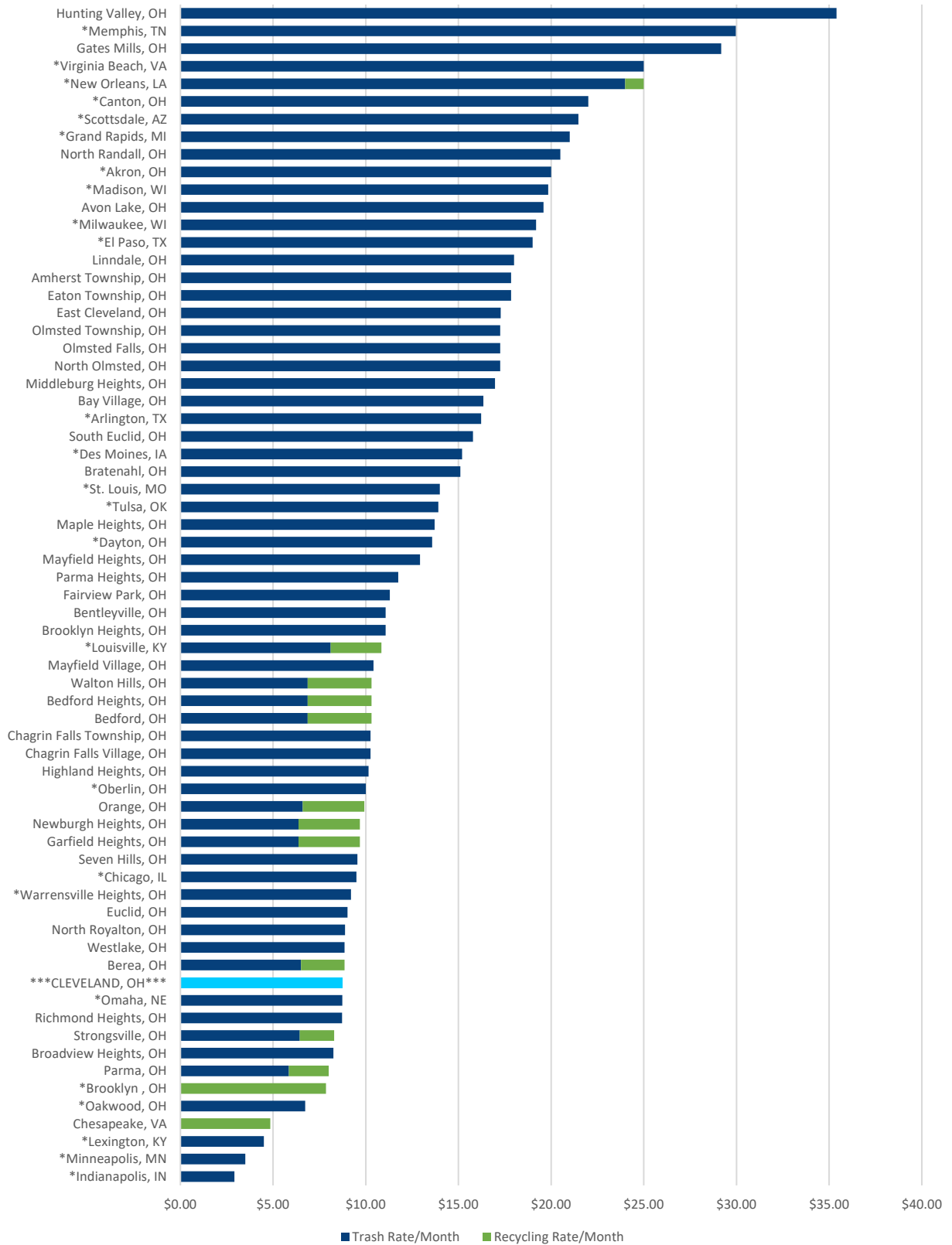
GT conducted an economic analysis of the curbside solid waste collection programs offered in Cuyahoga County, neighboring counties, and comparable communities across the nation. The analysis compared waste and recycling collection costs per household per month.

Nineteen communities analyzed are not included in the figure below because they do not have residents pay a fee directly to waste collection but rather use funds from the City’s general fund. In addition to Cleveland, 66 other analyzed communities’ residents pay a fee directly for waste collection, whether through a bill or a line item in their taxes. Most communities pay one price for trash with recycling services included. Some cities, such as Parma and Berea, pay separate prices for trash and recycling. The overall average charge per household per month for waste and recycling collection was \$13.75. Cleveland’s charge per household is below the average at \$8.75 per household per month.

The following figure summarizes the data. Additionally, any city noted with an asterisk (*) uses city-operated crews to collect waste rather than a private contractor.



Figure 37. Comparable Community Curbside Collection Household Cost Analysis





The City's waste collection fee is one of the lowest of the communities evaluated for this assessment. The City's fee covers roughly half of the actual costs of the program. The other half of the cost is covered by the general fund.

F. RECYCLABLES PROCESSING ANALYSIS

GT conducted a review of MRF processing charges to communities that self-haul their single-stream recyclables to a MRF. The following list depicts the charge incurred by the communities on a per ton basis for materials delivered to a MRF.

- Cleveland, OH - Cuyahoga County - \$149.51 / ton (Processing Cost of \$168.50 / ton minus rebate of \$18.99 / ton)
- Eastside Recycling Consortium: until September of 2020, these communities had a \$0 processing fee and 50% net revenue share adjusted monthly based on market prices. Starting in October of 2020:
 - Beachwood, OH - Cuyahoga County - \$55 / ton
 - Cleveland Heights, OH - Cuyahoga County - \$96 / ton
 - Highland Hills, OH - Cuyahoga County - \$55 / ton
 - Independence, OH - Cuyahoga County - \$69 / ton
 - Lyndhurst, OH - Cuyahoga County - \$55 / ton
 - Moreland Hills, OH - Cuyahoga County - \$55 / ton
 - Pepper Pike, OH - Cuyahoga County - \$96 / ton
 - Shaker Heights, OH - Cuyahoga County - \$69 / ton
 - Solon, OH - Cuyahoga County - \$69 / ton
 - University Heights, OH - Cuyahoga County - \$96 / ton
 - Woodmere, OH - Cuyahoga County - \$55 / ton
- Brook Park, OH - Cuyahoga County - \$94.56 / ton
- Lakewood, OH - Cuyahoga County - \$52.75 / ton
- Rocky River, OH - Cuyahoga County - \$100.00 / ton
- Valley View, OH - Cuyahoga County - \$95.00 / ton
- Brooklyn, OH - Cuyahoga County - \$52.75 / ton
- Westlake, OH - Cuyahoga County - \$80.00 / ton
- Chagrin Falls Village, OH - Cuyahoga County - \$58.52 / ton
- Chagrin Falls Township, OH - Cuyahoga County - \$58.52 / ton
- Elyria, OH - Lorain County - \$100/ton plus \$75/ton contamination surcharge
- Oberlin, OH - Lorain County - \$100/ton plus \$75/ton contamination surcharge
- Akron, OH - Summit County - \$ 57.03 / ton with a 40% revenue share to the MRF
- Cuyahoga Falls, OH - Summit County - \$46.79 / ton
- Canton, OH - Stark County - \$45.00 / ton
- Dayton, OH - Montgomery County - \$35.00 / ton
- Cheasapeake, VA - Norfolk County - \$95.00 / ton
- Lexington, KY - Fayette County - \$48.80 / ton



- Memphis, TN - Shelby County - \$45.00 / ton
- Milwaukee, WI - Milwaukee County - \$50.00 / ton
- Nashville, TN - Davidson County - \$101.40 / ton
- St. Louis, MO - St. Louis County - \$16.04 / ton

The overall average processing cost charged to the above communities was \$72.18.

In addition, the Recycling Partnership conducted a study in 2016 that covered 465 cities across the country. In that study, the range in tipping fees was \$32 to \$88 per ton. The average rate for the region that included Ohio was \$47 per ton. Because this report is now 4 years old, the range is assumed to have increased closer to the data presented above.

In 2019, the Recycling Partnership updated the report. The average processing charges for the region in the study that included Ohio was \$49.10 per ton. The overall average across the United States was \$63.69 per ton.

Many factors drive the cost of processing recyclables including the economy, competition, volume and frequency of recyclables, commodity prices and contamination rates.



IV. COLLECTION PROGRAM OPTIONS AND FUTURE KPIS

This section summarizes the options to operate the City's collection programs including curbside trash and recyclables, drop-off sites, bulk, yard waste, and special material programs for the future. Each option is discussed and includes a pros and cons analysis. At the end of this section, GT has presented three potential pathways that include specific collection operations and programs. Each pathway is evaluated using the following economic and performance metric considerations:

- User fee revenue and charge per household
- Capital investments
- Overall cost, cost per household, and cost per ton managed
- Education/outreach expenditures
- Recycling diversion percentage and tons recycled
- Tons landfilled
- Participation rates
- Staffing levels
- Service levels
- Route performance metrics

Finally, the KPI's from the current program will be compared to the KPI's for each of the three pathways presented.

The following section summarizes each of the main options for curbside waste and recycle collection:

A. WEEKLY TRASH

The City currently collects trash every week for all areas of the City by designated routes. This is the standard for waste collection across the country and is not suggested to change.

Pros:

- Maintains a clean and sanitary City
- Reduces vectors and flies
- Meets the needs of the community for their generation levels

Cons:

- Increased cost for collection

B. WEEKLY RECYCLE

The City currently collects recyclables every week for all areas of the City by designated routes. This is the standard for recyclable collection across the country although there is



a movement to pick up every other week as well. Weekly curbside recycling was the gold standard for many years because of containers with limited capacity used in recycling programs. In a report developed by the Recycling Partnership in 2016, 54% of 465 cities evaluated collect their recyclables every week.

Pros:

- Consistent collection
- Meets needs of high-volume recyclers
- No change in collection frequency

Cons:

- Increased cost for collection
- Most residents do not fill their recycle cart from one weeks' worth of waste generation
- Reduces the availability of staffing and resources for other services provided by the Division of Waste Collection

Weekly recycling collection is recommended for the "High Diversion" pathway discussed later to maximize recyclables collection.

C. BI-WEEKLY RECYCLE

The City could collect curbside recyclables every other week in lieu of the current weekly collection. This system of curbside recycling is becoming more prevalent across the nation. In a recent study conducted by the Recycling Partnership in 2016, 46% of 465 cities evaluated collect their recyclables every other week. This staggered frequency of collection is prevalent because of cart-based systems, such as the City's, where the capacity of the cart is large enough that most residential waste generators can accumulate recyclables and store for the two-week period.

Pros:

- Meets the needs of most residents' recycling habits
- Saves money and time regarding collection and staffing
- Right-sizes collection to actual recycling volumes generated
- Creates additional available staffing and resources to provide other services to City residents

Cons:

- May not meet the needs of certain high-volume recyclers
- May cause confusion in which week is recycling collection week
- Creates a change in the current program which may incur push-back from residents
- Recycling carts with contamination could attract vermin and pests



This option is recommended for the “Mid-Level” pathway discussed later to allow for adequate collection of recyclables and to free up resources for bulk collection or other services.

D. OPT-IN RECYCLING

The City could collect curbside recyclables weekly or every other week for residential units that opt in or subscribe to the service. This option would provide service only to residents that desire to have the service and agree to participate per the established rules of the program. The opt-in or subscription program could require a small fee per month such as \$1.00 to \$2.00 and/or a signed pledge to participate properly. Subscription requests would occur in advance of the roll-out of the program so that routing could be established. New subscriptions over time would be added to the existing routes and reviewed frequently to keep the routes efficient.

The easiest way to implement this program would be to provide each subscriber with a large, unique highly visible marking that would be placed on their current blue recycle cart. Only those carts would be serviced by the recycle route crews. All other black carts and blue carts without the unique marking would be serviced by the trash route crews. Another option could be switch out the carts for a different colored cart or take away carts from homes that do not subscribe.

Pros:

- Meets the needs of residents that desire to recycle
- Saves money and time regarding collection and staffing
- Right-sizes collection to actual recycling volumes generated
- Creates additional available staffing and resources to provide other services to City residents
- Reduces contamination
- Increases value or reduces cost of collected materials

Cons:

- May not meet the needs or expectations of high-volume recyclers
- Creates a change in the current program which may incur push back from residents

This option is recommended for the “Reset & Rebuild” pathway discussed later.



E. RECYCLABLE MATERIAL ACCEPTANCE

For each of the curbside recycling collection options listed above, a series of sub options for recyclable materials collected is provided. These options allow the City to participate directly in the commodity market by selling materials to end users and/or brokers. In order to directly participate in the markets, single-stream recycling would not be conducted; rather, targeted material collection would occur. The following targeted material acceptance options would allow the City to participate in a regional circular economy by collecting and selling materials that are made into products that City and regional businesses purchase. This process creates jobs in the region and completes the circular economy process. Indirectly, the City has participated in a regional circular economy through its current recycling programs. The City did not benefit directly from the regional economy as single-stream recycling costs the City money because of the processing costs and lower commodity prices.



These options are recommended for the “Reset & Re-build” pathway discussed later. These options allow the City to potentially generate revenue and/or to reduce the cost of the recycling program.

1. Option 1 – Cardboard Only

The City could only collect cardboard and paperboard (cereal boxes) at the curb. This would allow the City to directly market full trailer loads of this recycling stream to the existing boxboard mills in Ohio and others in the region. The concept involves the City to collect these materials, deliver to Ridge Road Transfer Station for accumulation into 100-yard transfer trailers (walking floor capability for off-loading), and then delivering to the boxboard mill that pays the best price for the product and has the capability of accepting loose loads of cardboard and boxboard. Prices for cardboard have ranged from \$27.50 to \$175 per ton delivered in the last 10 years. Transportation costs would reduce the revenue. A typical transfer trailer of mixed paper could weigh between 15-22 tons. The gross revenue from the sale of this trailer would be between \$412.50 and \$3,850 minus freight. Freight costs vary from \$500 - \$1,000 per load (or \$22 to \$66 per ton). The City could make money, break even, or pay substantially less on a per ton basis compared to sending materials to the current single-stream processing market that charges between \$70-\$150 per ton. Under this pricing, the same truck load discussed above, if it were single stream, would cost between \$1,050 and \$3,300 plus freight.



Other materials that are generated by residents including metals, plastic, and glass could be accepted at expanded City drop-off sites and through the regional drop-off network in the Cleveland area.

Pros:

- Allows the City to have the opportunity for revenue from collected materials
- Allows the City to directly participate in a regional circular economy

Cons:

- Residents could only recycle the targeted material at the curbs and would have to transport all other materials to a local drop-off location
- Requires additional investment in capital and operational activities
- Contamination issues could make it harder to market collected materials

2. Option 2 – Cardboard and Mixed Paper Only

The City could only collect cardboard, paperboard (cereal boxes), and mixed paper (including junk mail, newspaper, magazines, office paper) at the curb. This would allow the City to directly market full trailer loads of this recycling stream to the existing boxboard mills in Ohio and others in the region. This concept involves two scenarios for either loose accumulation or baled. For loose accumulation, the City would collect these materials, deliver to Ridge Road Transfer Station for accumulation into 100-yard transfer trailers (walking floor capability for off-loading), and then deliver to the boxboard mill that pays the best price for the product and has the capability of accepting loose loads of mixed paper. Prices for mixed paper with high cardboard content have ranged from -\$2.50 to \$132.50 per ton delivered.

For baled accumulation, the City would collect these materials and deliver to Ridge Road Transfer Station for accumulation. This concept could also require the City to purchase a horizontal auto tie baler (initial investment could range from \$300,000 - \$600,000). Once a full trailer load of baled cardboard and paper is ready for shipment, transportation would be arranged for the load to be delivered to the highest paying end user or broker identified.

Transportation costs would reduce the revenue. A typical transfer trailer of loose or baled cardboard could weigh between 15-22 tons. The gross revenue from the sale of this trailer would be between -\$37.50 and \$2,915 minus freight. Freight costs vary from \$500 - \$1,000 per load (or \$22 to \$66 per ton). The City could make money, break even, or pay substantially less on a per ton basis compared to sending materials to the current single-stream processing market that charges between \$70-\$150 per ton. Under this pricing, the same truck load discussed above, if it were single stream, would cost between \$1,050 and \$3,300 plus freight.

Other materials that are generated by residents including metals, plastic and glass could be accepted at expanded City drop-off sites and through the regional drop-off network in the Cleveland area.



Pros:

- Allows the City to have the opportunity for revenue from collected materials
- Allows the City to directly participate in a regional circular economy

Cons:

- Residents could only recycle the targeted material at the curbs and would have to transport all other materials to a local drop-off location
- Requires additional investment in capital and operational activities
- Contamination issues could make it harder to market collected materials

3. Option 3 – Plastics Only

The City could only collect #1 and #2 plastics (milk jugs, water bottles, beverage containers, and any other small mouth #1-#2 plastic) at the curb. This would allow the City to directly market full trailer loads of this recycling stream to end users or brokers in Ohio and others in the region. The concept involves the City to collect these materials, deliver to Ridge Road Transfer Station where they would be baled and stored until a full trailer load could be shipped. This concept would require the City to purchase a horizontal auto tie baler (initial investment could range from \$300,000 - \$600,000). Once a full trailer load of baled mixed plastic is ready for shipment, transportation would be arranged for the load to be delivered to the highest paying end user or broker identified. Prices for mixed plastics have ranged from \$10 to \$230 per ton delivered. Transportation costs would reduce the revenue. A typical trailer of baled mixed plastics could weigh 6 tons. The gross revenue from the sale of this trailer would be between \$60 and \$1,380 minus freight. Freight costs vary from \$500 - \$1,000 per load (or \$83 to \$166 per ton). The City could make money, break even, or pay slightly less on a per ton basis compared to sending materials to the current single-stream processing market that charges between \$70-\$150 per ton. Under this pricing, the same truck load discussed above, if it were single stream, would cost between \$420 and \$900 plus freight.

Other materials that are generated by residents including metals, paper, cardboard, and glass could be accepted at expanded City drop-off sites and through the regional drop-off network in the Cleveland area.

Pros:

- Allows the City to have the opportunity for revenue from collected materials
- Allows the City to directly participate in a regional circular economy

Cons:

- Residents could only recycle the targeted material at the curbs and would have to transport all other materials to a local drop-off location
- Requires additional investment in capital and operational activities
- Contamination issues could make it harder to market collected materials



F. MONTHLY BULK – WITH APPOINTMENTS

The City could continue to pick up bulk monthly; however, to even out the truck and labor utilization, it is recommended that the bulk item collection is staggered across the City. For example, dedicated bulk item crews would work different sections of the City each week. By the end of the month, all residents would have received the opportunity to use the bulk item service. In addition, the City could require a call in to schedule the bulk item collection. A call in would allow the City to run routes for metal, tires, and general bulk waste. Call in or appointments would allow the supervisors to effectively manage the bulk collection by scheduling pickups and eliminate the need to travel by all customers. Call-ins could also help control the current illegal dumping issue and allow customer service the opportunity to discuss other options for residents to dispose of materials either through third-party reuse or third-party collection/disposal. Prescheduled appointments will allow for effective routing and allocation of staff and equipment. This effective allocation will improve the safety of the operational staff because the quantity and types of bulk will be generally known.

The City of Dayton bulk program is a good example of a monthly program that collections different regions of the City during the month. It requires a prescheduled appointment and, where possible, they collect metals with a different route and truck.

Seven of the thirteen communities reviewed with bulk item collection required prescheduled appointments or on-call service

The City should consider creating a separate line of business to effectively manage bulk. As a separate line of business, the website and other outreach pieces would clearly identify the bulk program. The City could also consider combining the roll-off dumpster program into the bulk program because the services are related. Customer service could help residents decide what level of service would be appropriate: bulk item collection, roll-off dumpster, or transfer station utilization. It is recommended that a supervisor or manager be assigned to provide management of routing, cost control, safety control, and training. A supervisor or manager would work closely with customer service and would address customer service issues. Also, as a separate line of business, operating costs could be evaluated and managed. Once the costs of the program are known, the City could evaluate charging fees for bulk pickup and the fees for roll-off dumpsters.

Many communities require a fee to pick up bulk. For example, Grand Rapids requires \$30 per sticker per item and Des Moines requires \$5 per sticker. Residents pay for bulk item stickers or tags that are attached to each bulk item. A sticker or tag makes it easier for drivers to identify bulk to be collected, creates a revenue stream for service, and helps to mitigate dumping. However, the tags or stickers require a need for control of the inventory and requires a good system to collect the money and distribute the stickers or tags.

Pros:

- Saves money on collection and staffing



- Dedicated equipment and staff working the bulk collection
- Evens out the bulk collection
- Appointment-based program creates proactive management opportunity
- Appointment-based program mitigates dumping

Cons:

- Will require a significant roll-out and resident outreach transition
- Keeping the workload balanced for the bulk collection crews
- Bulk item collection remains at once per month for residents

The financial impact of this option is conservatively projected at a net of \$0. It is expected that the appointment-based system will be more efficient and would result in a potential reduction in unauthorized dumping. However, it is assumed that any efficiencies in labor and equipment would be allocated to other services. Also, the reduction in dumping is difficult to calculate and relies on other improvements including enforcement and education and outreach.

G. BI-WEEKLY BULK – WITH APPOINTMENTS

A bi-weekly bulk collection program would increase the collection opportunity for residents. By collecting twice per month, it would also decrease the volumes per collection and reduce staff and equipment requirements. A bi-weekly bulk collection could be integrated with bi-weekly recycling collection and with the existing routes. Because months have fractional weeks, a system must be in place for residents to easily know when their bulk item pickup occurs. For example, both recycling and bulk would be every other week on different weeks from one another.

An appointment-based system is recommended to better manage the assignment of bulk on existing routes, adjust staff and equipment as necessary, and to mitigate illegal dumping. The bulk claw collection vehicle would receive a route sheet each day for the larger collection items to eliminate the heavy items off the routes and trucks. Route supervisors will incorporate it into their route scheduling. Route supervisors would be responsible for route management, safety control and training, customer service issues. The appointment-based program would allow customer service to help residents identify the best service for the customer: such as bulk collection or regular semi-automated trash.

Without recycling, a stand-alone bi-weekly program could be set up to alternate throughout the City (i.e. west side 1st and 3rd weeks and east side 2nd and 4th weeks). It is recommended to set up a separate line of business similar to what was described in the monthly bulk program.

Pros:

- Residents receive bulk item collection twice per month
- Possible to incorporate with a bi-weekly recycling collection program
- Reduces the volumes per collection



- Integrates collection into existing routes

Cons:

- Residents may not understand when the bi-weekly pickup is happening
- Requires significant outreach
- If recycling expands to weekly, it could affect bulk collection

The financial impact of this option is conservatively projected at a net of \$0. It is expected that the appointment-based system will be more efficient and would result in a potential reduction in unauthorized dumping. However, it is assumed that any efficiencies in labor and equipment would be allocated to other services. Also, the reduction in dumping is difficult to calculate and relies on other improvements including enforcement and education and outreach.

H. WEEKLY BULK COLLECTION WITH APPOINTMENTS

Weekly bulk collection is the most convenient for customers. The weekly collection of bulk requires a good appointment-based system because the bulk will be integrated directly into the routes, and additional routes may need to be created each day for a separate claw or bulk truck. The weekly bulk will spread out the bulk material into more manageable pieces as compared to the monthly or bi-weekly collection.

Pros:

- More convenient for customer
- Evens out collection throughout the month

Cons:

- Requires a robust appointment-based system
- Must be managed and routed daily
- Drivers must use route sheets and only collect material scheduled
- May require different equipment on routes

The financial impact of this option is conservatively projected at a net of \$0. It is expected that the appointment-based system will be more efficient and would result in a potential reduction in unauthorized dumping. However, it is assumed that any efficiencies in labor and equipment would be allocated to other services. Also, the reduction in dumping is difficult to calculate and relies on other improvements including enforcement and education and outreach.

I. WEEKLY BULK WITHOUT APPOINTMENTS

This option includes bulk routes that operate every day that service out-of-cart materials and bulk items with manual rear load trucks. The concept of this option is that it allows the automated routes to truly operate as automated where only one driver is utilized per



truck with no helpers. The City of Elyria and other communities operate this way for bulk and out-of-cart materials.

The City currently operates the Heil MultiPack automated side loader dual loading combo truck which provides a rear load option along with an automated side load capability. This truck could be used to eliminate multiple truck drive-bys for customers with out-of-cart or bulk items. In areas where a traditional automated side loader is used currently for carts, it would require a second pass with a rear load truck or a MultiPack truck.

Pros:

- No scheduling or appointment required
- Picks up all out-of-cart and bulk items to maximize automation efficiency
- The Heil MultiPack truck can effectively collect bulk materials and carts
- Rear loaders can provide service for alleys

Cons:

- No communication with customer and limited customer information
- Limited impact on reducing dumping, pick everything up
- May require second truck on traditional automated routes

The financial impact of this option is projected at a net of \$0 because it is effectively performing the same as the current system but performed on a daily basis. This will even out the demands of the operation; however, this option could actually require an increase in resources because there will be more overall route collection time because some routes are driving by all residents every day to collect bulk.

J. EXPANDED DROP-OFFS

The concept behind this option is to provide an expanded number of staffed City drop-off sites for material collection and to ensure contamination of delivered materials is reduced or eliminated. The number of expanded sites would go from the current 2 operated by the City to as much as 6-10 depending on the implementation of other options listed in this study. Staffing to operate these sites would be reallocated from changes in other operations depending on final decisions made by the Administration. As an example, if curbside collection went from weekly to bi-weekly or opt-in, staff resources could be reallocated to the drop-off sites.

The drop-off sites could accept the following materials:

- Cardboard and paperboard
- Mixed paper
- Magazines
- #1 and #2 small mouth plastic containers
- Aluminum cans



- Ferrous metal cans
- Glass bottles and jars

Pros:

- Provides an outlet for recyclable materials
- Works in concert with regional drop-off system
- Staffed sites will reduce or eliminate contamination issues
- Provides recycling opportunities for multi-family housing residents that are not covered by the curbside program (greater than 4 units)

Cons:

- Less convenient to residents than curbside recycling
- Staffing plans would need to be coordinated
- New sites may need to be identified

K. SUPER CENTER DROP-OFFS

As discussed in the expanded drop-off option, super center drop-offs could also be developed. The concept behind this option is to provide an expanded number of staffed City drop-off sites for material collection, ensure contamination of delivered materials is reduced or eliminated, and provide an opportunity to drop-off hard-to-manage materials. The number of super center sites would go from the current 2 standard recycling drop-off sites operated by the City to as much as 6-10 depending on the implementation of other options listed in this study. Staffing to operate these sites would be reallocated from changes in other operations depending on final decisions made by the Administration. As an example, if curbside collection went from weekly to bi-weekly or to opt in, staff resources could be reallocated to the drop-off sites.

Super center locations could include the three stations operated by the City and up to 3-5 more sites to be identified from existing City properties or project partners.

The drop-off sites could accept the following materials:

- Cardboard and paperboard
- Mixed paper
- Magazines
- #1 and #2 small mouth plastic containers
- Aluminum cans
- Ferrous metal cans
- Glass bottles and jars
- Appliances
- Household hazardous waste and used oil/antifreeze
- Scrap tires
- Certain bulk items if stored in movable containers 50 cubic yards or less



- Other specialty materials as identified

Pros:

- Provides an outlet for recyclable materials and other hard-to manage-materials
- Works in concert with regional drop-off system
- Staffed sites will reduce or eliminate contamination issues
- Provides recycling opportunities for multi-family housing residents that are not covered by the curbside program (greater than 4 units)

Cons:

- Less convenient to residents than curbside recycling
- Staffing plans would need to be coordinated
- Possibly, new sites may need to be identified
- Volume of special materials may increase causing an increase in operational costs

L. REGIONAL DROP-OFF SYSTEM

GT identified almost 90 local and regional drop-off locations that accept targeted materials such as aluminum cans, ferrous metal, and mixed paper and cardboard. This option entails the City developing a partnership with as many of these sites as possible so they can be incorporated into the recycling service options promoted by the City. This system of sites would be very beneficial to the City if the curbside recycling program were downsized either through reduced collection frequency, opt-in, or targeted material collection.

Regional partnerships with third party reuse entities, such as, Goodwill and Salvation Army could reduce bulk item collection costs and would provide a valuable diversion opportunity for the City. These partnerships would require the City and the third parties to create a win-win partnership. This partnership could include a general understanding of what is acceptable to donate and possibly a subsidized disposal rate at the Ridge Road Transfer Station to support the third party for items that were donated but have no value.

Even if no changes were made to the current City curbside recycling program, the network of sites identified in this study would be an important part of the City's overall approach to recycling and service opportunities.

Pros:

- This would provide a free opportunity to recycle for residents with no costs to the City
- Drop-offs are located throughout the City to reach residents from all areas
- Multiple drop-offs are available for cardboard, paper, plastic, and metal cans
- With a relationship, the City could request third-party drop-offs to move/add locations when necessary

**Cons:**

- Third-party drop-offs may not notify the City of changes when they occur
- No opportunities for glass were identified

M. WEEKLY YARD WASTE COLLECTION

The weekly yard waste collection program would be considered source-separated yard waste set at the curb and taken to a compost facility (as opposed to yard waste that is not source-separated is simply included in the trash cart). The program would require a dedicated yard waste truck for each route. If carts were used, there could be an automated opportunity to collect the yard waste. If source-separated yard waste would not utilize carts, then manual collection would be needed.

This option could also feed a local circular economy by providing a feedstock of organic materials that could then be turned into compost and mulch. These products could then be sold back into the Cleveland area to complete the circular economy process. Generating clean yard waste and food waste feedstock for local composters would also create jobs. The City is currently developing a request for proposals for a consultant to develop a road map for circular economy initiatives. Organic waste management should be a part of that process.

The yard waste volumes would be included in the total diversion and recycling numbers for the City. Yard waste makes up 12.1% of the total residential waste generation stream⁶, and the City could expect an increase in diversion. It should be noted that in other communities that provide curbside weekly pickup, contamination is a concern and can be problematic for the compost facilities. Contamination can result in additional costs for the load or possibly rejection resulting in landfilling the load.

A weekly yard waste curbside collection program would require outreach and education to mitigate contamination. Drivers can help control contamination as long as they can visually see all materials that are going to be loaded into the truck. A dedicated truck for yard waste is recommended because it will reduce the possibility of contamination. If a trash or recycling truck is used and it is not adequately cleaned out, it could contaminate the load.

A successful established curbside program can be leveraged to incorporate a food waste program. Typically, adding a food waste component would require use of carts.

It is recommended that the program is seasonal: typically, April 1 through December 5. An additional week or two could be added in January if the City wants to collect Christmas trees.

⁶ Advancing Sustainable Materials Management: 2018 Fact Sheet, USEPA, November 2020.



Pros

- Increase in diversion
- Easy to route
- Additional service for residents
- If carts are used, route can be automated
- If manual, material can be checked for contamination
- Decrease in trash volume
- Reduction in disposal costs

Cons

- Material can be heavy and difficult to handle
- Requires a dedicated truck and staff which the City would need to plan for or purchase
- Requires education and outreach
- Consideration must be made for containers or bags
- Carts for yard waste are a significant expense

N. APPOINTMENT-BASED YARD WASTE COLLECTION

This program could be source-separated or could be included with bulk program collection. Inclusion in the bulk program would require additional guidelines for quantities and bundling of yard waste. Dedicated trucks would be required, and the material collected would be transported to a compost facility. These volumes would be included in the City's diversion numbers.

Residents would contact customer service representatives at the 311 system a minimum of 24 hours in advance. The customer service representatives would electronically send the list of residents needing pickup to Division of Waste Collection so that the routes could be created for the yard waste collection routes.

To financially support the appointment-based system, the City could sell tags, bags, and/or stickers.

Carts could be used but are not recommended because the appointment-based system is not expecting a high rate of participation, and when a household does request a pickup, all the material may not fit in a cart. In addition, providing carts for yard waste would be a significant investment with inconsistent participation.

It is recommended that the program is seasonal: typically, April 1 through December 5. An additional week or two could be added in January if the City wants to collect Christmas trees. Also, it is recommended that the appointment-based system be supplemented with an expanded curb leaf pickup for the City for six weeks in the fall. Also, the City should consider collecting limbs and branches at the curb after significant storms for a couple of



weeks. This should be infrequent and possibly happening only once per year. Both the curbside leaf pickup and the storm limb collection would not require an appointment.

All source-separated curbside yard waste programs have the potential for contamination; however, the appointment-based system would allow the drivers to screen the material as they load because the routes would not be as dense and would not be automated if carts are not used. However, a significant outreach program would be necessary to reduce contamination. Composting facilities generally expect material with minimal contamination.

Pros:

- Increase in yard waste diversion
- Additional service for residents
- Reduction in disposal costs
- Decrease in trash volume
- If carts are used, route can be automated
- If manual, material can be checked for contamination
- Prescheduling appointments allows for efficient routing

Cons:

- Possible contamination of the collected material
- Education and awareness required
- Dedicated route truck
- Additional capital needed
- Not effective to combine with food waste program

O. STATION-BASED SPECIAL MATERIAL COLLECTION

The station-based drop-off option would include special materials as discussed earlier. The following option would be to expand special collection of special waste at each station of the City's waste collection operations. Other materials covered in the Super Center option would not be collected.

The station based special material collection requires a more robust education and outreach program to promote all special materials to be collected.

Pros:

- Increased diversion of special materials
- Keeping hazardous materials out of the landfill
- Encourages residents to understand and manage their consumption

Cons:

- May require additional oversight from staff or vendor
- Disposal and recycling of special wastes are expensive.



P. COLLECTION OPTIONS SUMMARY

The following table summarizes three suggested pathways to restructure the City’s collection program. Each of the pathways contain the key collection program elements that were described in detail earlier. This table represents GT’s suggestion for how the City could redesign its program based on the three main criteria established:

- “High Diversion” – High recycling diversion with high investment and increased rates or subsidy
- “Mid-Level” – Mid-level option with low investment and rates remain the same
- “Reset & Re-Build” – Reset and re-build with low investment and no rate increase

The final pathway that will be incorporated into the implementation plan that will follow this study under a separate cover will be based on which recommendations and collection options are selected by the City.

Table 27. Main Collection Components in Three Pathways

Waste Stream	High Diversion/ High Investment	Mid-Level/ Low Investment	Reset & Re-Build/ Low Investment
Curbside Trash	Weekly Trash	Weekly Trash	Weekly Trash
Curbside Recycle	Weekly Recycle	Bi-Weekly Recycle	Opt-in Recycle or Targeted Recycle
Curbside Bulk	Appointment-Based Bulk – collected by area during the month	Appointment-Based Bi-Weekly Bulk	Appointment-Based Weekly Bulk
Drop-off Recycle	Un-Staffed Recycling Drop-Offs (2)	Super Center Recycling Drop-Offs (staffed)	Super Center Recycling Drop-Offs (staffed)
Curbside Yard Waste	Fall Leaves Curbside for All Areas Seasonal Curbside Weekly Yard Waste and Optional Food Waste in Future	Fall Leaves Curbside for High Generating Areas	Fall Leaves Curbside for High Generating Areas
Drop-off Yard Waste	No Yard Waste Drop-off	Yard Waste Drop-off Included in Super Centers	Yard Waste Drop-off Included in Super Centers
Drop-off Special Materials	Station Based Special Materials Collection	Super Center Collection for Special Materials	Super Center Collection for Special Materials
Other Drop-offs	Regional Drop-Off System (City Not Operator)	Regional Drop-Off System (City Not Operator)	Regional Drop-Off System (City Not Operator)

Based on GT’s experience with this project, the nature of the City’s current program, past performance, budgetary constraints, and other factors identified in this Study, the “Reset



& Rebuild” option is recommended. This option allows the City to restart its recycling program with significant participation options available to residents from all demographics and household units (even units above 4), including the following:

- Residents could opt into curbside recycling for a nominal fee.
- Residents could deliver their recyclables, yard waste, and special materials to the super center sites located throughout the City.
- Residents could deliver their recyclables to the large infrastructure of private drop-off sites (90 identified) located throughout the Cleveland area.

The City would benefit from this option from the following:

- The City can grow the number of its opt-in accounts through education/awareness.
- The City can reduce its contamination rate in the curbside recycling program and reduce operating costs through more favorable recycling processing contracts.
- The City could reallocate existing resources to the super center sites and appointment-based bulk program to offer excellent service to its residents.

1. Projected New KPIs

The following table summarizes the estimated key performance indicators for each of the three pathways for consideration:

Table 28. Estimated KPI for 3 Pathways

KPI	High Diversion/ High Investment	Mid-Level/ Low Investment	Reset & Re- Build/ Low Investment	Current with 2020 Budget
Staffing Level:	216	216	216	216
Participation Rate¹:	72%	50%	25%	79%
Tons Recycled:	16,740 ²	11,625 ³	5,813 ⁴	10,328 ⁵
Annual Pounds Per Household Recycled	216	150	75	54
Estimated Recycle Diversion	11.3%	7.8%	3.9%	7.0%
Tons Landfilled:	131,456	136,571	146,899	137,869
Operating Cost Per Household/Month:	\$24.70	\$20.11	\$17.94	\$16.37
Operating Cost Per Total Tons Managed/Year:	\$310.03	\$252.42	\$225.12	\$205.42

¹ Participation rate is estimated to reduce by 25% in Reset & Re-Build per Ohio EPA estimated subscription participation, 50% in Mid-Level for double the subscription participation, and 72% in High Diversion (using the average from surveyed communities by Recycling Partnership).

² Tons Recycled: High Diversion is estimated on an average 300 lbs. per households at a 72% participation (using the average from surveyed communities by Recycling Partnership).

³ Tons Recycled: Mid-Level is estimated on an average 300 lbs. per households at a 50% participation.



⁴ Tons Recycled: Reset & Re-Build is estimated on an average 300 lbs. per households at a 25% participation.

⁵ Tons Recycled: Current with 2020 Budget is estimated using the average of 2015-2017 (22,648.19) with a 62% contamination and a 20% contamination mark down to account for a typical contamination rate of 20% to come to an estimated 10,328 tons for a baseline.

2. Financial Analysis

The following table summarizes the additional new costs or status quo costs for each of the major collection options identified.

Table 29. Estimated Costs Associated to Recommendations

Waste Stream	Recommendations	Estimated New Costs
Trash	Weekly Trash (Curbside)	\$0
Recycle ¹	Weekly Recycle (Curbside)	\$2,502,797
	Bi-Weekly Recycle (Curbside)	\$1,738,054
	Opt-in Recycle or Targeted Recycle (Curbside)	\$869,027
Bulk ²	Appointment-Based Bulk – collected by area during the month (Curbside)	\$0.00
	Appointment-Based Bi-Weekly Bulk (Curbside)	\$0.00
	Appointment-Based Weekly Bulk (Curbside)	\$0.00
Drop-off Recycle ³	Un-Staffed Recycle Drop-Offs (2)	\$0
	Super Center Recycling Drop-Offs (staffed) (3 locations)	\$154,294
Yard Waste ⁴	Fall Leaves Curbside for All Areas (Curbside)	\$30,000
	Fall Leaves Curbside for High Generating Areas (Curbside)	\$0
	Seasonal Weekly Yard Waste and Optional Food Waste in Future (Curbside)	\$0
	Yard Waste Drop-off included in Super Centers	\$120,000
Special Materials ⁵	Station Based Special Materials Collection (Drop-off)	\$0
	Super Center Collection for Special Materials (Drop-off)	\$183,351
	Regional Drop-Off System (Not City Responsible)	\$0

¹ Recycle: Estimated tons found in KPI for 3 for recycle at \$149.51 per ton processing fee. The City previously did not pay a tipping fee for collected recyclables.

² Bulk: The financial impact of this option is conservatively projected at a net of \$0.

³ Drop-off: Estimated 6 Super Centers at 172 tons of recyclables per year at \$149.51 per ton processing fee.

⁴ Yard Waste: Estimated an additional 1,500 tons of yard waste at \$20 per ton processing fee for remaining areas for fall leaves curbside. Estimated 6 Super Centers at 1,000 tons per year or yard waste at \$20 per ton processing fee.

⁵ Special Materials: Additional expenses for tires at 22 lbs. per tire with a 25% generation rate for the population of Cleveland (380,989). Rate charged to tire pick-up is \$175/ton.



All estimates are used to evaluate costs of the above programs. The final cost for the City of Cleveland will be determined upon the results of a bid process for contractual services.

The following table summarizes the current City program costs along with projected expenses for the three pathways listed above.

Table 30. Financial Estimate Based on Recommendations Compared with 2019 Unaudited Expenditures

Category	High Diversion/ High Investment	Mid-Level/ Low Investment	Reset & Re-Build/ Low Investment	2020 Budget
Salaries and Wages	\$14,806,471	\$12,064,532	\$10,967,756	\$10,967,756
Recycling Coordinator + Benefits	\$75,000	\$75,000	\$75,000	
Recycling Coordinator Assistant + Benefits	\$75,000			
Benefits	\$7,660,209	\$6,241,652	\$5,674,229	\$5,674,229
Other Training & Professional Dues	\$12,636	\$10,296	\$9,360	\$9,360
Utilities	\$723,209	\$589,281	\$535,710	\$535,710
Contractual Services	\$13,366,015	\$10,890,827	\$9,900,752	\$9,900,752
Materials & Supplies	\$53,295	\$43,426	\$39,478	\$39,478
Maintenance	\$60,750	\$49,500	\$45,000	\$45,000
Claims, Refunds, Maintenance	\$10,800	\$8,800	\$8,000	\$8,000
Interdepartmental Service Charges	\$6,209,564	\$5,059,645	\$4,599,677	\$4,599,677
Education Programs	\$359,600	\$179,800	\$179,800	\$25,000
Recommendations Estimated Additional Cost				
Weekly Trash (Curbside)	\$0	\$0	\$0	
Weekly Recycle (Curbside)	\$2,502,797			
Bi-Weekly Recycle (Curbside)		\$1,738,054		
Opt-in Recycle or Targeted Recycle (Curbside)			\$869,027	
Appointment-Based Bulk – collected by area during the month (Curbside)	\$0			
Appointment-Based Bi-Weekly Bulk (Curbside)		\$0		
Appointment-Based Weekly Bulk (Curbside)			\$0	
Un-Staffed Recycle Drop-Offs (2)	\$0			
Super Center Recycling Drop-Offs (staffed) (3 locations)		\$154,294	\$154,294	
Fall Leaves Curbside for All Areas (Curbside)	\$30,000			
Fall Leaves Curbside for High Generating Areas (Curbside)		\$0	\$0	
Seasonal Weekly Yard Waste and Optional Food Waste in Future (Curbside)	\$0			
Yard Waste Drop-off included in Super Centers		\$120,000	\$120,000	
Station Based Special Materials Collection (Drop-off)	\$0			



Category	High Diversion/ High Investment	Mid-Level/ Low Investment	Reset & Re-Build/ Low Investment	2020 Budget
Super Center Collection for Special Materials (Drop-off)		\$183,351	\$183,351	
Regional Drop-Off System (Not City Responsible)	\$0	\$0	\$0	
Total	\$45,945,346	\$37,408,457	\$33,361,434	\$31,804,962
Households	155,000	155,000	155,000	155,000
Total Cost per Household	\$296.42	\$241.34	\$215.24	\$205.19
Total Cost per Household per Month	\$24.70	\$20.11	\$17.94	\$17.10

Based on the financial analysis above, the following table compares the City’s current costs and future projected pathway costs to communities evaluated in this Study.

Table 31. Operational Expenditures Per Household Per Month Compared to Surveyed Communities

City	Total Operational Cost to City per Household per Month	Households Served
Cleveland (2019)	\$16.37	155,000
Reset & Re-Build/Low Investment	\$17.94	
Mid-Level/Low Investment	\$20.11	
High Diversion/High Investment	\$24.70	
Canton, OH	\$8.86	25,000
Chesapeake, VA	\$23.81	70,000
Dayton, OH	\$15.28	60,000
Des Moines, IA	\$10.63	66,000
Grand Rapids, MI	\$19.97	45,000
Lexington, KY	\$26.92	93,790
Madison, WI	\$21.21	84,000
Memphis, TN	\$24.29	174,954
Milwaukee, WI*	\$4.62	181,000

*Owns MRF and 2 transfer stations

Q. ALTERNATE SOLID WASTE MANAGEMENT TECHNOLOGIES

GT evaluated alternative solid waste management technologies (ASWMT) that either complement or displace curbside recycling programs. The City evaluated several ASWMT options from 2011 – 2014. The options evaluated included waste to energy in conjunction with curbside recycling and other technologies. The following section summarizes common ASWMT utilized throughout the country.





ASWMT utilize a combination of technologies like recycling, composting, resource recovery (waste-to-energy, thermal conversion, etc.), and landfilling to effectively manage solid waste. ASWMT can be an essential components of solid waste management system for the City. ASWMT utilized various systems that:

- Divert waste from landfills
- Recover resources from the waste stream
- Minimize environmental impact

The following AWTs are discussed in this section:

- Biological Technologies
 - Composting
 - Anaerobic digestion
- Thermal Technologies
 - Mass burn with energy recovery
 - Gasification
 - Pyrolysis
- Mechanical Separation Methods
 - High efficiency sorting technologies
- Depolymerization and Decomposition
 - Thermal depolymerization
 - Chemical decomposition

1. Biological Technologies

The following section details two types of biological technologies used to manage source-separated organics: composting and anaerobic digestion.

a. Composting

The U.S. EPA describes the composting process as a method of waste management to stabilize organic waste. The stabilized end-product (compost) is used to amend soil to improve soil structure, provide plant nutrients, and facilitate the re-vegetation of disturbed or eroded soil. The composting process uses microbial activity to degrade raw organic materials, such as yard trimmings, manure, municipal bio-solids, and food waste so that the end-product is relatively stable, reduced in volume (when compared to the initial amount of waste), and free from offensive odors. Composting can be done on a large or small scale, with the management requirements and intensity increasing dramatically as system size increases.



This section defines the four types of compost facility classifications that are regulated by Ohio EPA (source Ohio EPA).

iv. Class I

These facilities may accept a variety of solid wastes such as mixed solid waste, food waste, yard waste and other industrial wastes. Class I facilities do not have size restrictions. These facilities require a permit, air permits, license, and financial assurance. These facilities also have numerous environmental management systems for leachate collection, dust and odor management, storm water management and litter management. The outbound product may or may not be required to pay state and local fees depending on the use of the product.

Medina County was the only licensed Class I Compost Facility in the State of Ohio but has since closed.

v. Class II

This classification may accept only source-separated yard waste, animal wastes, food waste, specified agricultural wastes, authorized bulking agents and additives, and other alternative materials. Alternative materials (feed stocks, bulking agents, and additives) may be utilized in the compost process if prior approval is obtained from the Director of OEPA. Class II facilities do not have size limitations. Such facilities require a license, financial assurance, registration and leachate, storm water management and possible air permits.

Exceptions: If the facility exclusively co-composts sewage sludge with source-separated yard wastes and/or animal wastes and/or bulking agents, it is exempt from the requirements of the solid and infectious waste regulations and solid waste disposal fees. It is, however, subject to the requirements of water pollution control and air pollution control regulations.

The closest Class II compost facilities to the City include the following (this does not guarantee that the facility has capacity or is willing to work with outside entities):

1. Full Cycle Organics LLC – Cleveland, OH – 0 miles
2. Rid-All Green Partnership – Cleveland, OH – 0 miles
3. Cloverleaf Facility – Independence, OH – 8 miles
4. ODOT Medina County Burbank Outpost – Burbank, OH – 46 miles
5. Barnes Nursery Inc Yard Waste Recovery Division – Huron, OH – 56 miles
6. Paradise Composting II – Wooster, OH – 58 miles

**vi. Class III**

These types of facilities may accept only source-separated yard waste, animal wastes, specified agricultural wastes, authorized bulking agents, and additives. These facilities must be limited to less than 15,000 square yards of total area. Class III facilities only require a registration but must still manage leachate and storm water.

vii. Class IV

There are more Class IV compost facilities than any other class. These facilities may accept only source-separated yard waste, authorized bulking agents, and the following additives: urea and bacteria or fungal inoculums. These facilities do not have size restrictions. Class IV facilities only require a registration and management of storm water and leachate.

b. Types of Composting Technology

There are many types of composting technologies. Operators of compost facilities must select the technology that fits the type of materials to be processed, the geographic location, climate and, in Ohio, the type of class of compost facility. Examples include:

viii. Aerated Static Pile (ASP) Composting

ASP composting is a space efficient method that involves mixing organics and bulking agents in piles up to 16 in height. Air is forced through the piles using an aeration system, which requires less manipulation of the pile than the windrow composting method. ASP is often used as the first stage of managing organic material for a period lasting 15 to 25 days. After this stage is complete, it is followed by a 3 to 4-week period of "curing" the materials in un-aerated static piles.

ix. Un-aerated Static Pile Composting

Organic discards are piled and mixed with bulking material. This method is best suited for small operations; it cannot accommodate meat or grease. Un-aerated static pile composting requires the least effort to operate or maintain but takes the longest time to produce finished compost (approximately 10 to 26 weeks).

x. Windrow Composting

Shredded organic materials (food waste, yard trimmings, wood chips, etc.) are formed into rows or long piles and aerated by turning the pile either passively or mechanically. This method can accommodate large quantities of organic materials. It cannot accommodate large amounts of meat or grease without frequent turning and careful temperature and moisture control. This process can handle large quantities of input, such as yard trimmings of up to 100,000 cubic yards per year, on only a few acres of land. Both windrow and static pile composting operations have low capital and operating costs;



however, these systems require more buffer zones and space than in-vessel composting. Finished compost can typically be produced in 6-12 weeks using this method.

xi. Chipping and Grinding

Logs, branches, brush, and other untreated woody materials that are a by-product of gardening or outdoor maintenance can undergo size reduction through grinding and chipping. Low-quality ground cover, like mulch, can be produced after the product has gone through a composting heat cycle to kill weeds and seeds.

xii. In-Vessel Composting

In-vessel composting involves feeding organic materials into a drum, silo, concrete-lined trench, or similar equipment where temperature, moisture, and aeration are closely controlled. The apparatus usually has a mechanism to turn or agitate the material for proper aeration. In-vessel composting can process large amounts of waste without taking up as much space as the windrow method. In addition, it can accommodate virtually any type of organic waste (e.g., meat, animal manure, biosolids, food scraps).

Organic material is converted to compost in as little as a few weeks. Once the compost comes out of the vessel, however, it still requires a few more weeks or months for the microbial activity to stabilize into finished compost. In-vessel composting generally contains process air and liquids so that they can be captured and treated prior to discharge. Because in-vessel systems are completely enclosed, they are typically the most expensive of the composting methods presented.

xiii. Mixed Waste Composting

Mixed waste composting is a process of breaking down organic materials found in the municipal solid waste stream. Separation and size reduction technologies are used to separate and prepare organic materials for the actual composting process. The quality of compost produced varies greatly depending on methods used to pre-sort materials and remove non-compostable residual material after the composting process is complete.

Many MSW composting facilities that were operating in the U.S. during the 90's have shut down due to technical reasons, like odor control, or financial difficulties. Most financial issues stemmed from unrealistic expectations of the value of compost products produced through this process. Actual revenues tended to be lower than expected, causing MSW composting projects to be too costly and non-competitive with other waste management alternatives. The compost product through MSW composting has a low economic value and competes with peat moss as a soil conditioner or can be used as alternative daily cover at a landfill. For MSW compost products used as alternate daily cover at landfills, it is important to point out that the material is still disposed of in a landfill and is not creditable as recycling. The material may pose value to the landfill operator, if the landfill needs materials to use as alternate daily cover, to reduce their handling and operational costs



for harvesting virgin soils for cover materials. The material may also have limited economic value to the MSW composter via a reduced tip fee for disposal.

Medina County was the only Class I compost facility in the State of Ohio that processed MSW into a compost material. The compost process required significant binder agents such as yard waste and woody waste to process the MSW. The resulting screened compost product produced was never economically viable as a product for sale. The compost was used as alternate daily cover on a landfill for a reduced tipping charge. The Class I compost used as alternate daily cover represented less than 3% of the landfills daily cover requirements.

This facility has since closed.

c. Benefits of Composting

- Produces viable end product (non-MSW compost)
- Diverts organic waste (only waste that decomposed for MSW composting) from landfills

d. Barriers to Composting

- Odor/pest control
- In-vessel requires large capital investment
- Siting a facility in close proximity to generators of organic waste
- Collection and hauling of organic waste

e. Anaerobic Digestion

Anaerobic digestion (AD) is the biological process in which organic material is broken down by bacteria in an oxygen-deprived setting by feeding pre-sorted waste into water tanks. Using agitators, pumps, conveyors, and other materials handling equipment, MSW is wetted and formed into slurry. Non-organic contaminants such as metals and glass are eventually discharged from the system and can either be recycled, processed, or disposed. The soluble waste components generate “black water” which has a relatively high organic content and is processed in a series of sealed digesters without air. Microorganisms break down the solids and generate biogas, which can be used to generate heat and electricity.

AD is used in different regions worldwide to:

- Reduce the amount of material being landfilled and produce a nutrient-rich soil amendment
- Stabilize organic material before disposal in order to reduce future environmental impacts from air and water emissions
- Recover and produce energy

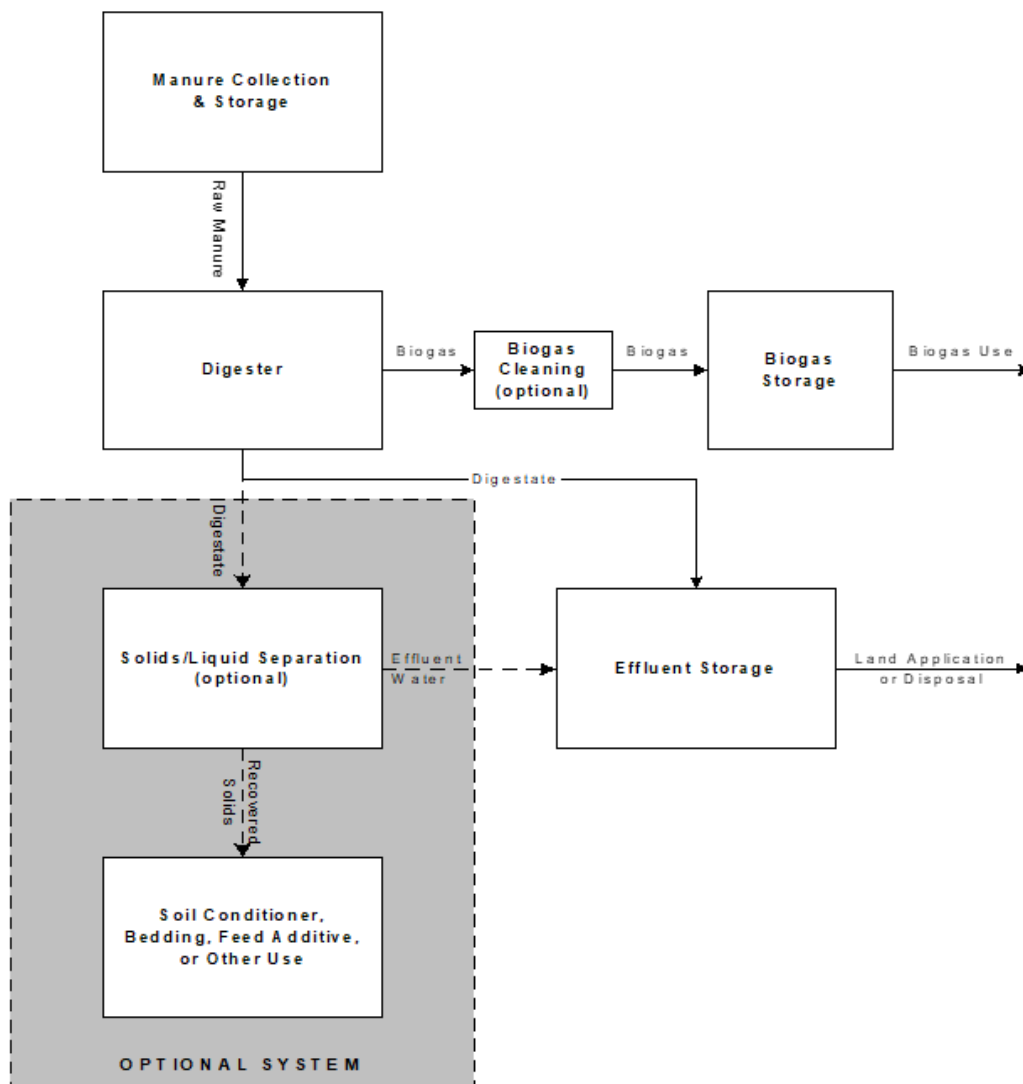


AD is primarily used for waste streams such as manure, sewage sludge, bio-solids and other high-volume organic wastes including food waste. AD systems require large volumes of organic materials to operate cost effectively. Research indicates that a base load of 10,000-20,000 tons/year of sewage sludge or other suitable organic waste, such as manure or bio-solids, is enough to invest in a facility.

Another benefit of AD is the reduced space requirements needed to operate as compared to many other large-scale composting methods. This makes the facilities easier to locate in urban areas.

The typical components of an AD system are shown in the following figure. Components include collection/storage, digester vessel, effluent (sludge) storage, gas handling, and gas use (e.g., heating, electricity generation, etc.).

Figure 38. Anaerobic Digestion Process





i. Benefits of Anaerobic Digestion

Anaerobic digestion uses organic waste materials to generate energy. AD complements other organic waste diversion technologies such as composting by creating a nutrient-rich soil additive. Utilizing AD technologies can help to reduce greenhouse gas emissions in a number of keyways, such as:

- Replacement of fossil fuels
- Reducing methane emission from landfills
- Displacing industrially produced chemical fertilizers
- Reducing vehicle movement (if facility is closer than landfill)
- Reducing electrical grid transportation losses

ii. Barriers to Implementing Anaerobic Digestion

While there are several benefits to AD, barriers to implementation including:

- Low landfill tipping fees
- Low energy prices
- High capital costs
- Securing a base load of material

2. Thermal Technologies

Thermal technologies including mass burn with energy recover, gasification, and pyrolysis are considered in this section. Waste-to-energy projects have not been competitive in the Ohio solid waste marketplace for the past 20 years because of their high cost to implement and existing low landfill disposal rates. However, new proposals for thermal technology projects, such as pyrolysis, are being seen in Ohio.

a. Mass Burn with Energy Recovery

Mass burn is the combustion, or incineration, of municipal solid waste without any pre-processing of the waste. Most mass burn facilities include some method of energy recovery. Energy recovery can be in the form of electricity or steam heat. For example, several municipal waste-to-energy facilities provide steam heat for downtown heating systems such as in the Covanta facility in Indianapolis, Indiana. Mass burn may also be implemented without energy and materials recovery; however, this is becoming a less attractive option. Modern mass burn facilities reduce the volume of the original waste by 90 percent depending upon composition and degree of recovery of materials such as metals from the ash for recycling.

There are 75 waste-to-energy facilities currently operating in the U.S and process more than 32 million tons annually. In the 1980s, Ohio had four incinerators, three of which



recovered energy. Regulatory requirements, enforcement, and environmental concerns forced these facilities to close by the mid to late 90s.

b. Benefits of Mass Burn Waste-to-Energy Facilities

- Waste-to-Energy is recognized as renewable energy at the federal level
- USEPA stated that Waste-to-Energy plants are, “clean, reliable, renewable sources of energy” (USEPA letter from Assistant Administrators Marianne Horinko, Office of Solid Waste and Recycling and Jeffrey Holmstead, Office of Air and Radiation, to Maria Zames, IWSA, 2/14/03).

c. Barriers to Implementing Mass Burn Waste-to-Energy Technologies

Obvious barriers to implementation include:

- Low landfill tipping fees
- Low energy prices
- Public acceptance
- Landfills still needed to dispose of ash
- More expensive than landfilling

d. Gasification

Gasification is a high temperature process that is optimized to produce a fuel gas with a minimum of liquids and solids. Gasification consists of heating organic material in a vessel with or without the addition of oxygen. Water may or may not be added. Decomposition reactions take place, and a mixture of hydrogen and carbon monoxide (CO) is produced (known as syngas). Plasma arc uses electrically generated plasma torches to convert waste materials into gas and a slag by-product. This technology is a type of gasification technology operating at up to 7,000 degrees Celsius (SRI International, October 1992. Waste Gasification, Impacts on the Environment and Public Health, The Blue Ridge Environmental Defense League, February 2009.).

Gasification is generating significant interest among proponents of alternative waste management and cleaner energy solutions. Gasification converts waste to synthetic gas (“syngas”) while producing no emissions, effluents, or odors. It also displaces the need for energy produced by coal or natural gas and diverts waste from landfills simultaneously. The aforementioned qualities illustrate the differences between gasification facilities and traditional waste management and power generation facilities that residents try to keep out of communities. For this reason, gasification facilities can be located closer to the communities generating waste, shortening the distance waste is transported for disposal. Correspondingly, gasification facilities can be located closer to populations consuming the electricity produced by this technology, making energy production more efficient. The 10 percent of energy that is usually lost by transporting



energy long distances to consumers can be delivered to nearby households without losing any power.

e. Benefits to Implementing Gasification

- Generation of power
- Minimize landfill disposal

f. Barriers to Gasification

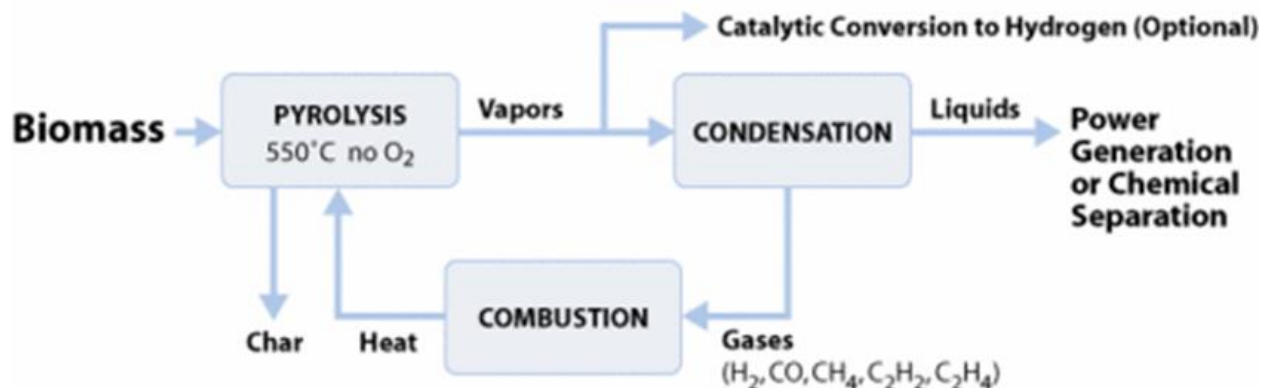
- Lack of track record for processing municipal solid waste in the U.S.
- Low landfill tipping fees
- Low energy prices
- Extensive pre-treatment required to process municipal solid waste

g. Pyrolysis

Pyrolysis is a technology for processing municipal solid waste, low-quality fuels, and homogenous waste streams like tires, biomass, industrial waste, hazardous waste, and PCBs. Unlike incineration, pyrolysis eliminates fly ash and gas emissions by using a medium to high-temperature (500 to 1,000° C) process for breaking down organic materials under pressure and in the absence of oxygen. This process produces a liquid residue and gaseous output which may be combusted to generate electricity. A solid slag is also produced which may require disposal or additional processing. The following figure outlines the pyrolysis process which is for biomass (organic matter derived from living, or recently living organisms), a source separated waste stream.

Figure 39. Pyrolysis Process

Biomass Liquefaction via Pyrolysis



Source for Pyrolysis Flowchart: U.S. Department of Energy website



h. Benefits to Implementing Pyrolysis

- Generation of power
- Minimize landfill disposal

i. Barriers to Implementing Pyrolysis

- Lack of track record for processing municipal solid waste in the U.S.
- Low landfill tipping fees
- Low energy prices
- Extensive pre-treatment required to process municipal solid waste

3. Mechanical Separation Technology

There are many variations of material recovery facilities operating in the U.S. These facilities process sorted recyclables or mixed solid waste to recover, sort, and prepare materials to be marketed by baling, crushing, compacting, or shredding. These systems use a combination of manual and mechanical separation methods. Many advanced systems are economical at a large scale, but new technologies are emerging that may make mechanical separation more cost effective for smaller volumes of waste.

There are numerous mechanical separation technologies in use across the United States that separate recyclables including the following:

- Rare earth magnets – non-ferrous metals
- Magnetic belts – ferrous metals
- Disk screens – separates fiber from containers
- Ballistic separators – separates fiber from containers
- Cardboard screens – separates bulk cardboard from incoming source separated recyclables
- Air knife/clarifier/screen – separates light fraction material from heavy (such as glass)
- Optical scanners – primarily used to separate plastics (PET from HDPE) but can also be used in glass separation and other materials
- Trommel screen – separates bulk material from fines and smaller debris, also breaks bags a part
- Glass screen – breaks glass and separates from light fraction waste materials
- Bag breakers – breaks or opens bags of trash prior to processing operations
- Robots – used in separation of contamination and/or targeted commodities in place of manual labor

The use of the above technologies together or independently increases the diversion of recyclables from the waste stream.



a. Benefits to Mechanical Separation

- Separates and processes commodities for sale on the open market
- Minimize landfill disposal

b. Barriers to Implementing Mechanical Separation

- High capital expense to develop
- Contamination management
- Labor costs
- Feed stock guarantee

4. Depolymerization and Decomposition

Depolymerization and decomposition are processes that break down materials into simpler molecules or compounds. Catalysts that drive these processes can be chemical, biological, or thermal. Depolymerization and decomposition can be useful for managing different types of wastes, with results usually yielding useful products like compost or fuel. This section summarizes thermal depolymerization and chemical decomposition.

a. Thermal Depolymerization

Thermal depolymerization, or decomposition, is a process that converts waste materials like biomass (organic matter derived from living, or recently living organisms) and plastic into crude oil. The process is similar to gasification with the major difference being that only medium temperature and pressure are used in order to break down molecules. Much like MSW composting, solid waste feedstock are usually pre-processed to remove recyclable and inert materials and to reduce the particle size in preparation for depolymerization.

b. Chemical Decomposition

Chemical decomposition converts materials into compounds using a chemical catalyst. Many facilities that use chemical decomposition to commercially manage waste materials require an external heat source. Microwaves can be used as the external heat source for chemical decomposition or depolymerization.

5. Past ASWMT Studies Conducted by the City

In 2013 and 2014, the City conducted an evaluation of alternate waste technologies and then developed a request for proposals. The AWS evaluated included the following:

- Autoclaves and thermal hydrolysis
- Transfer station + recycling + fuel pelletizing + CFB boilers + steam + electricity
- MRF + gasification of MSW + power generation



- MRF + gasification or mass burn + power generation
- MRF + fuel pellets + melting
- Gasification system + power generation
- MRF + RDF + fertilizer
- gasification + fermentation (ethanol) + power generation
- anaerobic digester for organics + power generation
- MRF + engineered fuel + Class I compost
- MRF + fuel pellets
- Batch gasifiers

The top 5 systems that the City preferred were the following in the order of most:

1. MRF + fuel pellets
2. MRF + engineered fuel + Class I compost
3. MRF + RDF + fertilizer
4. Gasification system + power generation
5. Transfer station + recycling + fuel pelletizing + CFB boilers + steam + electricity

An RFP was developed and advertised to the private sector, but no action was initiated by the City for the proposals submitted.

In conclusion, the various options listed in this section have been evaluated by the City through a third-party consultant. The City took no action on the implemented of these systems. Part of the issue for implementing these systems is the cost of management on a per ton basis as compared with what the City pays for its current disposal. No successful AWS has been implemented in Ohio that can process mixed solid waste at a competitive price.

As an example to the above statement, the Medina County Solid Waste District closed its mixed waste processing facility because of poor performance and high costs. This system was 1993 technology.

In 2016, a new high technology mixed waste processing facility was constructed in Warren Ohio by NEO-ARC. This facility was designed on the premise that it would easily achieve a 60% recycling rate (recyclables extracted divided by total waste received). The owners were so confident of the projected designed recycle rate potential of the facility that they did not incorporate a solid waste transfer facility option into the design. The facility includes many of the high-tech equipment you would expect to see in a modern recycling facility. The gate rate of the facility was \$52.25/ton delivered.

When they began operation in July of 2016, it became evident very quickly that the performance of the facility would not come close to the 60% recycling rate needed to demonstrate the State of Ohio's legitimate recycling facility exemption. Without the exemption, NEO-ARC would need a transfer station license to continue to operate. Faced with this reality, and after exhausting all operational and procedural options including



processing source separated recyclables, NEO-ARC closed the mixed waste processing in February of 2017 and only accepted source separated recyclables into the future.

With all of this said, an AWT system is not recommended for the near future for the City. If the technologies and associated capital and operating costs become more attractive in the future, the City may desire to evaluate options at the time. The City could engage with its local universities to evaluate and/or research alternate waste technologies regarding the scientific evaluation of processes.



V. CONCLUSIONS AND RECOMMENDATIONS

The City's waste collection program has evolved from a manual collection program with no curbside recycling (drop-off sites were operated) to a program that was intended to operate as an automated collection program using carts for both trash and recyclables. The implementation of this new system was initiated between 2011 and 2015. The program roll-out included informational literature provided to the residents directly via a flyer on their new cart when delivered and on the website. Other activities also occurred to inform the public on the new program. Starting in 2010, a waste collection fee began to be charged for the first time. Prior to 2010, all services were included in the tax-based revenue system. The waste collection fee started out at \$8.25 per residential unit, was increased to \$8.50 in 2012, then to \$8.75 in 2013, and remains at this rate as of 2020. This rate covers half of the cost of the overall Division of Waste Collection budget. The program also changed how staffing was paid from a task system where employees could leave after they completed their routes to hourly where they worked a standard 8-hour day plus overtime if authorized. This change was not received well from the staff.

As time went on, contamination issues, truck maintenance and availability issues, and staffing issues arose that evolved the program into a semi-automated program. The City rolled out an enhanced enforcement program to combat the issues of contamination and general ordinance abuse which included fines. These efforts did not affect the overall performance of the program and has since been scaled back. COVID-19 also had a direct effect on the program in 2020 including the suspension of bulk pickup for a period of time.

In 2019, the City was unsuccessful in obtaining a recycling processor for collected recyclables from its single-stream curbside program via two procurement processes. This resulted in materials collected from the curbside recycling program to be disposed in a landfill until a new processor could be hired. The reason that the two procurement processes failed to provide a viable contractor can be summarized by the following:

- Contamination of the collected single-stream recyclables by trash or other recyclable materials that were not acceptable in the program was excessive. The average contamination rate in Cleveland was over 60% per the previous contractor audits. The average contamination rate from comparable communities covered in this study was approximately 20%.
- Pricing and competition in the market has significantly changed based on several factors including China's ban on recyclables, commodity prices, economic forces, and contamination issues in the industry.

The above situation caused the City to re-evaluate its program for trash and recyclables collection along with other Division of Waste Collection operations. The City advertised a request for proposals for potential consultants to provide assistance in evaluating the City's waste collection programs and to offer recommendation on a re-design of the entire system.



This Study evaluated a broad spectrum of information and data from the City's operations along with comparable cities across the United States. In addition, this study obtained direct input from City managers/supervisors, staff, and decision makers as well as City residents on what is working and what needs to improve along with GT's professional ideas on potential improvements. The overall consensus for broad areas of improvement include the following:

- More comprehensive education and awareness of programs provided to residents to increase proper participation and decrease abuse of overall program and contamination in recycle program
- More enforcement and consistency on programs
- Improve bulk program to meet the needs of the community
- Develop parking ban for waste collection days and develop or change other ordinances to meet the needs of the new program
- Address multi-family housing properties and abuse of program by renters
- Routes need to be redone as they are extremely inefficient
- Staff morale is low and overall Division of Waste Collection culture is negative
- Staff sick time and call-off abuse is significant
- Equipment availability has improved through fleet department but is still significantly below the need of the division on a daily basis

The overall design of this Study was to lead the City to a decision on a pathway for improvement. The pathways presented in the previous section offer three unique opportunities for improvement that offer varying levels of changes and investments. The collection options listed in the previous section must be approved by the Administration along with the following best management practices recommended so an implementation plan can be developed, under separate cover, for the redesign to occur.

The recommendations provided in this section include the major collection programs by pathway and best management practice recommendations that should be considered *regardless of which pathway is decided upon for programmatic changes*. The best management practice recommendations are based on the results of this Study and not dependent, but may vary in implementation, on any other collection program changes. In other words, the recommendations provided are best management practices that should be considered regardless if the City changes any core parts of its collection operation. Each recommendation includes an authorization to be included in the implementation plan that will be developed afterwards under separate cover.

A. COLLECTION PROGRAM RECOMMENDATIONS

The following three pathways were developed as suggested combinations of collection programs to achieve different goals and objectives. The details and pros/cons for each collection program option was discussed earlier. The culmination of these collection system suggestions would re-invent the current Division of Waste Collection programs.



This re-invention of the program should be branded and communicated accordingly as discussed in the best management recommendations section.

Table 32. Main Collection Components in Three Pathways

Waste Stream	High Diversion/ High Investment	Mid-Level/ Low Investment	Reset & Re-Build/ Low Investment
Curbside Trash	Weekly Trash	Weekly Trash	Weekly Trash
Curbside Recycle	Weekly Recycle	Bi-Weekly Recycle	Opt-in Recycle or Targeted Recycle
Curbside Bulk	Appointment-Based Bulk – collected by area during the month	Appointment-Based Bi-Weekly Bulk	Appointment-Based Weekly Bulk
Drop-off Recycle	Un-Staffed Recycling Drop-Offs (2)	Super Center Recycling Drop-Offs (staffed)	Super Center Recycling Drop-Offs (staffed)
Curbside Yard Waste	Fall Leaves Curbside for All Areas	Fall Leaves Curbside for High Generating Areas	Fall Leaves Curbside for High Generating Areas
Drop-off Yard Waste	Seasonal Curbside Weekly Yard Waste and Optional Food Waste in Future	Yard Waste Drop-off Included in Super Centers	Yard Waste Drop-off Included in Super Centers
Drop-off Special Materials	Station-Based Special Materials Collection	Super Center Collection for Special Materials	Super Center Collection for Special Materials
Other Drop-offs	Regional Drop-Off System (Not City Responsible)	Regional Drop-Off System (Not City Responsible)	Regional Drop-Off System (Not City Responsible)

Based on GT’s experience with this project, the nature of the City’s current program, past performance, budgetary constraints, and other factors identified in this Study, the “Reset & Rebuild” option is recommended. This option allows the City to restart its recycling program with significant participation options available to residents from all demographics and household units (even units above 4), including the following:

- Residents could opt into curbside recycling for a nominal fee.
- Residents could deliver their recyclables, yard waste, and special materials to the super center sites located throughout the City.
- Residents could deliver their recyclables to the large infrastructure of private drop-off sites (90 identified) located throughout the Cleveland area.

The City would benefit from this option from the following:

- The City can grow the number of its opt-in accounts through education and awareness.



- The City can reduce its contamination rate in the curbside recycling program and reduce operating costs through more favorable recycling processing contracts.
- The City could reallocate existing resources to the super center sites and appointment-based bulk program to offer excellent service to its residents.

The following collection options will need to be decided by the Administration for a final pathway to be determined for the implantation plan:

Table 33. Main Collection Components Final Pathway Approval

Program	Approved for Implementation
Recycle Collection	
Weekly Recycle	
Bi-Weekly Recycle	x
Opt-in Recycle	x
Cardboard only	
Cardboard and Mixed Paper Only	
#1 and #2 Plastic Only	
Single stream	x
Drop-Off Collection	
2 City Drop-Offs	
Expanded Drop-Offs	
Super Center Drop-Offs	x
Regional Drop-Off System	x
Organics Collection	
Fall Leaves in High Generating Areas	
Fall Leaves in All Areas	x
Seasonal Weekly Curbside Yard Waste	
Seasonal Appointment-Based Yard Waste	
Year-Round Curbside Food Waste	
Bulk Collection	
Weekly Bulk	x
Monthly Bulk	
Bi-Weekly Bulk	
Appointment-Based Bulk	x (to be clarified)
Specialty Materials Collection	
Station-Based Expanded Collection	
Super Center Collection	x



B. BEST MANAGEMENT PRACTICE RECOMMENDATIONS

1. Collection and Routing

Recommendation 1.1

The City should select the standard collection systems by material collected and then transition its fleet and routing to that standard of collection. This effort will take time, but consistent collection is important to efficiency and service delivery. The City's fleet is a mixture of multiple types of trucks, including:

- 22 rear load packers
- 5 rental rear load packers
- 37 side loaders
- 4 front loaders
- 28 multi-pack trucks
- 3 roll-off trucks
- 1 flatbed truck
- 1 mini rear load packer

This diversity in trucks reflects the diversity in collection systems utilized by the City, specifically:

- Automated
- Semi-automated
- Manual
- Hybrid (automated and manual)

The City has enough automated trucks to operate as fully automated if this style of collection is selected. The same can be said with rear load and multi-pack trucks to operate as semi-automated or manual. The following definitions are provided:

Automated

This system usually requires only one employee to drive the truck and operate the automated lift arm. Fully automated collection is usually characterized by the use of a side-loading packer truck. Wheeled carts are placed at or near the curb or driveway apron by the resident. The automated truck then positions itself adjacent to the cart and then through the use of an articulated lift arm operated by the driver from within the cab, grabs the cart and dumps the load into the packer body.



Semi-Automated

This system requires 2-3 employees (1 driver and 1-2 collectors) to manually roll City provided wheeled carts to the City’s existing rear load packer trucks or multi-pack trucks where a tipper mechanism lifts the cart and dumps into the truck (currently not installed on City trucks). One to two collectors also allow the flexibility to collect additional materials (e.g., extra trash bags or bulk items) which would not fit into the cart.

Manual

This system requires 2-3 employees (1 driver and 1-2 collectors) to manually load trash or recyclables into a rear load packer or multi-pack truck.

Hybrid

This system exclusively uses the Heil Multi-Pack trucks to collected carts automated, semi-automated or manually. This system can have 1 -3 employees depending on the system of collection being used.

The following selections need to be made on which style of collection is desired by the City by material collected.

Trash Collection

- Approved for Implementation Plan: Automated Yes No
- Approved for Implementation Plan: Semi-Automated Yes No
- Approved for Implementation Plan: Manual Yes No
- Approved for Implementation Plan: Hybrid Yes No

Recycle Collection

- Approved for Implementation Plan: Automated Yes No
- Approved for Implementation Plan: Semi-Automated Yes No
- Approved for Implementation Plan: Manual Yes No
- Approved for Implementation Plan: Hybrid Yes No





Recommendation 1.2

The City should consider re-routing the entire City curbside collection routes to obtain the best efficiency. Previous studies of this nature have demonstrated cost savings of between 10% and 25% and/or increased efficiency and performance. These benefits have been achieved through the following:

- Reduced wear and tear on vehicles
- Less time to complete routes
- Increased efficiency of collection vehicles
- Reduced trips to the transfer station
- Reduced number of routes and vehicles
- Reduced overtime and other factors

There are numerous computer-aided modeling programs available that can be used to assist the City including Route Smart, a routing program GT has used to assist other communities.

Route optimization would be specific to the final curbside options that the Administration will have to decide upon. As an example, if true automated collection is selected, the City will have to create and then enforce ordinances for targeted parking bans so only one driver with no helper can run the routes. This would reduce the stop times from 11-20 seconds to approximately 5 seconds (assuming parking ban and other ordinances are created and followed). Bulk and other out-of-cart materials would be routed separately.

The following table shows potential hours that could be saved by a fully automated collection program. Metrics for seconds per stop were collected by sampling routes in September 2020. The feasibility for a fully automated program in the City of Cleveland is not likely based on current City ordinances:

- No ordinance prohibiting vehicles on streets during waste collection day.
- Some streets and alleys do not allow for fully automated collection based on physical limitations such as street width, power lines, and tree coverage.

Table 34. Potential Hours Savings for Fully Automated Curbside Collection based on Current Program Metrics

Category	Trash	Recycling
Number of Routes	190	139
Number of Households	155,000	155,000
Estimated Average Stops per Route	816	1,115
Estimated Average Participation Rate	87%	79%
Average Participating Stops per Route	712	876
Current Average Seconds per Stop	11.7	15.6





Category	Trash	Recycling
Current Estimated Hours for Servicing Stops Per Route*	2.3	3.8
Fully Automated Routes' Seconds per Stop	11.5	11.5
Fully Automated Hours for Servicing Stops Per Route*	2.3	2.8
Hours Difference Between Current and Fully Automated Per Route	0.0	1.0
Potential Maximum Hours Savings for Fully Automated Collection Over All Routes per Week	5.6	137.3

*Does not include time truck is moving between stops, to and from route, and trips to the transfer station.

True automated collection systems for heavily urbanized cities would see trash routes with 850-1,000 homes per route and recycle routes with 1,600 – 2,000 homes per route.

Another example would be if the City went to bi-weekly recycle collection or opt-in curbside recycling, the route optimization would have to account for reduced participation and volumes.

This recommendation is critical to any change in service as well as if no change occurs. The current routes are not efficient and are not consistently followed by drivers.

This recommendation would be implemented in the sequence articulated in the implementation plan and would incur working with a consultant to design the routes per the selected recommendations from this report.

Approved for Implementation Plan: Yes No

Recommendation 1.3

The City should develop a fee system to account for either new services or services that are not included in the new base programs:

- Special collections such as house move/clean outs
- Additional curbside appointment-based bulk pickups above stated program
- Additional Ridge Road Transfer Station bulk drop-off above stated program
- Bag charges for mattresses
- Additional appointment-based recycle pickups above stated program
- Call back charge for missed pickups when documented that material was not placed at curb per ordinance
- Extra out-of-cart materials
- Other services included in this Study such as curbside yard waste collection for composting and food waste collection

Approved for Implementation Plan: Yes No Maybe





2. Recycling Program

This Study has identified several recycle collection options with three specific pathways of potential program design. The ultimate final pathway will be decided by the Administration. The following section includes recommendations regardless of which pathway is chosen.

The combination of the recommendations provided below and in the education and outreach section, in their totality, can reduce the City's contamination rate from a high of 62% to the industry averages of between 20-30% or less over time. In addition, increased education and outreach can improve the recycling diversion rate as well.

Recommendation 2.1

The City should hire a full-time recycling coordinator. The recycling coordinator may be responsible for the following duties and initiatives. Priority should be given to operational management of the program followed by cooperating with partners to the recycling program, management of recycling education, operational labor, and other duties.

- Initial development of new City brand for recycling and then implementation of new program
- Work with the Cleveland Office of Sustainability
- Work with the regional recycling drop-off infrastructure
- Work with the Cuyahoga County Solid Waste Management District on branding, resource management, education and awareness, and technical assistance for City programs
- Work with the Community Development Corporation on resident engagement activities and neighborhood outreach
- Work with Division of Waste Collection management on contract management for the recycling and waste programs
- Work with and educate City Council on issues as well as successes and progress on an ongoing basis
- Educate City workers and Division of Waste Collection staff on the recycling program
- Work with the 311 staff to ensure the most up-to-date information is available to the call center when residents reach out with questions
- Conduct follow-up calls for any 311 call center request based on a resident call
- Communication to City residents on recycling procedures
- Promotion of City recycling and waste diversion services
- Social media (Facebook, Twitter, LinkedIn, Instagram, YouTube, etc.) development and routine updates.
- Website development and routine updates
- Conduct targeted recycle cart inspections and direct engagement with residents on issues found and proper recycling observed. This is normally done through



leaving information such as tags on the carts depicting the issues found or the proper performance observed. This activity would occur on an ongoing basis

- Targeted audits of recycles delivered to Ridge Road Transfer Station for performance and contamination documentation. This would be critical in any performance-based contract for recycle processing managed by the City
- Direct engagement with school-aged children in City schools to promote the waste diversion programs and to educate them on the proper way to recycle
- Direct engagement with City residents to promote the waste diversion programs and to educate them on the proper way to recycle. This could be done through neighborhood workshops and/or presentations
- Direct engagement with targeted multi-family housing complexes (1-4 units) to promote the City waste diversion programs and to educate them on the proper way to recycle
- Develop recycling ambassadors in the City by neighborhood to assist in the education of the program
- Develop new waste collection and recycling manual for new program and then keep updated. Maintain on website for download by residents
- Develop and maintain score card key performance indicator report. Maintain on website and other resources
- Develop market flow documentation to demonstrate to residents where their recyclables end up and what products are being made from them
- Develop a quarterly electronic newsletter for the website. Develop mechanism on website for residents to subscribe to the newsletter
- Periodically survey residents for feedback on the recycling program. This can be done on the website
- Develop and distribute stickers for recycle carts that include new branding and education on program participation
- Develop and distribute refrigerator magnets that include new branding and education on program participation
- Develop insert for utility/trash bill with education and awareness messaging. Periodically include in bills
- Other duties as assigned

Approved for Implementation Plan: Yes No

Recommendation 2.2

An assistant to the recycling coordinator is recommended for the “High Diversion” pathway. The staff member would assist the recycling coordinator with the implementation of the above job functions and would also assist in enforcement activities.

Approved for Implementation Plan: Yes No





Recommendation 2.3

The City should develop a working relationship with all third-party recycling drop-off locations in the City and region. This relationship-building task would ensure that up-to-date information on the availability of each site is known and can be communicated to City generators.

Approved for Implementation Plan: Yes No

Recommendation 2.4

The City should consider not accepting glass containers in its program. Glass has no market value in a single stream collection system. Removal of glass as well as reducing contamination would benefit the City in better processing charges or revenue.

Approved for Implementation Plan: Yes No

Recommendation 2.5

The City should install user friendly signs with examples of acceptable and non-acceptable materials for its drop-off program at all current and future sites.

Approved for Implementation Plan: Yes No

Recommendation 2.6

The City should collaborate with local institutions and universities to research and evaluate new technologies for waste and recycling processing techniques. This partnership could assist the City with determining the feasibility of any future proposed alternate waste technology.

Approved for Implementation Plan: Yes No

Recommendation 2.7

Once the City's new recycle program is implemented and matured, the City should consider joining the processing consortium developed by the Cuyahoga Solid Waste Management District. Working in conjunction with other communities to obtain the best prices for solid waste services is in the best interest of the City.

Approved for Implementation Plan: Yes No



Recommendation 2.8

The City could work with the other self-haul communities in Cuyahoga County to evaluate the feasibility of processing collected recyclables from all communities interested. Typically, operating a recycling facility is a risky proposition because of the capital investment needed, high overhead in staffing, and volatile commodity market. These factors and others would have to be considered to determine the feasibility of a regional recycling facility. The benefits of this facility would be control of operations and pricing, creation of new jobs, investment in the community, and other value-added benefits.

Approved for Implementation Plan: Yes No

3. Commercial Collection

Recommendation 3.1

The City should adjust its pricing based on container size and service frequency. This should be done through a commercial services pricing study. The City should consider pricing based on the market and not based on a set increase across the board. The private sector greatly values its commercial services and actively markets their services. The pricing currently charged by the City as depicted in the following figure is significantly below market pricing:

Figure 40. Waste Dumpster Fee Schedule

City of Cleveland Division of Waste Dumpster Fee Schedule		
Dumpster Type	Yards	Cost per Pick-Up
Roll-Off	10	\$242.00
Roll-Off	20	335.00
Roll-Off	30	405.00
Roll-Off	40	476.00
Roll-Off Compactor	40	568.00
Front End Load	2	16.00
Front End Load	4	20.00
Front End Load	6	23.00
Front End Load	8	27.00

Approved for Implementation Plan: Yes No





Recommendation 3.2

The City should expand the program to the maximum extent possible. Commercial collection, if operated at or just below market prices, will produce additional revenue to support other initiatives in this study. The private sector understands the benefits from efficiency and pricing in this market segment. The City can operate in this marketplace at an expanded level to capture revenue and to provide valuable services to the commercial marketplace. This would include multi-family housing that are more than 4 units.

To aid in this expansion, the City should dedicate a staff member to conduct the day-to-day management and expansion efforts. This staff member would be responsible for the following:

- Routing and management of commercial program
- Marketing and sales
- Development of website promotional information
- Development of marketing materials
- Potential customer base identification
- Competition analysis for capability and market share by hauler
- Target sales by customer type and service
 - ✓ Retail/commercial
 - ✓ Institutional
 - ✓ Governmental
 - ✓ Schools and universities
 - ✓ Restaurant and food service
 - ✓ Other as identified
- Other sales and marketing initiatives as identified

Approved for Implementation Plan: Yes No

4. Bulky Waste Collection

This Study has identified several bulk collection options with three specific pathways of potential program design. The ultimate final pathway will be decided by the Administration. The following section included recommendations regardless of which pathway is chosen.

Recommendation 4.1

The website and documents on the website identify the bulk item program for the residents at the transfer station as “Residential Dumping”. Residential dumping sends a mixed message to the public with respect to disposal of bulk items. The City should utilize a standard message when communicating the bulk item disposal program or disposing of material at the Ridge Road Transfer Station. For example, “Residential Bulk Item



Disposal”. Residential bulk should be defined in ordinance and will need to include out-of-cart materials and bags if true automated collection is selected by the Administration.

Approved for Implementation Plan: Yes No

Recommendation 4.2

The review of the website and related outreach materials identified a bulk item program that is included in the curbside trash collection program or is mixed with other programs. For example, the website has a table of household items with a detailed description of how to manage the materials, but because it is a long, all-inclusive list, it is difficult to quickly find what you are looking for. The bulk service is not clearly identified on the website. The bulk item collection program should be listed as a separate program.

The bulk collection program would be more effective if there was a comprehensive education and outreach message specifically identifying the program specifics for residents to easily understand. A bulk program that has clearly identified program standards on the website with supporting outreach could help communicate expectations, eliminate confusion, and mitigate abuse. In addition, the outreach could provide residents with additional alternatives to donate materials or obtain supplementary private services to collect and dispose of unwanted items. Bulk program standards that are clearly communicated can be more effectively managed and enforced. Also, providing residents with additional options to dispose of bulk items provides the resident with more flexibility and solutions.

A page on the website specifically dedicated to the bulk item program can help residents follow the program guidelines and ordinances. Residents’ understanding and compliance with the bulk item program requirements can reduce illegal dumping and assist with the adequate allocation of operational equipment and staffing.

Approved for Implementation Plan: Yes No

Recommendation 4.3

Additionally, in the review of the website, there is a service guide available to residents with a link on the website. However, it is dated 2015, and promotes the “One Simple Act” program that has been discontinued. The bulk program is listed as a second week of the month program which could be very confusing depending on how the weeks fall. This should be changed to first full week of the month.

There should be periodic reviews of the bulk program on the website and linked program documents to correct inconsistencies and update information.

Approved for Implementation Plan: Yes No





Recommendation 4.4

The City could implement a reuse program for high value bulk items left at the curb. Materials could be collected separately and marketed to end users as a reuse program.

Approved for Implementation Plan: Yes No

Recommendation 4.5

The City should advertise each time when bulk week is coming up. A post on the City’s and other neighborhood/community social media pages should be written the week before or week of bulk collection. Another option could be marquee or temporary traffic signs in strategic locations that remind people when bulk week is scheduled each month.

Approved for Implementation Plan: Yes No

Recommendation 4.6

The City should expand the operating hours and availability of the Ridge Road Transfer Station for bulk delivery from residents. The City currently allows residents to dispose up to 4 cubic yards of bulk items, yard waste, and household debris or appliances at no cost 4 times annually. Proof of residency is required in the form of photo ID and current vehicle registration. Trailers must be less than 4x8 feet. The fee for additional dumps (5 or more per year, payable by credit card only) is \$46.61 per ton for solid waste and \$49.29 per ton for bulk waste.

GT suggests the amount of yardage and frequency of delivery be increased to allow for bulk management options above and beyond what is recommended or suggested for the curbside bulk options. This allows for maximum options to reduce the load of bulk pick-up at the curb, reduce illegal dumping, and provide more services to residents.

Approved for Implementation Plan: Yes No

Recommendation 4.7

The City should track the unauthorized bulk setouts whether they get picked up or not. If the City continues to prioritize keeping bulk waste off of the curb, the address, date, quantity and material, and reason for picking it up though unauthorized should be tracked.

Approved for Implementation Plan: Yes No

5. Yard Waste and Organics

This study has identified several organic collection options with three specific pathways of potential program design. The ultimate final pathway will be decided by the





Administration. The following section included recommendations regardless of which pathway is chosen.

Recommendation 5.1

The City may want to consider operating a Class IV compost facility that would receive all yard waste materials collected from the residents. The Class IV facility could use the material collected to make compost and mulch. The compost and mulch could be used by the City or could be given away or sold to residents and businesses. This recommendation also provides a pathway for the City to participate in a local circular economy where a feedstock is generated, processed, and made into a saleable product while creating jobs in the community.

The compost and mulch final product that is used by the City or residents will not require the additional processing or the high-quality standards that many privately owned and operated compost facilities require. Free compost and mulch utilized by the City and/or residents can have some minor imperfections in the final product. An example of a closed system for City yard waste is the City of Kettering in southwest Ohio. Kettering operates a yard waste drop-off for residents and collects seasonal limbs and leaves and offers free mulch and compost to residents. Each spring, the residents can use their trucks and cars to load the free compost and mulch and use it at their residence. It is a great resource for the residents if fully utilized by residents by July 1.

Approved for Implementation Plan: Yes No

Recommendation 5.2

The City currently operates a curbside leaf collection for high generation areas of the City. The City should evaluate expanding the program to all residential single family home areas. This is an effective way to collect source separated organics seasonally. Using the vacuum truck system mitigates contamination because the leaves are visually screened prior to collection resulting in a high-quality organics stream for composting.

Approved for Implementation Plan: Yes No

6. Special Collections

This Study has identified several special material collection options with three specific pathways of potential program design. The ultimate final pathway will be decided by the Administration. The following section included recommendations regardless of which pathway is chosen.



Recommendation 6.1

Special waste management would be more effective if there was a comprehensive education and outreach message specifically identifying the program specifics for residents to easily understand. The special waste collection programs should be grouped together and easily identifiable on the website. In addition, the outreach could provide residents with additional alternatives to manage special waste providing residents with additional options with more flexibility and solutions. One customer service number for all special waste collections for residents would also provide for a more effective communication method. An outreach document could be designed that outlines all special waste collections and the services to residents. The outreach document could be made available to residents via the website. Also, the outreach document could be a resource to neighborhood groups to distribute and include in their newsletters.

Approved for Implementation Plan: Yes No

Recommendation 6.2

The City should develop and then list all third-party entities that accept special materials on its website as a stand-alone page. The materials that are commonly accepted by third parties are as follows:

- Used oil
- Used oil filters
- Antifreeze
- Recyclable household batteries
- Lead acid batteries
- Appliances with freon
- Appliances without freon
- Scrap tires
- Yard waste
- Food waste

By developing a comprehensive list of entities that accept these materials within the Cleveland area, the City can complement its special materials collection program and offer the best overall service options for its residents.

Approved for Implementation Plan: Yes No

7. Staffing

The biggest core issue ascertained from this study regarding staffing is employee morale and department culture. The following recommendations, in their totality, are designed to improve staff accountability, morale and overall department culture.



Recommendation 7.1

The City should conduct annual evaluations of its staff to ensure professional development and accountability of its work force. Evaluations should include documentation on employees’ strengths as well as their deficiencies with a pathway to improvement.

Approved for Implementation Plan: Yes No

Recommendation 7.2

The City should conduct job-specific training for all new incoming employees that goes above and beyond the normal Human Resources orientation and City policy review. The training should include job-specific training for the equipment being utilized by the employee and/or all standard operating procedures for the job functions of the new employee.

Approved for Implementation Plan: Yes No

Recommendation 7.3

The City should conduct job-specific refresher training for all employees on an annual basis. The refresher training should include job-specific training for the equipment being utilized by the employee and/or all standard operating procedures for the job functions of the new employee.

Approved for Implementation Plan: Yes No

Recommendation 7.4

The City should conduct random drug testing to ensure the workforce is drug free and safe. Random drug testing also sends a message that the City is resolute on this issue and for having a safe workforce at all times.

Approved for Implementation Plan: Yes No Maybe

Recommendation 7.5

The City should include communication and provide a “Q and A” session on new program rollouts to be inclusive and mindful of staff’s awareness of changes. The City should engage employees on feedback for changes in programs or policies. This will help create a team environment and allow the employees to have a transparent leadership in a program they will be a key player in the execution.

Approved for Implementation Plan: Yes No





Recommendation 7.6

The City should add to and improve on a system to hold employees accountable to rules of division. It should be easy for lead staff to let an employee know where they stand on warnings and account for or against them.

Approved for Implementation Plan: Yes No

Recommendation 7.7

The City should transition away from seasonal hires. Seasonal or temporary staff increase time needed for training and reduce turnover. Overtime, this can save hiring cost for the City and increase morale in the division.

Approved for Implementation Plan: Yes No Maybe

Recommendation 7.8

The City should hire based on the requirements of the job. The “right person for the right seat” standard must be employed for all City positions to ensure a quality workforce. Politics and other factors should not apply to any hiring activities.

Approved for Implementation Plan: Yes No

Recommendation 7.9

The City should make sure that all managerial and supervision staff are team players, good communicators and have leadership skills. Attitude reflects leadership in many ways. Ensuring that the City’s managers and supervisors have these important skills starts with “right person right seat” hiring practices and effective training. For existing employees in a management or supervisory role, training and accountability must be completed. If this strategy does not bring a sub-par manager or supervisor into acceptable performance, then changes must be made. Again, attitude reflects leadership; in order to have the overall workforce as effective as possible with better morale and Division culture, this cannot be overlooked by the City.

Approved for Implementation Plan: Yes No

Recommendation 7.10

The City should have dedicated employees known as “floaters” who come in to work every day and can be placed in any position where necessary to fill in for call-offs or AWOL employees. They would need to be trained in all positions.

Approved for Implementation Plan: Yes No Maybe





Recommendation 7.11

The City should award bonuses to employees who do not call off last minute nor are AWOL after a certain period of time, such as per month or per year. Smaller bonuses could be awarded for shorter periods of time or larger bonuses could be awarded for longer periods of time. Though this may add an additional cost, it would save the City costs in the long-term to avoid some overtime and avoid inefficiencies caused by lack of employees on certain days.

Approved for Implementation Plan: Yes No Maybe

8. Equipment and Maintenance

Recommendation 8.1

The City should aim to have an available equipment surplus ratio of 1.2. The City should at least allow an extra 20% of equipment for out-of-service vehicles, equipment breakdowns in the middle of the routes, or if there are higher volumes of waste than a typical week. So, if the City maintains 70 routes for trash and recycle, then there should be 84 available trucks for service. Currently, the available trucks for service ranges between 65 and 75. If routes are reduced because of route optimization and other changes made, the 20% ratio would account for these changes as well.

Approved for Implementation Plan: Yes No

Recommendation 8.2

The City should obtain software which would allow drivers to electronically perform a pre/post-trip review in the system. This would also provide reporting methods which can easily be pulled up and follow a truck’s history without needing to consult piles of past paperwork. Easy access to information would allow the main maintenance garage at Ridge Road to pull archive for reoccurring issues on a specific vehicle.

Approved for Implementation Plan: Yes No

Recommendation 8.3

The City should create a proactive schedule for replacement of equipment as the new equipment is purchased.

Approved for Implementation Plan: Yes No





Recommendation 8.4

The City should, over the next 5 to 10 years, transition the vehicle fleet for the new program to provide consistency in inventory. The Division of Waste Collection has many different types of waste collection trucks. Some can only be used for specific routes. A variety of trucks makes it difficult to train personnel, assign trucks to routes, and keep efficient maintenance.

Approved for Implementation Plan: Yes No

Recommendation 8.5

The City should involve drivers and laborers in bid specification development of new equipment. Drivers and laborers who use the equipment daily can provide insight on pros and cons of past purchased equipment and performance. Increased participation may aid in vehicle longevity and employee support.

Approved for Implementation Plan: Yes No

Recommendation 8.6

The City should budget for an equipment replacement fund for Waste Collection. Equipment replacement money must be available for routine and schedule equipment replacement. Equipment replacement schedules should be developed that matches the industry standard for the life cycle of the equipment being used by the City. The schedule should be staggered so the equipment replacement budget can cover the purchase of the scheduled equipment.

Approved for Implementation Plan: Yes No Maybe

Recommendation 8.7

The City should ensure that each station has the necessary supplies and equipment for drivers to service fluids for their trucks. Fluids includes top-off of engine oil, antifreeze, windshield washer fluid, hydraulic fluid, and grease. This is provided currently but not monitored directly to ensure adequate inventory of supplies to limit downtime for basic fluid top-off activities arising from pre/post trip inspections.

Approved for Implementation Plan: Yes No

Recommendation 8.8

The number one complaint registered in the 311 system relates to broken or damaged carts. Damage can be caused by improperly trained employees and/or lower quality carts. The City should purchase the highest quality carts on the market, ensure enough carts





are in stock for replacement, ensure enough repair parts such as lids, wheels and axles are available, develop a system to repair carts and develop a communication system between collection crews, and management so defective carts can be addressed as soon as possible.

Approved for Implementation Plan: Yes No Maybe

9. Education, Outreach, and Public Communications

All of the recommendations provided in this section are designed as a long-term investment to promote behavior change in the participants of the City’s waste diversion programs. The pathway to success in this area is consistent and understandable messaging and positive reinforcement on the progress of the City’s recycling program. Success also depends on continued education and outreach activities over time. Research from the Recycling Partnership has shown that messaging must be done 7-11 times to affect change and to foster good behavior and participation.

Also, education and outreach suggestions were the highest level of feedback obtained by GT from City staff, City management, City Council, City residents, and other stakeholders.

Recommendation 9.1

The City should brand its curbside recycling program so it stands apart from waste and other services. The branding would also provide a unique opportunity for education, awareness, and messaging. Some ideas on branding identification are included below:

- Recycle Cleveland
- Recycle Cleveland, a part of the Division of Waste Collection
- Cleanup Cleveland
- Recycle Right Cleveland
- Recycle in the CLE
- Recycle in the Land
- Others as identified

It is recommended that the City seek input from local stakeholders on the final version of the branding nomenclature.

Approved for Implementation Plan: Yes No

Recommendation 9.2

The City should, regardless of what collection system is used, differentiate trash trucks from recycle trucks in their appearance. If trucks are used on both services (trash and recycling) then a magnetic sign should be employed to indicate the truck is being used





for recycling. This is important for residents to know that their recyclables are not being disposed of by perception.

Approved for Implementation Plan: Yes No

Recommendation 9.3

The City's web page for trash and recycling collection should be enhanced. Residents should be given specific instructions about how to participate in both trash collection and recycling as well as other services such as bulk. Pictures demonstrating how residents should prepare their trash and recycling should be included. Specific instructions on locating their trash and recycling containers/cans/bags should be explained. Pictures of the acceptable recyclables should also be identified on the webpage. The web page should also include statistics on recycling and performance versus other Cuyahoga County communities.

If the City changes collection systems, the website and other forms of education should be improved and/or created.

Approved for Implementation Plan: Yes No

Recommendation 9.4

The City should develop a specific promotional video to promote the Division of Waste Collection programs.

Approved for Implementation Plan: Yes No

Recommendation 9.5

The City should utilize social media (Twitter, Facebook, LinkedIn) to promote specific educational and promotional messages.

Approved for Implementation Plan: Yes No

Recommendation 9.6

The City should add a generic waterproof sticker to recycling carts with main acceptable materials. The sticker would also have a link and/or QR code to the City's website which would assist the resident for additional information. The sticker serves as a continuous education piece for the resident to reference each time they go to their cart.

Other cities in Ohio and around the country utilize informational stickers and can be used as a template for Cleveland. Recycling carts currently used may be switched out with



stickered carts as the City prioritizes time to collect, wipe down, sticker, and issue carts to residents over a 3-to-6-month period.

Approved for Implementation Plan: Yes No

Recommendation 9.7

Every 1 to 3 years, the City should mail residents who receive service an information magnet for the do's and don'ts for recycling practices.

Approved for Implementation Plan: Yes No

Recommendation 9.8

The City should add notes or inserts to utility bills containing the waste charge. Since this media is already sent to residents, this is a great opportunity to add reminders or notices for recyclable materials.

Approved for Implementation Plan: Yes No

Recommendation 9.9

The City should develop a one-page online newsletter to update residents on the progress of the new program. This could be monthly, quarterly, or annually.

Approved for Implementation Plan: Yes No

Recommendation 9.10

The City should offer community-based education seminars, workshops, or townhall events. This could be either on the web or in-person as a public location such as a library or recreational center. This can be an opportunity to answer common questions and open it up to written questions to be answered at the end of the presentation.

Approved for Implementation Plan: Yes No

Recommendation 9.11

The City should offer school presentations on waste reduction and recycling. The presentations can help the City gather information on whether students have recycling opportunities in the classroom or at home. The Cuyahoga County Solid Waste Management District may be able to assist with this recommendation.

Approved for Implementation Plan: Yes No





Recommendation 9.12

The City should conduct random quarterly, bi-yearly, or yearly recycle cart audits. These audits would include notifying residents of proper or improper recycling participation. The Recycling Partnership as well as from GT's experience has shown that cart tagging with direct resident engagement can reduce contamination by 30-50% if no service stoppage is required. If the City refuses pickup because of improper participation, contamination reductions of between 50-80% have been achieved in other cities.

Approved for Implementation Plan: Yes No

Recommendation 9.13

Develop recycling ambassadors in the City by neighborhood to assist in the education of the program.

Approved for Implementation Plan: Yes No Maybe

Recommendation 9.14

Develop new waste collection and recycling manual for new program and then keep updated. Maintain on website for download by residents.

Approved for Implementation Plan: Yes No

Recommendation 9.15

Develop and maintain score card key performance indicator report. Maintain on website and other resources.

Approved for Implementation Plan: Yes No

Recommendation 9.16

Develop market flow documentation to demonstrate to residents where their recyclables end up and what products are being made from them.

Approved for Implementation Plan: Yes No

Recommendation 9.17

The City should utilize the 311-call center as the primary mechanism for residents to contact the City for recycling information. The 311 system should be advertised on the City's website and all resource materials and messaging conducted. Calls can be directed to the recycling coordinator if follow-up is needed.





Approved for Implementation Plan: Yes No

Recommendation 9.18

The City should conduct an annual training session for City Council so they have the best information and metrics when dealing with their constituency. City Council can sometimes be the first contact from residents on their waste collection services, so having Council informed on a routine basis is very important.

Approved for Implementation Plan: Yes No

Recommendation 9.19

The City should include in any future recycling processing contracts that the processor must financially assist with recycling education to residents. The contract could require that the processor apply \$2 per ton accepted (or another amount) to recycling education.

Approved for Implementation Plan: Yes No

Recommendation 9.20

The City should develop and provide the same educational material in different languages to reach non-English speakers in the City. The City could incorporate a translating tool on their website, create duplicate pieces of media in multiple languages (i.e. magnets, stickers, flyers), and provide translators or non-English speaking employees to answer questions over the phone.

Approved for Implementation Plan: Yes No

Recommendation 9.21

The City should develop and implement a campaign targeted to reduce consumption and generation of solid waste. Reduction in solid waste generation is key to any diversion program and should be implemented in tandem with education efforts on how to recycle properly. Examples of reduction of solid waste include reducing materials that use significant amount of packaging, buying in bulk in lieu of small container purchases of products, online subscriptions in lieu of hard copy periodicals, reusable bags for grocery and other retail purchases, reuse or donation of durable goods, and many other initiatives and/or activities to reduce generation of waste.

Approved for Implementation Plan: Yes No



10. Customer Service

Recommendation 10.1

The City should standardize comments in the 311 system in order to easily filter complaints for the solid waste carts. Language is not consistent and difficult to find issues specific to main waste division issues such as cart issues, missed collection, bulk item collection, illegal dumping, program information, etc. For example, language used for the collection cart may be listed under cart, can, bin, or container. Unified sub-category language assisted with a notes/comments column will assist the City to benchmark and label complaints accordingly.

Approved for Implementation Plan: Yes No

Recommendation 10.2

The City should advertise 311 as the main system for complaints or information resource for waste collection programs. There should be one place for the system used in order to identify all issues brought up by residents. Complaints received by the Mayor’s Action Center should be recorded in the 311 system or calls should be forwarded to 311 in order for them to be recorded with all other waste-related complaints.

Approved for Implementation Plan: Yes No

Recommendation 10.3

The City should develop an appointment system for subscribing to new services. The system may or may not be joined with the 311 system software. There should only be one system which records new service requests. New service requests may be logged in the same fashion as bulk item appointments by parcel, address, and extra notes.

Approved for Implementation Plan: Yes No

Recommendation 10.4

The City should invest in RFID tags for recycling and/or trash carts. These RFID tags usually cost about \$1 per tag and have a 10-year life span. The RFID tags could keep track of missing carts, could identify if and when carts are picked up and emptied, and could keep track of participation rates.

Approved for Implementation Plan: Yes No Maybe



11. Illegal Dumping and Enforcement

Recommendation 11.1

The City should collect records for dumping in one system (such as 311) and be able to sort by parcel/property and name of who identified issue if possible. This would give the City data to have the ability to easily identify repeat offenders and higher volume areas of the City. This data would allow for enforcement of open dumping and to track trends and problem areas of the City.

Approved for Implementation Plan: Yes No

Recommendation 11.2

The City should operate a dedicated enforcement team to follow up on illegal dumping, unpaid bills, incorrect setouts, and abuse of program incidents. This team could individually go to households or send things by mail to personally contact the resident. Then this team would be responsible for implementing any clean-ups, fines, or taking away unused carts.

Approved for Implementation Plan: Yes No Maybe

Recommendation 11.3

The current bulk collection program has evolved into a city-wide clean-up program once per month. The City should consider and evaluate the possibility of an independent affiliate of Keep America Beautiful (KAB). KAB has many programs and resources that could support a City affiliate, "Keep Cleveland Beautiful". KAB resources include annual contributions to affiliates for bags, gloves, and other litter supplies. Keep Cleveland Beautiful would provide these supplies and a structure to the residents for cleanup activities. These cleanup activities will instill neighborhood pride and would provide the City with additional resources to provide clean ups. These cleanups and programs could allow the bulk program to focus on bulk collections that comply with ordinances and reduce the City-wide cleanup mandate for the bulk program.

Approved for Implementation Plan: Yes No

Recommendation 11.4

The City should make contact with large multi-family housing complexes to reiterate rules around illegal dumping. The City could also use this time to build relationships with these buildings and offer assistance in finding a contractor to collect recycling or to provide trash and recycle collection to apartments with more than 4 units.

Approved for Implementation Plan: Yes No Maybe





Recommendation 11.5

The City should offer education seminars to small business landlords and LLCs through community workshops or non-profit organizations. One of the topics covered in these seminars could include how to handle renovations, clean-outs and move-outs, and City rules regarding illegal dumping and bulk collection.

Approved for Implementation Plan: Yes No Maybe

12. City Ordinances

The City should update and develop new ordinances which match the “restart” of the waste collection program. Ordinances include but are not limited to changes/updates in allowable trash at curb, recyclable materials, recycling collection guidelines, and cart placement related to parked vehicles. The following specific recommendations are being made in addition to other changed or added ordinances that would precede any other changes in the redesign efforts.

Recommendation 12.1

The City should require out-of-cart trash to be covered by the bulk program regardless if the materials are bagged or bulky items.

Approved for Implementation Plan: Yes No

Recommendation 12.2

The City should develop a detailed ordinance on acceptable recyclables and guidelines in the program.

Approved for Implementation Plan: Yes No

Recommendation 12.3

The City should develop an ordinance on the proper cart placement for trash and recyclables.

Approved for Implementation Plan: Yes No Maybe

Recommendation 12.4

The City should develop a detailed ordinance for multi-family housing participation (up to 4 units) in the Division of Waste Collection curbside programs.

Approved for Implementation Plan: Yes No Maybe





Recommendation 12.5

The City should develop a detailed ordinance for multi-family housing participation (greater than 4 units) in the Division of Waste Collection commercial collection program.

Approved for Implementation Plan: Yes No Maybe

Recommendation 12.6

The City should consider a parking ban on solid waste collection days for parcels receiving City services and driveways with a length exceeding a determined footage (such as 20 feet for 2-car-wide driveway or 40 feet for a single-car wide-driveway). A vehicle parked in the street could result in waste collection not being provided for the week and/or a warning/fine for the vehicle owner.

Approved for Implementation Plan: Yes No Maybe

Recommendation 12.7

The City should develop a system for tracking parcel, persons, and/or vehicles associated with City ordinance non-compliance. An ordinance enforcement plan should be developed, and personnel assigned to managing ordinance enforcement.

Other recommendations taken into consideration, such as rerouting for increased truck efficiency and recycling/special collections program changes, may allow more time/flexibility to be built in for the drivers/helpers to note issues and relay information to assigned ordinance enforcement personnel.

An ordinance enforcement system may include but is not limited to:

- No collection of waste for the week of ordinance violation
- Warning/fine for the parcel owner
- Warning/fine for the vehicle owner

Approved for Implementation Plan: Yes No Maybe

Recommendation 12.8

The City should require that all carts for trash and recycle and bulk must be set-out at the curb by 7 am on the day of collection.

Approved for Implementation Plan: Yes No Maybe





13. Safety

Recommendation 13.1

The City should require all field staff (drivers, collectors/laborers, transfer station staff, route supervisors) to wear high visibility vests, safety glasses, gloves, and safety shoes during operations.

Approved for Implementation Plan: Yes No

Recommendation 13.2

The City should consider adopting the “Slow Down to get Around” campaign for safety of collections crews. This initiative was recently passed in the State of Ohio Senate and House. The initiative was spearheaded by Rumpke and the Solid Waste Association of North America and is an excellent safety program.

Approved for Implementation Plan: Yes No Maybe

Recommendation 13.3

The City should upgrade its trucks with more lights (LED preferred) to provide crews with additional safety. Lighting systems for the side and rear of the trucks should also be considered to improve visibility for the driver, crews, and passing motorists. In addition, side cameras would also greatly increase drive visibility and assist in the prevention of accidents.

Approved for Implementation Plan: Yes No Maybe

Recommendation 13.4

The City should conduct tailgate safety meetings every day or week before crews head out on the routes. Each meeting should cover different topics and should engage staff to participate.

Approved for Implementation Plan: Yes No Maybe

Recommendation 13.5

The City should subscribe to the Solid Waste Association of North America “Safety Monday” newsletter and provide it to the workforce weekly via email.

Approved for Implementation Plan: Yes No Maybe





14. Administration

Recommendation 14.1

The City should apply for Ohio EPA Community Development grants which are due in February of each year. The grant options can include equipment and education and awareness projects. These projects require a 25% match in most cases. Total grant assistance can be up to \$200,000. Grants are required to be implemented in a 12-month period from July 1 to June 30.

Approved for Implementation Plan: Yes No

Recommendation 14.2

The City should revise its RFP for processing of collected recyclables to include the new program details and performance. It is recommended that data is collected on the performance of the new curbside recycling program before the RFP is sent to the marketplace. Documented performance of the program will be crucial in attracting multiple proposers and competitive pricing.

The RFP could also ask for two options, one with revenue sharing and one without.

If the City chooses to collect only targeted materials (OCC only, OCC plus Mixed Paper only, etc.) and does not want to market directly, this RFP can be used to solicit proposals for this level of service as well.

Approved for Implementation Plan: Yes No

Recommendation 14.3

The City should develop a detailed position description for the next Commissioner of Waste Collection (current Commissioner is scheduled to retire soon). This position will be crucial in the implementation of the new programs and initiatives. The new Commissioner must have experience in the following:

- Positive department culture fostering and performance
- Demonstrated team building and managerial experience with multi facilitated solid waste collection system for large municipality
- Demonstrated experience in communication, employee development, technology application, management and supervision and leadership
- Documented experience with equipment capability, specification development, maintenance, and procurement processes
- Customer service oriented
- Demonstrated experience in staff retention and low absenteeism
- Other attributes as determined



Approved for Implementation Plan: Yes No Maybe

VI. CITY SUMMARY OF APPROVED RECOMMENDATIONS

The recommendations from this study were presented to City Management and the Administration on January 29, 2021.

This summary document includes two sets of recommendations for consideration by the Administration: Collection Programs and Best Management Practices. The details for all recommendations can be found in Cleveland’s *2020 Assessment and Redesign of Residential Solid Waste and Recycling System* report in sections IV and V: Collection Program Options and Future KPIs and Best Management Practices.

The summary of recommendations was presented to the Administration in two separate meetings on February 4 and 11, 2021. The following section details the decisions made by the Administration.

A. COLLECTION PROGRAM RECOMMENDATIONS

The first set of recommendations defines how the City will collect trash, recyclables, and bulk materials from curbside and drop-off services:

Waste Stream	Recommendation Accepted by the Administration	Current System
Curbside Trash	Weekly trash items collected using semi-automated system	Weekly trash collected using semi-automated system
Curbside Recycle	Bi-weekly collection of single stream with or without glass for opt-in recycle household only Signed oath/certification with opt in Non-participants will have carts pulled	Weekly collection of single stream with glass for all households
Curbside Bulk	Bi-weekly 3 item limit transitioning to appointment based	Once a month bulk collection for up to 3 items for all households
Drop-off Recycle	Up to 6 Super Center Recycling Drop-Offs (staffed) that accept all curbside materials plus special materials (HHW, appliances, yard waste, tires, bulk)	2 drop-off sites at Ridge and Carnegie that accept all curbside materials



Waste Stream	Recommendation Accepted by the Administration	Current System
Curbside Yard Waste	Fall leaves curbside by Street Department for high generating areas only	Fall leaves curbside by Street Department for high generating areas only
Drop-off Yard Waste	Yard Waste and Leaf Drop-off Included in Super Centers for Composting	None
Drop-off Special Materials	Super Center Collection for Special Materials	HHW at Stations
Other Drop-offs	Regional Drop-Off System (Not City operated but promoted by City)	Regional Drop-Off system (not operated or promoted by City)

B. BEST MANAGEMENT PRACTICES RECOMMENDATIONS

The following section summarizes the highest priority best management practices accepted by the Administration.

Recommendation	Description	Current System
1.2	Reroute collection routes for efficiency	Routing last done in 2010
2.1	Hire a full-time recycling coordinator	None
2.4	Consider accepting or not accepting glass containers in recycling program depending on bid prices from recycling processors	Glass accepted
3.1, 3.2	Review commercial services pricing and adjust, expand services	Non-Market price model Non-growth model
4.12, 4.2, 4.3	Rebrand bulk program and redevelop bulk information on website	Extension of trash
7.1, 7.2	Annual evaluations of all staff, employees, and management and conduct training for all new employees	None
7.5	Improve communication with staff on new programs and/or processes	Minimal
7.6	Improve process of communicating warnings and issues with employees	No defined system
7.8	Hire only “right person for the right seat” rather than based on seniority or other factors	Based on seniority and other factors



Recommendation	Description	Current System
7.9	Managerial and supervision staff should have specific leadership qualities before hiring	Not a major consideration
8.1	Equipment surplus of 20%	Equipment deficit or neutral
8.4	Transition to vehicle fleet with consistent and homogenous inventory	Varied fleet and capabilities
9.1	Rebrand recycling program	None
9.3	Enhance trash and recycling website	Basic web site
9.6	Add waterproof sticker to recycling carts on acceptable and non-acceptable materials	None
9.17, 10.2	Utilize 311 as main mechanism for citizens to contact the city about waste questions or issues and advertise as such	311 not advertised, MAC uses, Division calls
9.19	Include in recycling processing contracts that processor apply certain dollar amount to recycling education	None
11.3	Become an affiliate of Keep America Beautiful (KAB)	None
12.2	Develop ordinance on acceptable materials in recycling program and other ordinances as needed	Ordinances do not match collection practices

Other best management practices that were deemed as beneficial for the implementation plan but not a top priority can be found in Cleveland’s *2020 Assessment and Redesign of Residential Solid Waste and Recycling System* report in “Section V. Conclusions and Recommendations.” Some of these recommendations may be implemented in the future if approved by the Administration.

C. NEXT STEPS

- Implementation Plan Development with Schedule
- Implementation Assistance with Approved Scope of Work and Budget



APPENDIX A

Recycle Cart Audit Pictures



APPENDIX A

Cart Audit Pictures

September 8, 2020 - September 12, 2020

MONDAY ROUTE

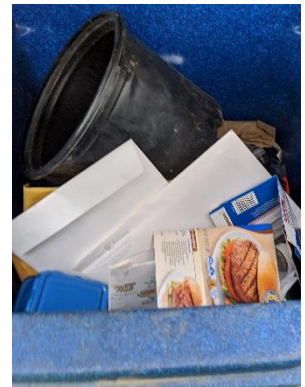




TUESDAY ROUTE



WEDNESDAY ROUTE



TUESDAY ROUTE



FRIDAY ROUTE





APPENDIX B

Recycle Stream at Transfer Station Audit Pictures



APPENDIX B

Transfer Station Audit Pictures

September 8, 2020 - September 12, 2020

MONDAY RECYCLE LOADS

Monday
Truck: 8H44
Route: RR1

Sample 1



Sample 2



Sample 3



Sample 4



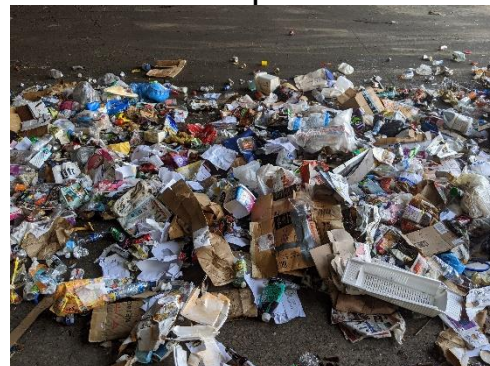
Sample 5



Sample 6



Sample 7

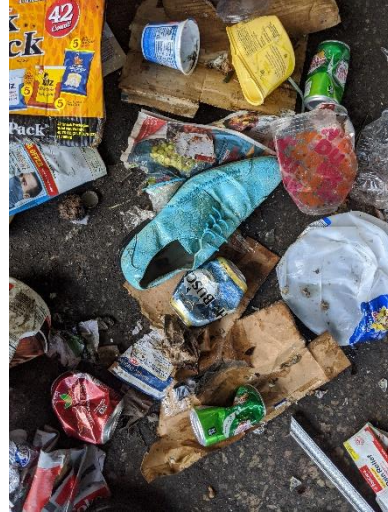




Monday
Truck: 8H44
Route: RR1

Extra Pictures

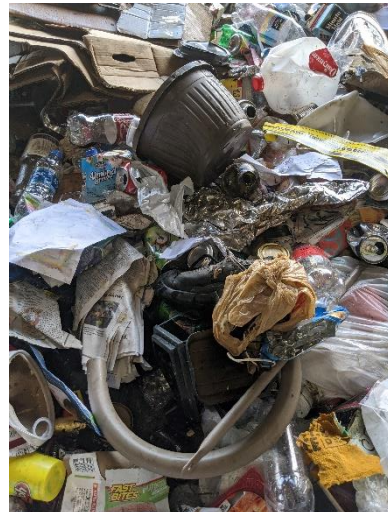
Extra Pictures



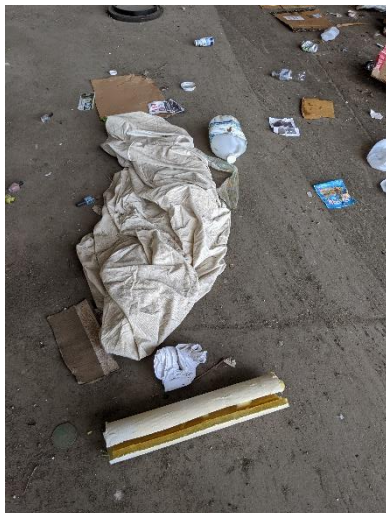
Extra Pictures



Extra Pictures



Extra Pictures



Extra Pictures



TUESDAY RECYCLE LOADS

Tuesday
Truck: 15H163
Route: CC1

Sample 1



Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7





Tuesday
Truck: 15H163
Route: CC1

Extra Pictures

Extra Pictures



Extra Pictures



Extra Pictures



Extra Pictures



Extra Pictures



WEDNESDAY RECYCLE LOADS

Wednesday
Truck: 15H163
Route: CC1

Sample 1



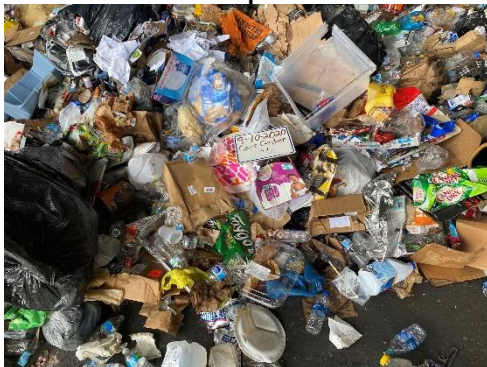
Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7



Wednesday
Truck: 15H252
Route: RR1

Sample 1



Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7





Wednesday
Truck: 15H252
Route: RR1

Extra Pictures

Extra Pictures



Extra Pictures



Extra Pictures



Extra Pictures



Extra Pictures



Wednesday
Truck: 15H71
Route: RR2

Sample 1



Sample 2



Sample 3



Sample 4



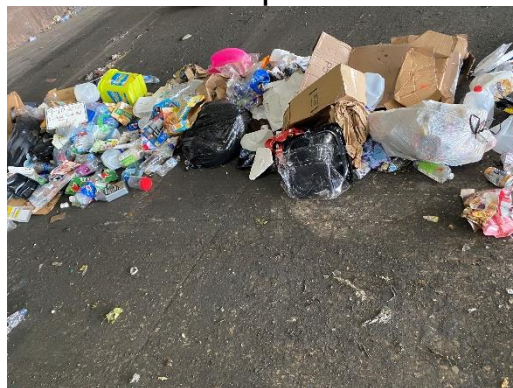
Sample 5



Sample 6



Sample 7





Wednesday
Truck: 15H71
Route: RR2

Extra Pictures

Extra Pictures



THURSDAY RECYCLE LOADS

Thursday
Truck: 15H252
Route: RR1

Sample 1



Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7



Thursday
Truck: 18H32
Route: CC1

Sample 1



Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7

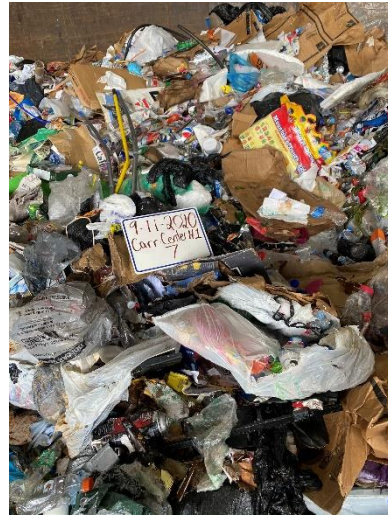




Thursday
Truck: 18H32
Route: CC1

Extra Pictures

Extra Pictures



Thursday
Truck: 15H163
Route: CC2

Sample 1



Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7



FRIDAY RECYCLE LOADS

Friday
Truck: 15H163
Route: CC1

Sample 1



Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7





Friday
Truck: 15H163
Route: CC1

Extra Pictures

Extra Pictures

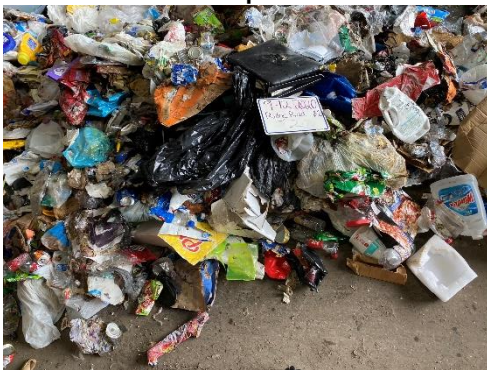


Friday
Truck: 8H43
Route: RR1

Sample 1



Sample 2



Sample 3



Sample 4



Sample 5



Sample 6



Sample 7



Friday
Truck: 15H252
Route: RR2

Sample 1



Sample 2



Sample 3



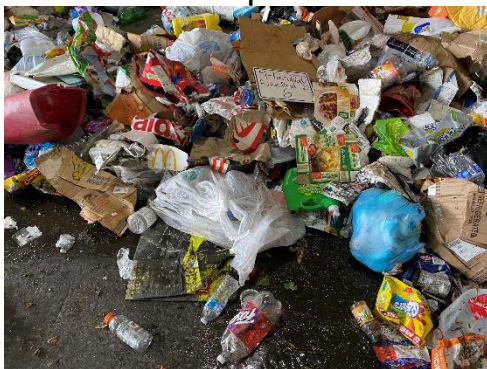
Sample 4



Sample 5



Sample 6



Sample 7





APPENDIX C

Residential Focus Group Engagement Report



ILLUMINOLOGY



CITY OF CLEVELAND RECYCLING FOCUS GROUP RESEARCH REPORT

NOVEMBER 2020

KEY FINDINGS



Recycling knowledge and attitudes: Participants are unaware of what materials they can recycle and how clean their recyclables should be. This seems to be a major cause of contamination, and it's a source of frustration for residents.

Program evaluation:

- Subscription-based program
 - Pros: Some participants like the idea because they're willing to do their part and/or they feel it would reduce contamination.
 - Cons: Some participants think recycling should be community-wide and see the extra cost as another tax they don't want to pay.
- Weekly curbside pickup: Importance of this varies depending on how quickly their recycling bins fill up.
- Curbside recycling of materials besides paper and cardboard: This is generally important. Participants want to be able to recycle items they use every day such as plastic water bottles and aluminum cans.
- Recycling drop off locations: Many participants said these are important, but they seem to care more about having a place to drop off bulk items than having materials recycled.

Bulk waste: Many participants would like to see bulk waste picked up more frequently, and they see many abuses of the system.

RECOMMENDATIONS



Recommendations:

Educate, educate, educate!

- Residents need to know which materials to recycle and how clean they need to be. Otherwise, contamination will continue to be a concern and residents will continue to be frustrated.
- Residents need to be convinced the recycling is being processed. Some residents are aware that the recycling isn't currently being processed and they're skeptical about whether or not the recycling will be processed moving forward.

TABLE OF CONTENTS



Topic	Slide #
Research Overview	4
Current Recycling Knowledge and Attitudes	5
Waste / Recycling Program Evaluation	11
Recommendations	26

RESEARCH OVERVIEW



Research objectives:

- Primary objectives: Explore residents' recycling attitudes and behaviors, assess recycling opportunities and costs, and evaluate recycling program attributes.
- Secondary objectives: Learn which information sources are best for increasing recycling education, engagement, and participation. Gauge perceptions towards bulk waste collection and abuse of bulk waste collection.

Research method:

Illuminology conducted three 90-minute virtual focus groups via Zoom in mid-October, 2020, with 6 participants in each group. Participants were Cleveland residents who have a City of Cleveland recycling bin, and there was a good mix of gender, age, household income, and whether they live closer to downtown or further from downtown.

- October 13th: moderate recyclers (perceive recycling as somewhat important or recycle some of the materials - don't fall into low level or devoted group)
- October 14th: low-level recyclers (perceive recycling as slightly or moderately important and rarely / never recycle or only recycle some materials)
- October 15th: devoted recyclers (perceive recycling as extremely or very important and recycle all or nearly all materials)

Few differences between the groups occurred - where they did, they are indicated with this icon:





CURRENT RECYCLING KNOWLEDGE AND ATTITUDES

Participants like that recycling saves the planet, it's easy and convenient, and it provides an additional option for waste removal besides the trash bin.

Recycling saves the planet

- “ I really just like it because - well, first off, recycling is helping the world and everything.
- “ It's a commonsense way of - I don't know - I guess saving the world.
- “ I think we need to just speak more on how it's affecting our children and our planet. We only have one planet and I think that by not - recycling's an easy thing to do, when it comes down to the bigger picture.

Recycling is easy and convenient

- “ It's just easy to do. We have our trash and then our recycling trash can, right next to each other, in our kitchen. So it's just easy for us to separate things as we're throwing things away.
- “ If you don't have transportation to take it and drop it somewhere, at least you know when garbage day comes, somebody is going to pick it up. That's very convenient.

Recycling option helps with waste removal

- “ I think it's easier when you got a lot of recyclables that you can put into one bin, versus trying to put them in there with the trash. Because garbage cans get filled up pretty quickly when you have a family. And you find yourself trying to say, how can I make space to put this one more bag in here until garbage day comes around? Or recyclable? So I think having that extra bin makes a difference because that saves you more space to put your trash in your can.

Participants dislike that they don't know what's recyclable.

- “ It seems I'm not fully aware of [what's] considered recyclable and what's not.
- “ I like it, but it has gotten to be very confusing.
- “ As the citizens, we just need to be real clear about what should go in recycling and what shouldn't. It seems like the past couple of years, it's gotten real dicey, and it's unclear.
- “ Usually, I'll just - if I see that little triangle recycling thing, I usually just pitch it in the recycling...But it's confusing. I don't know what the numbers mean - recycling sign on it, so I just feel like it's able to be recycled.
- “ After taking the survey, I realized that I'm not that knowledgeable. I don't know what should go in there and what shouldn't.
- “ Before, I didn't know you couldn't place plastic bags inside the recycling bin. And I would do that a lot, until a friend told me. If she hadn't told me, I would still be doing it. Just more specifications of what can actually go in that bin.
- “ It differs from area to area that I work in, so I'm always trying to read numbers and it does get time consuming, where I'm like "I don't know where this goes, I'm throwing it in the trash."

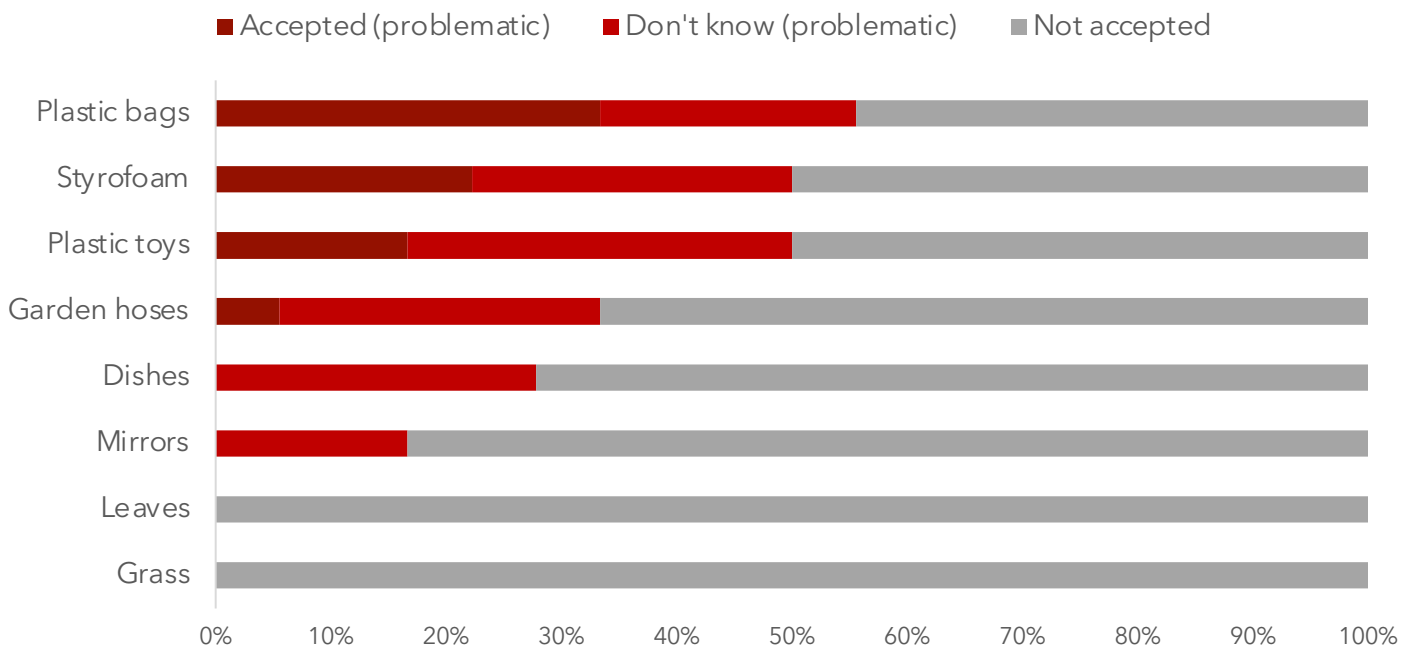
CURRENT RECYCLING KNOWLEDGE: WHAT MATERIALS ACCEPTED

Half or more than half of participants believe plastics bags, Styrofoam, and plastic toys are accepted or don't know whether they're accepted, resulting in a high risk of contamination from these items.

Materials Not Accepted

City of Cleveland Recycling Program:

Whether materials are accepted, not accepted, or don't know

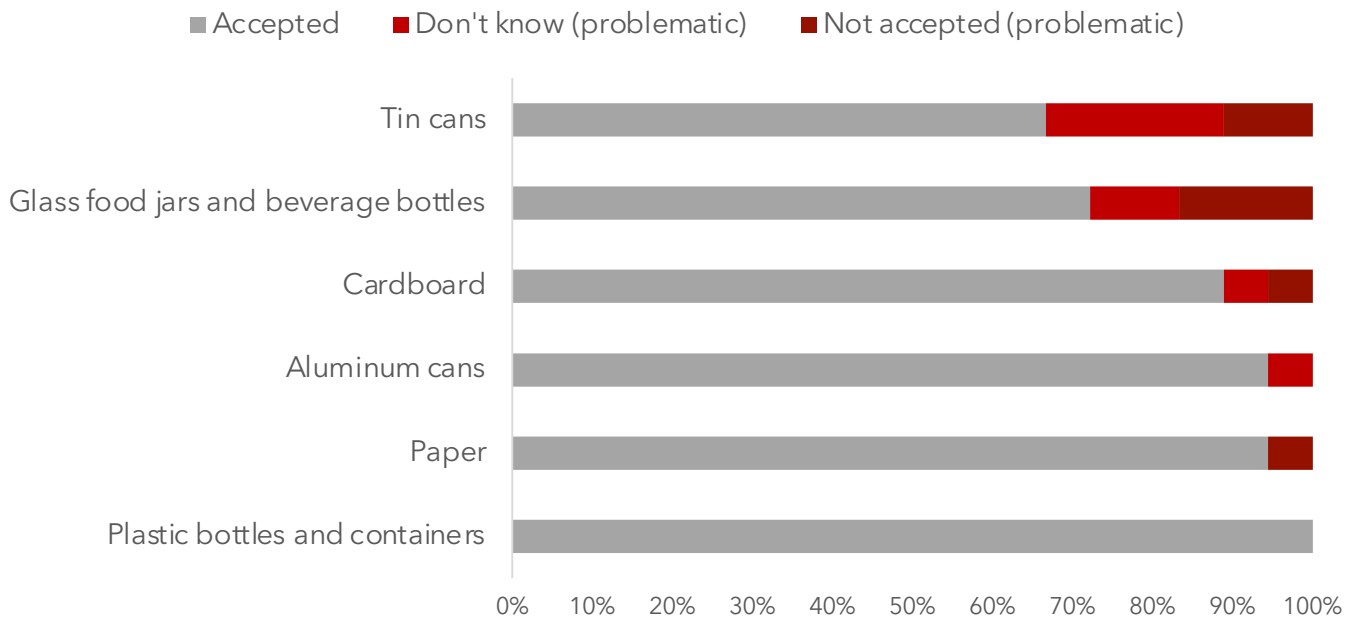


CURRENT RECYCLING KNOWLEDGE: WHAT MATERIALS ACCEPTED

Around 30 percent of participants either believe tin cans and glass food jars and beverage bottles are not accepted or don't know whether they are accepted, resulting in potential missed opportunities for recycling these materials.

Materials Accepted

City of Cleveland Recycling Program:
Whether materials are accepted, not accepted, or don't know



Although 100% of participants believe plastic bottles and containers are accepted, there is a lack of clarity about which containers are accepted.

“It gets questionable about some of the containers, because at one time, you were able to know what is plastic. And now, with all the different codes, the quandary now becomes, “Oh, I guess this can go in. I’m not sure.”

Participants have different opinions / lack of clarity about how clean their recycling needs to be.

Participants are influenced by / influence others

- “ I didn't know [rinsing] was supposed to be done until, I guess, my friend told me to do it. So I just rinsed them out because somebody told me to do it that way.
- “ My husband wants to put everything in there. And I'm like no, you cannot recycle that, take that out. Or he doesn't rinse it. And I walk by and I see it I'm like ugh. So I take it out rinse it, put it back in.
- “ I didn't realize that until I literally just heard somebody say it on this Zoom. I didn't know that they were supposed to be rinsed out.
- “ Often times, I find my girlfriend yelling at me about throwing stuff that's contaminated with food into the recycling bin.

Some participants don't rinse their recyclables

- “ That's all I do, cans and bottles, is just pour out the liquid and then just throw it in there. I don't really rinse [anything] out.
- “ I typically do not rinse it out, we'll be honest; I don't. But if it is something, a liquid in a bottle, I may pour it out, but - or I may just tighten it up and make sure it doesn't come out



WASTE / RECYCLING PROGRAM EVALUATION

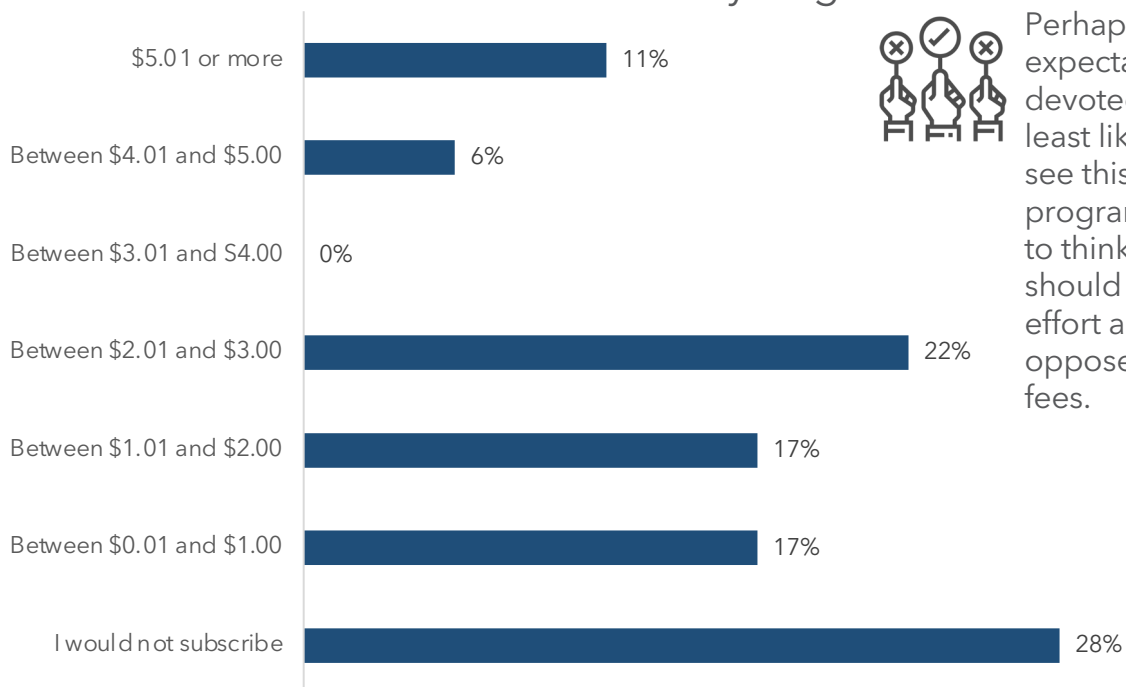
SUBSCRIPTION-BASED MODEL: OVERALL EVALUATION AND WILLINGNESS TO PAY

Participants were provided with background information about the current Cleveland waste collection program and asked about their opinions toward a paid, subscription-based recycling program for which only those who subscribe would have curbside recycling.

One third of participants said they would like to see a subscription program implemented in Cleveland.*

In terms of participants' personal willingness to pay for this type of program, nearly a third said they would not subscribe, and the others would be willing to pay varying amounts.

Likelihood of subscribing / willingness to pay per month for subscription-based recycling



Perhaps contrary to expectations, the devoted recyclers were least likely to want to see this type of program - they tended to think that recycling should be a community effort and they were opposed to additional fees.

*This question was not asked of the first group, moderate recyclers. The focus group discussion guide was revised to include this question after the first group.



Some participants like the idea of a subscription-based program because they recognize that the service costs money and they're willing to pay their part.

- “ I just think it's worth it for the whole recycling process, and like you said, it's a job. And maybe if we put a little money into the system and they actually do something with that money and make it to a process where maybe these - there's people working in it that could help clean out some of the stuff so it can get recycled, or - I would be willing to participate in something like that and pay the money for it.

- “ I don't know, with those fees you could get more education, they could put out different containers, we could sort up stuff ourselves. If that was all available, it would make everything easier...

- “ I chose the \$2, mainly because, if it were to be implemented differently, the workers who would be picking up the recycling specifics and stuff like that. People need to get paid to work. So I'm guessing it has to come from somewhere.

- “ When it comes down to recycling, it's a job... At least if I have control over, I know where it's beneficial, and if you get a certain amount of people to subscribe, then it would be helpful.



Some participants like a subscription-based program because it seems like a good way to reduce contamination.

- “ I think a fee-based service is a no-brainer. The people that are gonna sign up for this are the ones that are motivated to recycle and learn about what you're supposed to put and what you're not supposed to put in. Whereas if you keep doing a flat waste management fee, you might get stuff intermingled and we might get, keep getting contaminated I don't know dumps or recycled dumps. So I would just do a fee-based and have the people that wanna do it, they're gonna hop in and get it.

- “ The people that really care about recycling are gonna be the ones that would sign up for the fee-based. When it's a flat rate, every resident has recycling. I'm even guilty of this. [It's] that sometimes I just, I don't throw away what's supposed to be recycled in the recycling and it goes in the trash just more or less by accident or I'm in a rush or whatever. But if I knew I was paying an additional fee, I might be a little bit more careful about that and just aware of what I'm recycling or not recycling. So that's my thought on that.

- “ If that main obstacle to us recycling is contaminating - because when we sort it or - when they sort it, stuff gets contaminated. I think you just go to fee-based, and the people that want to do it, do it.



Some participants think recycling should be more community-based.

- “ Everybody needs to be included because some communities don't want it at all. They see it as a waste of time. And you might have another community where they don't care, where they just throw trash down and just throw whatever in there, contaminated or not. So I think it needs to be a consistency of everybody in the community if they wanna try that.

- “ What we need to do is really find a way that we can all work together and get this done. Solve the problem. We put a man on the moon, we should be able to find a way to either make plastic that doesn't take 10,000 years to decompose or something. Some way that we can keep the earth clean... Who is paying for the future? I'm not sure that [the subscription-based program] is the best solution at all.

- “ I think maybe doing an educational marketing campaign to communicate and educate people on the importance of recycling and what can be and what cannot be recycled would be a better solution.

- “ To me, the problem is that we need to get everybody on board to start recycling, it's something we should have been doing a long time ago, and I think we need to just speak more on how it's affecting our children and our planet...I think everyone needs to do it; we just need to get everyone on board somehow.



Some participants see a subscription-based program as extra taxes and don't want to pay more taxes.

- “ Because as a homeowner, I'm already paying into this. So I don't feel like I should be paying double, when I'm already, without my consent, paying for a service that I'm not getting already. And how long have we not been recycling, but I'm still paying the fees for it? So no, I wouldn't be willing to double-pay. No. And I wasn't asked, either. They just made me pay for it.
- “ I've been in my house 25 years and originally, for a long time, there was no fee for waste collection, there was no charge. I remember those days and it kind of pisses me off that we have to pay and then now we have to pay more for recycling, so that just turns me off. I'm like; I don't think it's fair.
- “ I chose that because we already pay a lot of money in extra taxes, especially living close to downtown Cleveland, like with the cent taxes for the both - the stadium, the arena, and every - all the other little taxes they hit us for, I'll pay a dollar, that's about it. You're already taking my money anyway.
- “ It's going to be hard to get people to buy into it, because it's like, especially right now, it's another bill.
- “ That's what we got here. We got a tax... I think that we need to understand that we're already being taxed enough. There's gotta be some way that we can get more out of our city for what we're getting in the first place.

Thinking about a new program, participants would need to be reassured that the recycling would actually be processed.

- “ I’m willing to do my part. But also, in doing my part, what does that really mean? To what extent? What’s going to really happen with that? Is it going into a landfill?”

- “ I wouldn’t pay for [recycling]. I would just learn where my locations are to do it...I was actually jealous of the cities that had it. And I’m like, “That would be nice, if they do it here.” Then, when they did it here, I was so excited. And I got really upset when I heard on the news that they were not even recycling. They lost the contract. I’m like, “So what’s the point?””

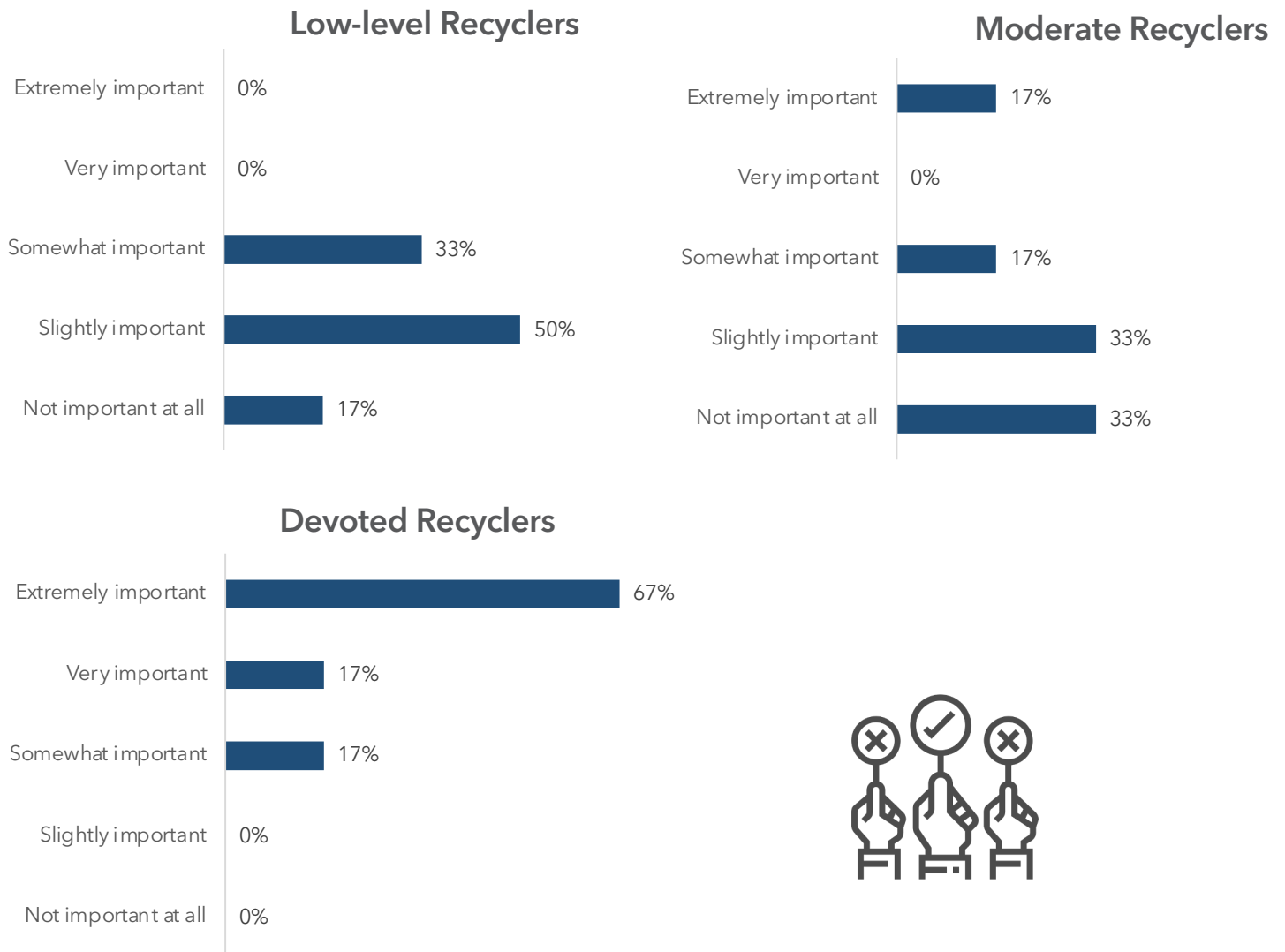
- “ This might have been six months or so back. But it had a large percentage of the recyclables going in a landfill, anyway. So I feel like it would be pointless, if we don’t actually have the proven science behind it or actual proof that it’s going to a recycling facility, versus a landfill.

- “ I want to also ensure and make sure that they’re actually recycling, that it’s actually going to a recycle facility that is actually helping the environment, all those good things that we do recycling for, and it’s not going to a landfill.

PROGRAM EVALUATION: PICKUP FREQUENCY

Participants varied widely in how often they felt recycling should be picked up. This depended largely on how quickly their bins tended to fill up. All of the devoted recyclers said this was extremely, very, or somewhat important, whereas almost all of the low-level and moderate recyclers said this was not important at all, slightly important, or somewhat important.

Importance of weekly curbside recycling pickup





Recycling pickup frequency preferences depend on how quickly participants fill their bins.

Some participants need / prefer weekly pickup

- “ I regularly accumulate a lot. So it is nice for them to come once a week.
- “ I basically chose [the once a week option] because I need to know, because having kids, having a large family, I need a way to be able to get rid of this stuff. There's no way I'm going to keep all of that in the garage or anything. Because if you keep a lot of recyclables, especially cardboard and stuff, it draws insects and mice.
- “ And now with COVID, I order everything online, so everything comes through Amazon. So I'll have boxes upon boxes. Even though my kids play with them, eventually my garbage spills.

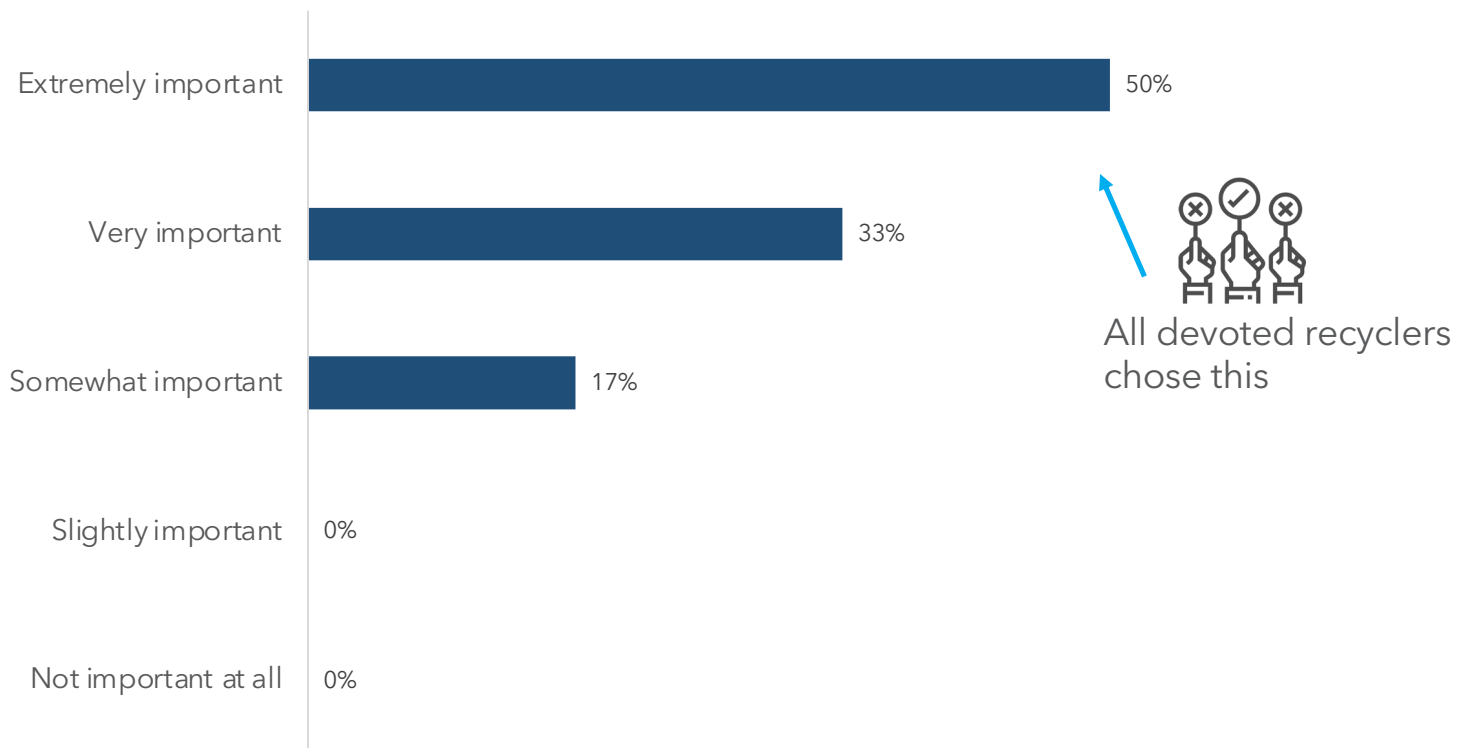
Other participants wouldn't use weekly pickup

- “ I just don't accumulate enough in a week. A lot of times, I don't even wheel my recycling bin out. I do it every two weeks myself, sometimes. Honestly, it could be a great way to offset costs for the recycling program if you don't have to have them come pick up every week.
- “ Because in one week's time, what I've noticed - it's really not necessary for us to have to put recycling out. Because we really don't have that much. So sometimes it could be two weeks, maybe three weeks before we put a recycling bin out.

PROGRAM EVALUATION: IMPORTANCE OF RECYCLING A VARIETY OF MATERIALS

Participants generally thought it was important to have the ability to use curbside recycling to recycle materials besides paper and cardboard.

Importance of ability to use curbside recycling for materials besides paper and cardboard



PROGRAM EVALUATION: IMPORTANCE OF RECYCLING A VARIETY OF MATERIALS

Participants want to have curbside recycling available for everyday items such as plastic water bottles and aluminum cans.

- “ The curbside, that's what I want. I don't, I personally don't wanna drive somewhere to drop off my recycling ...I really think it's important that the curbside would have more than just the cardboard and paper. I'm thinking of the more or less the everyday use stuff like your plastic water bottles, and aluminum cans. Things that people are technically really recycling on a daily basis

- “ I chose very important because that's mostly what I recycled anyway, aluminum, glass, and cans, and bottles and stuff like that.

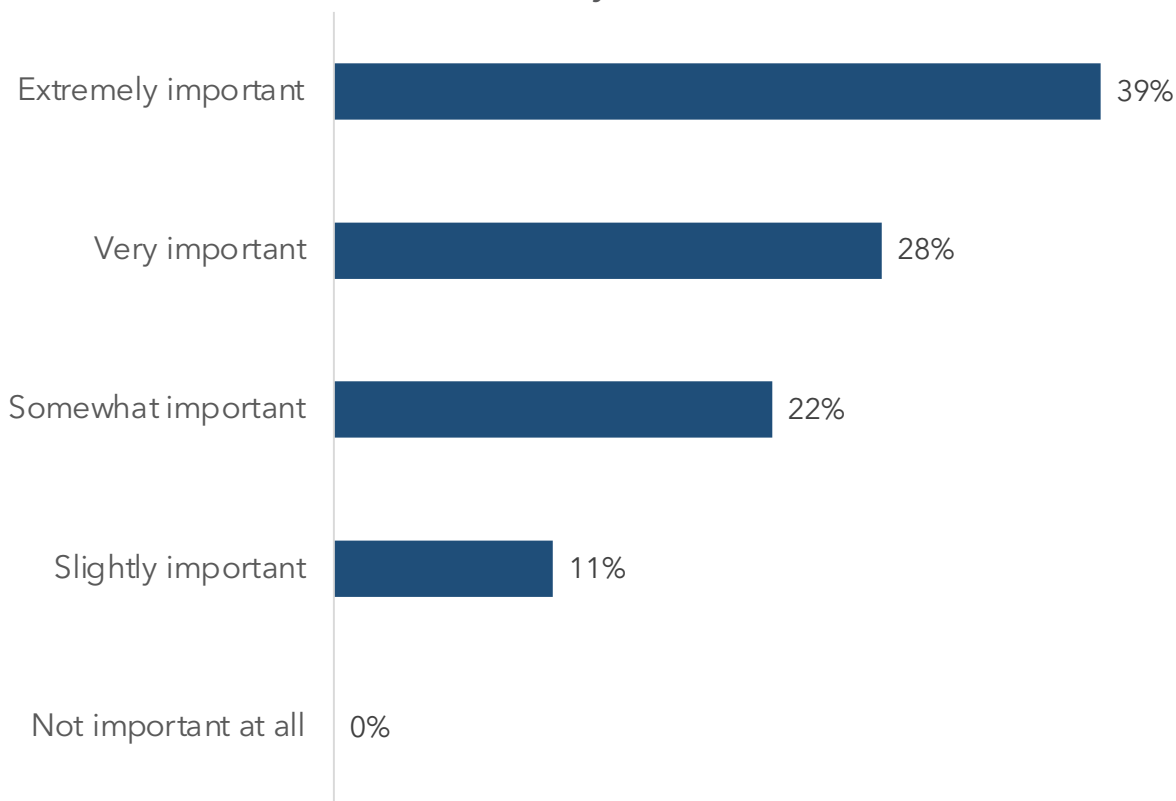
- “ Well right now I don't mind recycling regular things on my bin like the cardboard, the water bottles, things that we use at least in my house a lot of the time....But yes, I think it's necessary for them to come pick up the regular things on a regular basis.

- “ I use a lot of plastic water bottles myself which I try not to do, but in reality I do. And so that's important for me to be able to recycle those.

PROGRAM EVALUATION: RECYCLING DROP OFF LOCATIONS

Many participants thought it was important to have recycling drop off locations available where they could recycle materials that they could not leave at the curb such as appliances and furniture. However, it seems that largely, **they care more about having a location to drop off items** as opposed to those items being recycled.

Importance of drop off locations to recycle materials that can't be recycled curbside



Several participants feel that bulk pick up once a month for three items is not enough, and many participants see people abusing the bulk waste system.

Participants need a place to drop off bulk items.

- “ I chose very. I just think that as long as I know what exactly I can take there, I think I would use a drop-off. There's a lot of stuff that I'm like I don't know what to do with. I don't know if it goes in the trash. I don't know if I can recycle this. So I think somewhere with the staff would be helpful to maybe help explain things.
- “ We've cleaned the yard, and changed some things around. And we've had four big tires...So it would be nice if we knew that there was a specific location that we could put them in the car, take them there, and drop off. Because I've seen a lot of stuff being thrown on tree lawns, that sit and sit. And they become an eyesore in neighborhoods.
- “ I just threw out an old grill. Sometimes you wonder, can this go out? What do I need to do with it? And if we had those places, it would be easy to just take those to a place and drop them off.
- “ I chose very important because if we do have a drop-off, it does matter because...we have a truck, so we'll just put everything on the truck and take it there because I don't like to see a bunch of trash on the lawn and then stuff just sits there for days.
- “ A lot of times, they don't take...big appliances. Sometimes they don't even take furniture. So having those places to drop it off would be extremely important... on our specific street, we try to keep it as clean as possible. So we don't have any eyesores.

Many participants feel that bulk pick up once a month is not enough.

- “ I think we need more than that one day, like everybody was saying. Because sometimes you can just have so much stuff ...I know this past year, I moved into a new house. And I had so much stuff that I was trying to throw away. But again, I can only set out three bulk items. I literally had to keep going to my old house every week, for about two months, until I got rid of everything.

- “ So I would think twice a month, and maybe five items. You know what I mean? Because people are constantly - especially during income tax time, and things like that. People are getting rid of stuff and buying new stuff... when they weren't doing the bulk days, they was talking about, on TV, that they had trash everywhere. People were taking their trash and putting it on other people's lawns, behind buildings, all that kind of stuff.

- “ But the idea of having - what are we going to do with it until - next day, the guy is coming for the - to start building a new garage. What am I going to do with it for the next week or so, until - or actually, a month, until bulk week comes, and they can pick it up? So there's - I think the idea of having someplace that we could take it to, that's not, let's say - the transfer station over on Ridge Road would be a great thing to do.

- “ We had three months of stuff piling up. So it's very important that we have several sites, where you can drop stuff off. Because some people don't care about them picking it up. If they have a way to go drop it off, then that's more time for them to get to people that can't get it to them.

Some participants don't think a drop off location or more frequent pickups are necessary.

Bulk waste left out gets picked up by people in the community

- “ I think bulk pickup once a month is [enough] for us. We do have a lot of it. To be honest with you, if we put anything out on our tree lawn over here, somebody is bound to come and pick it up no matter what it is.
- “ There's always people coming around to pick stuff up too so it's like why not leave it on the tree lawn if somebody is going to take it and get it off my hands?

Some participants don't have a lot of bulk waste

- “ I said slightly because a lot of the bulk pickup you can put the appliances on your tree lawn and they'll take it away. So there's not a huge need to have a drop-off facility, plus it's hard to get bigger items to load it. If you don't have a truck, you're screwed.

Some participants doubt people will drive to a drop off location

- “ I just think the majority of people aren't going to drive to drop off recycling. I just think it's kind of the nature of people, and convenience. I know it says a convenient drop-off facility, but I just don't think people are thinking that's even convenient, to go and drive somewhere, to drop things off.



RECOMMENDATIONS

RECOMMENDATIONS



Educate, educate, educate!

No matter what type of program is adopted, Cleveland residents need to be educated:

- Especially because contamination is a concern in Cleveland, residents need to understand which materials can and can't be recycled and how clean the materials need to be.
- Many residents are aware that recently the recycling has not been processed. Once processing starts back up, it needs to be made very clear that their recycling is no longer going to a landfill, so that residents aren't skeptical about their recycling efforts being wasted.

The following slides provide suggestions for how to educate residents about what materials can be recycled, specifically.

Participants want visual reminders of what is accepted for recycling, and suggested that bin signage, refrigerator magnets, and printed materials would be helpful.

Bin signage

- “ Even if the City of Cleveland sent everybody a sticker and [said] place this on top of your recycling bin...I think just having that there on that bin, when I'm like literally throwing something away...having something visual always seeing it, that would be the best option.
- “ Until we can get clear on all the things that can go into recycling, I think signage is critical... If people would get in the habit of seeing that signage on those bins for recycling, that might be a little bit more helpful.

Magnets

- “ Send me a magnet with the city number, what to do with the garbage pickup. Send me that. I'll put it on the refrigerator, so I'll look at that.
- “ Something we can always have readily available...and that you could stick on the refrigerator. That way, you always reminded of what's this and what's that.

Printed materials

- “ So you have some that are not tech-savvy...they're going to need that piece of paper and in front, dead center of the bill is the best place.
- “ Really a door type hanger flyer will be beneficial. Now you could move it to different locations, so therefore you could advertise it yourself if you want to inform others like look I recycle here, this home recycles.
- “ I guess if you put flyers out in the community up and down your street lane. You know, these are the requirements; these are the dos and don'ts.

Participants want information about recycling that is easily accessible from online sources, television news, and school-based programs.

Information online

- “ Just make sure they have it in their web site. So if you forget, it's readily available. You can just go to the Cleveland web site. Easy to find, just a nice little link, on the home page.
- “ Just put something up on the Facebook page - on the Cleveland Waste Management Facebook page. That would be so easy.
- “ But you should be able to...sign up to receive emails.
- “ Everybody's always on their phones, and looking up stuff. And if it just pops up on Facebook or something like that, we're more likely to see it and learn about it.

Television

- “ A lot of times I see on Fox8 when they're talking about the recycling, they tell us what we can and cannot recycle. Even though you heard it changed a couple of times what they were taking and what they would not take.

Education in schools

- “ I think educating kids in school because it starts a lot with these kids. They are just throwing everything in the trash. And I just think maybe sending someone to school, maybe have them do projects, bring it home to their families where they have to do these recycling projects at home so the parents have to get involved too.



APPENDIX D

Blank Survey Form





Municipal Solid Waste Collection Information Request For the City of Cleveland

Please complete the following survey using 2019 information.

1. Contact Information

Community Name:	Contact:
Address:	Title:
Email:	Phone:

2. Tonnages

	Residential	Commercial	Total
2019 Trash Tons	tons	tons	tons
2019 Recycling Tons	tons	tons	tons
2019 Yard Waste Tons	tons	tons	tons
2019 Bulk Tons	tons	tons	tons
2019 Recycle Contamination Rate (%)	%	%	%

3. Collection Services

Which programs did your community operate in 2019?	Trash		Recycling		Yard Waste		Leaves	
	Yes	No	Yes	No	Yes	No	Yes	No
Residential Curbside Manual Collection:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Residential Curbside Semi-Automated Collection:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Residential Curbside Automated Collection:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Residential Side/Back Door Collection:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Residential Unlimited Material Collection:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Residential Weekly Bulk Pick-Up:	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
Residential Monthly Bulk Pick-Up:	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
Residential On-Call Bulk Pick-Up:	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
Multi-family Households/Apartments:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial Collection:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Collection Programs:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Trash	Recycling
2019 Residential Receptacle Type(s) & Size(s)		
Is residential collection subscription or non-subscription?		
# of Residential Customers		
# of Residential Routes (total per week)		
Residential Participation/Set-out Rate (%)	%	%
2019 Commercial Receptacle Size(s)		
# of Commercial Customers		
# of Commercial Routes (total per week)		
Collection Day(s)		
# of Sanitation Employees Dedicated to Collection:		
# of Sanitation Employees per Route:		
Distance from Routes to Disposal/MRF Facility (miles)		
Recycling: If Single Stream (explain materials accepted):		
Recycling: If Dual Stream (explain materials accepted & sorting required):		



Municipal Solid Waste Collection Information Request For the City of Cleveland

4. Challenges

- | | |
|--|--|
| <input type="checkbox"/> Trouble with alleys | <input type="checkbox"/> Recycling processing facility costs |
| <input type="checkbox"/> Financial burden for low-income residents | <input type="checkbox"/> Recycling materials markets |
| <input type="checkbox"/> Acceptance of a new program | <input type="checkbox"/> Collection frequency |
| <input type="checkbox"/> Enforcement and costs | <input type="checkbox"/> Operational costs (staff, etc.) |
| <input type="checkbox"/> Monitoring and evaluation | <input type="checkbox"/> Education efforts |
| <input type="checkbox"/> Bulk collection | <input type="checkbox"/> Multi-family housing/Apartments |
| <input type="checkbox"/> Open dumping | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Cars in the streets | <input type="checkbox"/> Other _____ |

How are ordinances enforced? (fines, container rejection, etc.)

How are missed collections handled:

How are missed collection days handled (holidays/weather issues):

Does your city use any of the following alternative solid waste management technologies?

- | | |
|--|---|
| <input type="checkbox"/> Waste to energy (energy production) | <input type="checkbox"/> Mixed waste processing |
| <input type="checkbox"/> Incineration (volume reduction) | <input type="checkbox"/> Other technologies _____ |

5. Costs and Revenue

	Trash	Recycling
2019 Residential Charge (cost/month/household):	\$	\$
2019 Residential Charge (property tax on each household):	\$	\$
2019 Other Residential Charges (i.e. bulk, yard waste):	\$	Explain:

Is the Sanitation Department operated as an enterprise fund?

If not, what other sources of revenue are relied upon (i.e. taxes, grants):

How do you budget for equipment replacement?	
2019 Labor Costs:	\$
2019 Total Operating Costs (Excluding labor):	\$
<i>If 2019 operating costs are atypical, explain:</i>	
2019 Cost/Ton Paid for Disposal (including fees):	\$
2019 Total Revenue from Sale of Recyclables:	\$
2019 Cost/Ton Paid for Recyclables Processing (including fees):	\$

Other information that may help the City of Cleveland:

Thank you so much!
Please email back to ktuax@gtenvironmental.com.



APPENDIX E

Survey Summary



**Appendix E
Comparable Community Survey Summary**

Survey Section	Topic	Question	Canton	Chesapeake	Dayton	Des Moines	Grand Rapids	Lexington	Louisville	Madison	Memphis	Milwaukee	Nashville	St. Louis
Contact Information	General	Contact:	Michael Parker	Greg Martin	John Parker	Jo Farrell	Robert Swain	Lauren Monahan	Keith S. Hackett	Bryan Johnson	Philip Davis	Samantha Longshore	Sharon Smith	Randy Breitenfeld
Contact Information	General	Title:	Superintendent	WM administrator	Manager	Sanitation Administrator	Acting Manager of Public Works	Environmental Initiatives Specialist	Assistant Director	Recycling Coordinator	Solid Waste Deputy Director	Resource Recovery Program Manager	Assistant Director	Deputy Commissioner of Refuse
Contact Information	General	Address:	2436 30th St. NE	912 Hollowell Ln	1010 Ottawa St. Dayton OH 45402	216 SE 5th St	201 Market Ave SW Grand Rapids 49503	200 E Main St	600 Meriweather Avenue		125 N Main St Room 628 Memphis, TN 38119		750 S. 5th St, Nashville 37206	4100 S. First St., 63109
Contact Information	General	Email:	michael.parker@cantonoohio.gov	gmartin@cityofchesapeake.net	john.parker@daytonohio.gov	jkfarrell@dmgov.org	rswain@grcity.us	wastemanagement@lexingtonky.gov	keith.hackett@louisvilleky.gov	bjohnson2@cityofmadison.com	philip.davis@memphishistn.gov	slongs@milwaukee.gov	sharon.smith@nashville.gov	breitenfeldr@stlouis-mo.gov
Contact Information	General	Phone:	330-438-6977	757-439-2341	937-333-4948	515-237-1349	616-456-3473	(859) 280-2556	(502) 574-2775	608-267-2626	901-636-6872	414-286-2334	615-862-8715	314-353-8900 ext. 34
Tonnages	Trash	Residential Tons	35,992	60,000	51,118	62,428	29,800	Not available	75,457	44,158	226,810	179,510	179,136	143,443
Tonnages	Trash	Commercial Tons			0	0	52							
Tonnages	Trash	Total Tons	35992	60,000	51117.66	62428	29852	171,144.50	75457		226810			
Tonnages	Recycling	Residential Tons	1,706	15,000	6,000	8,782	6,800	Not available	11,122	17,834	14,364	25,455	27,002	16,505
Tonnages	Recycling	Residential Contamination Rate		25%	16%	18%	15-20%		8-10%	19%	14%	19%	29%	69%
Tonnages	Recycling	Residential Recycling Rate	5%	20%	11%	12%	19%		13%	29%	6%	12%	13%	10%
Tonnages	Recycling	Commercial Tons			0	0	42							
Tonnages	Recycling	Commercial Contamination Rate			0%	0%								
Tonnages	Recycling	Commercial Recycling Rate					45%							
Tonnages	Recycling	Total Tons	1706	15,000	6000	8782	6842	21,979	11122		14364			
Tonnages	Recycling	Total Contamination Rate		25%	16%	18%	15-20%	34%	8-10%		14%			
Tonnages	Bulk	Residential Tons	Included in trash	20000	7674.62	Included in trash	Included in trash	Included in trash	Not available	9,396.17	142436	5258	Included in trash	7799
Tonnages	Bulk	Commercial Tons			0	0								
Tonnages	Bulk	Total Tons		20000	7674.62	Included in trash					142436			
Tonnages	Yard Waste	Residential Tons		20000	0	14230	12650		12043	leaf: curb: 12,304, do: 2,748 lower than previous years, brush: curb: 12,749.45, usually slightly higher, usually 16-18k tons, leaf usually 15-16k tons	12000	33,272 (this is total from curbside and drop-off)	35,755.60	25072
Tonnages	Yard Waste	Commercial Tons			0	0								
Tonnages	Yard Waste	Total Tons		20000	0	14230	12650	30,304	12043		12000			
Collection Services	Trash	Residential Curbside Manual Collection:	yes	no	no	no	yes	yes	no		no	no	no	yes
Collection Services	Trash	Residential Curbside Semi-Automated Collection:		no	yes	no	yes	yes	yes	yes	yes	yes	no	
Collection Services	Trash	Residential Curbside Automated Collection:		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Collection Services	Trash	Residential Side/Back Door Collection:	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no
Collection Services	Trash	Residential Unlimited Trash Collection:	yes	no	yes	no	no	yes	no		no	no	no	no
Collection Services	Trash	Multi-family Households:	yes	no	yes	no	yes	yes	yes	yes	no	y, City only collects MFH of 2-4 residences, some condos, and residential tenants in mixed use buildings	yes	yes
Collection Services	Trash	Commercial Collection:	yes	no	no	no	yes	yes	yes	no	yes	no	no	no

**Appendix E
Comparable Community Survey Summary**

Survey Section	Topic	Question	Canton	Chesapeake	Dayton	Des Moines	Grand Rapids	Lexington	Louisville	Madison	Memphis	Milwaukee	Nashville	St. Louis
Collection Services	Trash	Other Collection System: Residential Weekly Bulk Pick-Up:			Street Maintenance does curbside leave collection	9 free bulk drop-off events each year	low income		Bulky waste by area 3 X Year. Unlimited	every other week bulk, separate brush collection (manual and automated), alley pickup using rear loader, student move in time use extra rear loader, holidays use semi manual, need back door accessible and yearly check-ins, two options for cart sizes are same price	2 x per month bulk pick-up		some small business collection along residential routes that can use rolling carts for both trash and recycling. We do not track the number of small businesses we provide service to since they are just combined with residential collection	y, residential drop off
Collection Services	Bulk	Residential Monthly Bulk Pick-Up:		yes	no	yes	no	yes	no	no	no	yes	no	no
Collection Services	Bulk	Residential On-Call Bulk Pick-Up:		no	yes	no	no	no	no	no	no	no	no	yes
Collection Services	Bulk	Residential Curbside Manual Collection:	yes		no	no	yes	yes	no	no	no	yes	yes	no
Collection Services	Recycling	Residential Curbside Semi-Automated Collection:			yes	no	no	yes	yes	yes	yes	yes	no	
Collection Services	Recycling	Residential Curbside Automated Collection:		yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
Collection Services	Recycling	Residential Side/Back Door Collection:	no	no	no	yes	yes	yes	yes	yes	no	yes	yes	no
Collection Services	Recycling	Residential Unlimited Trash Collection:	yes	no	yes	no	no	yes	yes		no	no	no	no
Collection Services	Recycling	Multi-family Households:	n	no	yes	no	yes	yes	yes	yes	no	y, City only collects MFH of 2-4 residences, some condos, and residential tenants in mixed use buildings	no	yes
Collection Services	Recycling	Commercial Collection:	yes	no	no	no	yes	yes	yes	no	no	no	no	no
Collection Services	Recycling	Other Collection System:				yes					no			yes
Collection Services	Yard Waste	Residential Curbside Manual Collection:		yes	no	no	yes	yes	yes	no	no	yes	no	yes
Collection Services	Yard Waste	Residential Curbside Semi-Automated Collection:			no	yes	yes	yes	yes	yes	yes		no	
Collection Services	Yard Waste	Residential Curbside Automated Collection:		yes	no	yes	no	yes	no	no	no	no	yes	yes
Collection Services	Yard Waste	Residential Side/Back Door Collection:		no	no	yes	no	no	no		no	no	no	no
Collection Services	Yard Waste	Residential Unlimited Trash Collection:		no	no	no	no	yes	yes		yes	no	yes	no
Collection Services	Yard Waste	Residential Weekly Bulk Pick-Up:		yes	no	yes	yes	yes	no		no	no	no	no
Collection Services	Yard Waste	Residential Monthly Bulk Pick-Up:		no	no	no	no	no	no		no	no	no	yes
Collection Services	Yard Waste	Residential On-Call Bulk Pick-Up:		no	no	no	no	no	no		no	yes	no	no
Collection Services	Yard Waste	Multi-family Households:		no	no	no	yes	no	yes		no		no	yes
Collection Services	Yard Waste	Commercial Collection:		no	no	no		no	no	no	no	no	no	no
Collection Services	Yard Waste	Other Collection System:				yes				yes	yes	yes	no	yes
Collection Services	Leaves	Residential Curbside Manual Collection:		yes		no	yes	yes	yes	no	no	no	no	yes
Collection Services	Leaves	Residential Curbside Semi-Automated Collection:				yes	yes	no	no	yes	yes	no	no	
Collection Services	Leaves	Residential Curbside Automated Collection:		no		yes	no	no	no	no	no	yes	yes	no
Collection Services	Leaves	Residential Side/Back Door Collection:		no	no	yes	no	no	no		no	no	no	no

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Survey Section	Topic	Question	Canton	Chesapeake	Dayton	Des Moines	Grand Rapids	Lexington	Louisville	Madison	Memphis	Milwaukee	Nashville	St. Louis
Collection Services	Leaves	Residential Unlimited Trash Collection:		no		no	no	yes	yes		yes	no	yes	no
Collection Services	Leaves	Multi-family Households:		no		no	yes	no	yes		no	no	no	no
Collection Services	Leaves	Commercial Collection:		no	no	no		no	no	no	no	no	no	no
Collection Services	Leaves	Other Collection System:				yes					yes	yes		yes
Collection Service Data	Trash	2019 Residential Receptacle Size	95 gallon cart	96 gallon cart	96 gallon cart	96 gallon & 64 gallon cart	32, 64, 96 gallon carts	96 & 65 gallon cart	95 and 68 gallon cart	65 and 96 gallon carts	96 gallon cart	96 gallon cart	96 gallon cart	roll carts 90 gallon, alley dumpsters 400 gallon
Collection Service Data	Trash	Subscription or non-subscription	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Collection Service Data	Trash	# of Residential Customers	25000	70000	60000	66000	45000	93,790	84000	67000-75000	174954	181k	140,116	110000
Collection Service Data	Trash	# of Residential Routes:	9	160	17 per day	70	45	100	105	14-16 per day	360	10	178	231
Collection Service Data	Trash	Residential Participation Rate (%)		95%	100%	95%	48%	99%	100%	100%	100%	na	unknown	95%
Collection Service Data	Trash	2019 Commercial Receptacle Size		0 na		0 4, 6		dumpster/cart	small business 95 gal (less than 4 carts per week)	na	96 gal x 2 carts, up to 6 carts	na	na	
Collection Service Data	Trash	# of Commercial Customers		0	0	0	2	4000	Est. 2,000	na	7,298	na	na	0
Collection Service Data	Trash	# of Commercial Routes:	2	0	0	0	5	66	Collected with residential	na	n/a, included on residential routes	na	na	0
Collection Service Data	Trash	2019 Collection Days	5	4 M-Th		5 M-F	M T T H F	S-S	5 days	5	M-F, 11 holidays	T-F	M-F	
Collection Service Data	Trash	# of Sanitation Employees Dedicated to Collection:	42	40	68	41	11	90	1 per truck plus a few extra	300	na	largely contracted service		123
Collection Service Data	Trash	# of Sanitation Employees per Route:	3	1 1 to 3		1	1 1 to 3	3	1	3	1 to 2	largely contracted service	1 trash, 2 bulk	
Collection Service Data	Trash	Distance from routes to disposal facilities	8	5 15 miles		13.5	1 to 5	7	city's transfer station, goes to county landfill	15	Transfer stations located within City	waste transfer station is centrally located in city/county	<15 miles	
Collection Service Data	Recycling	2019 Residential Receptacle Size	18 gallon bin	95 gallon cart	32 and 96 gallon carts	96 Gallon & 64 Gallon Cart	64, 96 gallon carts	96 & 65 gallon carts	95 gallon cart and 18 gallon bin	65 and 96 gallon carts	96 gallon cart	96 gallon cart	96 gallon cart	roll carts 90 gallon, alley dumpsters 400 gallon
Collection Service Data	Recycling	Subscription or non-subscription	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
Collection Service Data	Recycling	# of Residential Customers	25000	Not available	30000	66000	53000	77645	84,000	71000	174,954	181000	105198	110000
Collection Service Data	Recycling	# of Residential Routes:		80	5 per day		35	32	65	35	8-10 per day	180* based on volume	35 daily routes	44
Collection Service Data	Recycling	Residential Participation Rate (%)		75%	30%	70%	75%	99%	estimated 50%	100%	35%	na	75%	33%
Collection Service Data	Recycling	2019 Commercial Receptacle Size		na		96 gallon cart	4, 6	dumpster/cart	small business 95 gal (less than 4 carts per week)	na	96 gal cart	na	na	
Collection Service Data	Recycling	# of Commercial Customers		0	20	4	4000	Est 1,000	na	7,298	na	na	na	0
Collection Service Data	Recycling	# of Commercial Routes:		0	0	5	16	Collected with residential	na	0	na	na	na	0
Collection Service Data	Recycling	2019 Collection Days	5	2 M-Th		5 M-F	M T T H F	S-S	5 days	5	M-F, 11 holidays	T-F	M-F	
Collection Service Data	Recycling	# of Sanitation Employees Dedicated to Collection:	6	20	13	6	10	40	29	1 per truck plus a few extra	100	na		123
Collection Service Data	Recycling	# of Sanitation Employees per Route:	2	1 1 to 3		1.4	1 1 to 2	3	1	1.5	1 to 2			1
Collection Service Data	Recycling	Distance from routes to disposal facilities	8	5 8 miles		12.4	1 to 5	7	Average of 10	15	MRF in city	Recycling processing facility is centrally located in city/county	<15 miles	

Appendix E
Comparable Community Survey Summary

Survey Section	Topic	Question	Canton	Chesapeake	Dayton	Des Moines	Grand Rapids	Lexington	Louisville	Madison	Memphis	Milwaukee	Nashville	St. Louis
Collection Service Data	Recycling	Recycling: If Single Stream (explain materials accepted):		<ul style="list-style-type: none"> •Paper bags •Glass jars & bottles (remove and discard caps) •Tin or steel cans •Cardboard (Flatten all boxes) •Telephone books •Junk mail •Envelopes with clear windows •Magazines & catalogs •Newspapers & inserts •Office paper & file folders •Aluminum cans •Plastic bottles & containers with a spout – #1 and #2 (remove and discard caps) •Cereal boxes •Paper towel and toilet paper rolls NO •Plastic grocery store bags •Garbage •Styrofoam •Electronics •Food waste 										
Collection Service Data	Recycling	Recycling: If Dual Stream (explain materials accepted and sorting required):			na			paper is collected separately from other recyclables (see attachment)						
Challenges	General	Trouble with Alleys	yes	no	yes	no	yes	no	yes	yes	yes	yes	no	yes
Challenges	General	Financial burden for low-income residents	no	no	yes	no	no	no	no	no	yes	no	no	no
Challenges	General	Acceptance to a new program	no	no	no	no	no	no	no	yes	yes	no	no	no
Challenges	General	Enforcement costs	no	no	yes	no	yes	yes	no	no	yes	yes	no	yes
Challenges	General	Monitoring and evaluation	no	no	yes	yes	yes	no	yes	no	yes	no	no	no
Challenges	General	Bulk Collection	no	no	yes	no	no	yes	yes	no	yes	no	no	no
Challenges	General	Open Dumping	yes	no	yes	no	yes	no	yes	no	yes	yes	no	yes
Challenges	General	Cars in the streets	yes	no	yes	yes	yes	yes	yes	no	yes	no	no	no
Challenges	General	Recycling processing facilities cost	yes	no	yes	yes	yes	no	yes	no	yes	no	no	no
Challenges	General	Recycling materials markets	no	no	yes	yes	no	yes	yes	yes	yes	no	no	no
Challenges	General	Collection frequency	no	no	no	no	no	no	yes	yes	yes	no	no	no
Challenges	General	Operational costs (staff, etc.)	no	no	yes	no	no	no	yes	no	yes	yes	no	yes
Challenges	General	Education efforts	no	no	yes	yes	no	no	yes	yes	yes	no	no	no
Challenges	General	Multi-family housing	no	no	yes	no	no	yes	no	yes	yes	no	no	no
Challenges	General	Other _____						contamination in recycling			organized labor workforce			y, illegal dumping
Challenges	General	Other _____						contamination in yard waste						no
Challenges	General	How are ordinances enforced? (fines, no collection, etc.)	fines	embedded WM inspectors/ reject.	we pick it up	reject, monitor, removal	fines and service rejection	Fines, container rejection, enforcement tags	Citation/Code Board	Building inspection gives warnings and then fines	Lengthy environmental court process	Written warnings, citations, fines and late fees	n/a recycling carts with obvious contamination are tagged	fines and container rejection

**Appendix E
Comparable Community Survey Summary**

Survey Section	Topic	Question	Canton	Chesapeake	Dayton	Des Moines	Grand Rapids	Lexington	Louisville	Madison	Memphis	Milwaukee	Nashville	St. Louis
Challenges	General	How are missed collection stops handled:	We have a missed truck	reviewed then acted upon	we pick it up	If out late - \$25 Return fee missed - must be reported within 24 hrs. of collection day, we collect free of charge. If past 24 hrs., pay \$25 return fee or wait until next recycle day.	go back one business day after notice (within one business day)	Routeware tracks late set outs	Next 48 hours return	Go back when they call, no fee or incentive to make sure they get it out in time	Go back and collect	Call center and online submission. Work order system	reported to 311 call center and pickup	usually get notified through service request
Challenges	General	How are missed collection days handled (weather issues):	labor agreement	move collection day up	pushed back one day	Return trip - no fee IF reported within 24 hrs. of collection day	one day delay on holidays, weather may cancel for the day with no makeup	Wednesdays serve as makeup day	Delay a day		1 day delayed	Make up M-F	weather isn't an issue for the most part/ Holiday misses are reported to 311 and we usually pickup the next business day	usually the next day or off days
Challenges	General	Alternative solid waste management technologies:		WTE				yard waste to composting facility		used to have waste to energy facility in mid 90s, Oscar Meyer plant burn for energy, county looking at pyrolysis, looking at county in Michigan and Florida state				
Costs and Revenue	Trash	2019 Residential Charge (cost/month/household):	\$22.00	\$0.00	\$13.58	\$15.20	32 gallon is \$3.15 per tip, 64 is \$5.25 per tip, 96 is \$7.35 per tip	\$4.50		\$0.00	\$29.96	second cart is \$17/quarter	\$0.00	\$14.00
Costs and Revenue	Trash	2019 Residential Charge (property tax on each household):						\$0.1426 per each \$100 value of home		\$8.11		\$57.74 per quarter		
Costs and Revenue	Recycling	2019 Residential Charge (cost/month/household):		\$0.00	\$0.00	included				\$0.00	included	0 for 2nd cart	\$0.00	\$14.00
Costs and Revenue	Recycling	2019 Residential Charge (property tax on each household):		\$4.85	\$0.00	\$0.00				\$2.74		Solid waste fee	\$0.00	
Costs and Revenue	Recycling	2019 Other residential charges (bulk, yard waste)			Bulk and recycling are services that we provide as a service included in trash fee. Bulk is monthly by zone.	PAYT program. \$5 per bulky items (\$35 for each appliance)			bulky \$3.34			\$0 for up to 1cy, bulk pickup included in charges, but for more than 1cy: \$50 for 1-4cy or \$150 for 4-6cy	0	0
Costs and Revenue	General	Is the Sanitation Department operated as an enterprise fund:	yes	no	No-However we qualify as one.	yes	no	no	no	no	special revenue fund	no	no	no
Costs and Revenue	General	if not, what other sources of revenue are relied upon (taxes, grants):		general fund	General Fund - Waste Collection Fees		program fees and millage support	taxes and fees	taxes	federal EPA grant for special projects, taxpayer	none	state cost sharing/grant revenue: \$2,311,905	general fund and waste generator fees	taxes and grants
Costs and Revenue	General	How do you budget for equipment replacement?		5% annually	We compete for capitol funds with all other general fund operations.	staggered replacement at 10 year intervals.	Annual charge from fleet has purchase for new truck built in	Capital accounts	Based on age of equipment and prioritizing needs with budget	on top of that! they put aside money for equipment, aggressive fleet superintendent, green the fleet as much as possible	Debt service paid by solid waste fund	Request through City budget process. Age of fleet currently older than industry standard.	Handled by General Services Department, Fleet Division	trash fee
Costs and Revenue	General	2019 Labor Costs:	\$3,576,288.00		\$5,000,000.00	\$4,619,657.00	\$2,039,350.00	\$25,457,678.00			\$28,000,000.00	na		
Costs and Revenue	General	2019 Total Operating Costs (minus labor):	\$2,658,811.00	\$20,000,000.00	\$11,000,000.00	\$8,415,450.00	\$10,781,746.00	\$30,293,092.00		\$18,069,853.43	\$51,000,000.00	\$10,042,178.00		our total refuse budget is around 19M yearly

**Appendix E
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Survey Section	Topic	Question	Canton	Chesapeake	Dayton	Des Moines	Grand Rapids	Lexington	Louisville	Madison	Memphis	Milwaukee	Nashville	St. Louis
Costs and Revenue	General	Operating cost additional explanation									service delivery model change requiring \$5.2 million investment in equipment and technology			
Costs and Revenue	General	2019 Cost/Ton Paid for Disposal (including fees):	\$30.95	\$58.00	\$38.25	\$36.00	\$63.09	\$19.50	\$32.27	\$50.00	\$24.96	\$44.36	\$39.74	\$34.94
Costs and Revenue	General	2019 Total Revenue from Sale of Recyclables:	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1,072,512.00			\$17,000.00	\$1,336,225.00	revenue sharing agreement	\$0.00
Costs and Revenue	General	2019 Cost/Ton Paid for Recyclables Processing (including fees):	\$76,595.00	\$95.00	20.00 in 2019 / 35.00 in 2020 / 40.00 in 2021	\$243,500.00	\$446,000.00	\$48.80	\$411,991.00	\$3000 per month total (net)	\$45.00	50/ton in 2019	\$101.40	\$26.80 y/w, \$16.04 recycle \$264,741 total
Other	General	Other information		we operate 3 lines of business 4 days per week: Res SL automated 20 routes...Driver Res RL manual 10 Routes... Driver / 2 laborers Automated Grapppler 10 routes. Driver TFC is a subcontractor for the City, they collect the Cities s curbside recycle items 2x per month.	If you have follow up questions or comments please feel free to contact me at 937-333-4948.		Grand Rapids has a PAYT refuse program in which people pay ahead for service and are charged only when the cart is out at the curb.		1. To understand our system go to 2016 study link: https://louisvilleky.gov/node/255521/ 2. We have not done an audit of our cost per household since 2016 so cost per household is from then. 3. Bulky waste cost includes some common good services and about 500 plus special events 4. We service a central business core seven days per week. 5. We service small businesses generating less than (4) 95 gallon containers per week with our	Wisconsin cannot landfill recyclables in landfill, local ordinances back it up, cities fill out form and grant money gets kicked back, be creative with solutions, recycling since 1968 and has a history big deal for them		All of these statistics are for 2018.	our contract is currently out for bid and we are looking at alternative solid waste management technologies as an option.	



APPENDIX F

Unverified Processors and End Users



**Appendix F
Unverified Potential Processors and End Users**

Company Name	Address	City	State	ZIP Code	Phone Number	Primary SIC Code	Primary NAICS
1 Shot Services	6377 Hahn Rd.	Bradford	OH	45308	(937) 447-3300		
1-800-Cars4Cash	13840 Fenkell St	Detroit	MI	48227	(313) 246-9500	509314	42393020
1932 LTD	1351 E 168th St	Cleveland		44110			
15T Choice Recycling	2120 E 9 Mile Rd	Warren	MI	48091	(586) 806-2133	509312	
24Th Street Recycling, L.L.C.	2703 23Rd St	Detroit	MI	482161066	3138979694	495399	562920
3P Industries Llc	40249 Schoolcraft Rd	Plymouth	MI	481702706	7343353174	495399	562920
3R Recycling	2040 E Kemper Rd	Sharonville	OH	45241	(513) 771-4002		
574 Metals	1025 Ray Ave. Ne	Newcomerstown	OH	44663	(740) 294-7353		
88 Air Base Wing Environmental Management	5490 Pearson Rd	Dayton	OH	454335332		261103	322110
A & A Tire & Recycling	5125 Canton Rd	Carrrollton	OH	44615	(330) 863-1936		
A & B Iron & Metal Company	329 Washington St	Dayton	OH	454022541	9372281561	509302	423930
A & B Metal Recycling	3049 E 55Th St	Cleveland	OH	44127	(216) 640-2920	509312	
A & B Salvage	112 Little Yellow Creek Rd	Harmony	PA	16037	(724) 452-5865	509313	42393019
A & S Salvage Co Inc	213 State Route	Hammondsville	OH	43930	(330) 532-4654	509312	42393017
A J Recycling	7440 Job Greenville Rd	Kinsman	OH	44428	(330) 876-0229	509312	42393017
A L Solutions	1000 S Chester St	New Cumberland	WV	26047	(304) 564-5694	509312	42393017
A New Beginning Recycling Inc	8023 Saint Paul St	Detroit	MI	48214		509312	42393017
A.J. Met. Inc.	5780 Timberwood Ln	Almont	MI	480038922	9893852342	495399	562920
A-1 Battery Shop	2935 Detroit Ave	Cleveland	OH	44113	(216) 861-6001		432930
Aardvark Industries	8201 Almira Ave.	Cleveland	OH	44102	(216) 825-3085		
Aaromet Metals Recycling Llc	3208 West 63Rd Street	Cleveland	OH	44102	(216) 961-5050	509313	
ABC Mobile Shredding	1662 E 361st St. (440) 943-1995	Willoughby		44095	(440) 943-1995		
Abitibi Recycling	3400 Vega Ave	Cleveland	OH	44113	(216) 961-3900	509312	42393017
Able Alloy Inc	3500 West 140	Cleveland	OH	44111	(216) 251-6110		
Absolute Polymers, Inc.	2789 E State St Unit 105	Salem	OH	444609327	8888500455	495399	562920
Academy Metals Llc	35984 Lakeland Blvd	Willoughby	OH	44095	(440) 269-8750	509313	42393019
Ace Iron & Metal	2515 Groveport Rd.	Columbus	OH	43207	(614) 443-5196	495399	562920
Adams & Brown Counties Economic Opportunities, Inc.	9262 Mount Orab Pike	Georgetown	OH	451219311	9373783431	495399	562920
Adams County Waste&Recycling	95 Trefz Road	West Union	OH	45693	(937) 378-3431		
Advance Iron And Metal Co.	7007 Quincy Ave.	Cleveland	OH	44104	(216) 432-1160		
Advanced Disposal	12255 Southfield Fwy	Detroit	MI	48228	(313) 635-5212 (313) 493-8945	509312	42393017
Advanced Drainage Systems	401 Olive St	Findlay	OH				
Advanced Plastic Recycling	55 N Garfield St	Minster	OH	458651123	4196288034	495399	562920
Aetna Metal Recycling	8300 Aetna Rd	Cleveland	OH	44105	(216) 441-7025	509313	
Affordable Bike Recyclery	10001 Lorain Ave	Cleveland	OH	44111	(216) 334-2453	509312	42393017
Agmet Metals	7800 Medusa Rd	Bedford	OH	44146	(440) 439-7400	509312	42393017
Ahlstrom West Carrollton Llc	1 S Elm St	Dayton	OH	45449	9378593621	262102	322121
Ahstabula Recycling	1718 Lake Ave	Ashtabula	OH	44004	(440) 964-0388	509342	42393041
Air Gas Great Lakes	2020 Train Ave.	Cleveland	OH	44113	216-241-1696		
Aj Cores Llc	7130 Orangeville Kinsman Road	Kinsman	OH	44428	(330) 876-0229		
Alexander Mill Services, Inc.	897 Perry Hwy	Harmony	PA	160379423		509302	423930
Aliquippa Recycling	12 Woodlawn Rd	Aliquippa	PA	15001	(724) 378-3734	509313	42393019
All Aluminum	17245 Mount Elliott St	Detroit	MI	482121339	3138912096	509302	423930
All American Recycling Co	441 E 21St St	Lorain	OH	44052	(440) 245-3055	509312	
All City Recycling	17149 Saint Clair Ave	Cleveland	OH	44110	(216) 481-5575	509313	42393019
All Metal Recycling	471 Railroad St	Rochester	PA	15074	(724) 774-2073	509312	42393017
All Ohio Secure Shred (aka Ohio Secure Shred)	3842 Congress Parkway	Richfield	OH	44286	(216) 332-9850		
All Scrap Salvage Co Inc	3550 W 140Th St	Cleveland	OH	44111	(216) 941-7100	509313	
Allegheny Raw Material Llc	206 Bilmar Dr Fl 2	Pittsburgh	PA	152054601	4124244415	509302	423930
Allen Alloys	8693 State Route 14	Streetsboro	OH	44241	(330) 422-1814	509313	42393019
Allen County Recyclers Inc	541 S Central Ave	Lima	OH	458041305	4192235010	509302	423930
Alliance National	3911 Ben Hur Ave	Willoughby	OH	44094	(440) 946-7478	509313	
Alliance Recycling Ctr	15969 River St Ne	Alliance	OH	44601	(330) 821-8057	509312	42393017
Allied Erecting And Dismantling Co., Inc.	2100 Poland Avenue	Youngstown	OH	44502			
Alloy Exchange	300 Rockford Park Dr NE	Rockford	MI				
Alloy Exchange	300 Rockford Park Dr NE	Rockford	MI	49341			
Alpha Waste Services Llc	5001 Vulcan Ave	Columbus	OH	432289573	6148599394	495399	562920
Alumagraphics, Inc.	214 Parkway View Dr	Pittsburgh	PA	152051404	4127877594	267904	322299
Aluminum Cans For Burned Children	3100 East 45th St., Suite 214	Cleveland	OH	44127	216-883-6633		
Aluminum Shredding Sales LLC	29500 Aurora Rd Ste 15	Solon		44139			
American Automotive Scrap & Salvage Recycling Llc	318 East Main St.	Newark	OH	43058	(740) 408-1013		
American Autorecyclers Llc	6259 Rt7	Andover	OH	44003	(724) 982-9715		
American Car Crushing	1390 Sugar Grove Road	Lancaster	OH	43130	(740) 653-6030		
American Car Crushing	391 Gravel Bank Road	Marietta	OH	45750	(740) 373-6002		
American Car Crushing 2	875 Eastern Ave.	Chillicothe	OH	45601	(740) 775-5400		
American Iron-Metal Cleveland	1240 Marquette St	Cleveland	OH	44114	(216) 266-0509	509312	42393017
American Metal Recycling	13170 York Road	Cleveland	OH	44133	(440) 237-1500		
American Paper Converting Llc	6142 American Rd	Toledo	OH	436123902		267999	322299
American Recycling Co Ltd	13932 Oak Brook Dr	North Royalton		44133			56221
American Recycling Svc Of Oh	803 S Mahoning Ave	Alliance	OH	44601	(330) 680-4121	509312	42393017
American Scrap Mart	3335 W 65Th St	Cleveland	OH	44102	(216) 281-0000	509313	
American Seas Inc	4100 Bennett Rd	Toledo	OH	436121991		495399	562920
American Turf Recycling Llc	3705 Alesia Kae Dr	Brunswick	OH	44212		509312	
Ameriwaste Environmental Services	6111 Carey Drive	Valley View		44125	(800)343-2179		432930
Ampac Plastics, Llc	12025 Tricon Rd	Cincinnati	OH	452461792	5136711777	262108	322121
Amsden Salvage & Wrecking	7793 W Twp Rd 34	Amsden	OH	44830	(230) 567-0366		
Amware Recycling	19801 Holland Rd.	Brook Park	OH	44142-1339	440-234-4081		
Appvion Inc.	1030 W Alex Bell Rd	West Carrollton	OH	454491923	9378598262	262100	322121
Ardleigh Minerals Inc	24100 Chagrin Blvd # 380	Cleveland	OH	44122	(216) 464-2300	509323	42393016
Arlington Heights Recycling	400 Station Ave	Cincinnati	OH	452155437	5137619000	495399	562920
Ars Recycling Systems	4000 Mccartney Rd	Lowellville	OH	44436	(330) 536-8210	495311	56292001
Ashland County Recycling Center	1270 Middle Rowsburg Road	Ashland	OH	44805	(419) 289-7382	509312	42393017
Ashley'S Fur Root & Recycling Llc	119 Commercial St	Mineralwells	WV	26150	3044892338	495399	562920
Ashleys Recycling	404 Fort Harmar	Marletta	OH	45750	(304) 489-2338		
Ashtabula Recycling Corp	25121 Chardon Rd	Richmond Heights	OH	44143	(216) 531-3492		56221
Asphalt Recycling Systems, Llc	20360 Tower Dr Ste 1	Brecksville	OH	44141		495399	562920
Associated Paper Stock Inc	11510 South Ave	North Lima	OH	44452	(330) 549-5311	509312	42393017
Atlantic Metals 2	100 Kragel Road	Richmond	OH	43944	(301) 424-3000		
Autobusters Inc	2838 Compton Rd	Cincinnati	OH	452512634		509302	423930
Automatic Recycling, Inc.	2 Industrial Park Rd	Benwood	WV	260311236	3042325175	509302	423930
A-Z Recycling, Inc.	1465 E 17Th Ave	Columbus	OH	43219	(614) 298-8587		
B & B Auto Recycling Llc	245 4Th St.	Portsmouth	OH	45662	(740) 353-4589		
B & B Paper Converters, Inc.	12500 Elmwood Ave Frnt	Cleveland	OH	44115987	2169418100	262107	322122
B & B Plastics Recyclers, Inc.	3300 Lockbourne Rd	Columbus	OH	432073917	6144092880	495399	562920
B & B Wrecking & Excavating	4510 E 71st St	Cleveland		44105	(216) 429-1700		
B&G Auto & Recycling Center, Inc.	17437 National Rd.	Wapakoneta	OH	45895	(419) 645-4464		

Appendix F
Unverified Potential Processors and End Users

B&R Salvage&Wrecking	2352 Anderson Ave. N.E	Minerva	OH	44657	(330) 862-3473		
B-2 Auto Crushers	659 N Park Ave	Alliance	OH	44601	(330) 823-4488	509312	42393017
Bagley Road Recycling Center	711 Bagley Road Unit 6	Berea	OH	44017	(440) 840-8600		
Ball Auto & Scrap	9536 Brooks Rd	Hartstown	PA	16131	(814) 382-3103	509313	
Ball Corporation	2121 Warner Rd Se	Canton	OH	447072273	3302442800	263100	322130
Barker'S Recycling	4024 Bobo Road	Beaver	OH	45613	(740) 226-5865		
Basic Metals	31 Mary St	Mount Clemens	MI	48043	(586) 465-8000	509312	42393017
Bates Recycling Inc	12729 Jerry City Rd	Cygnat	OH	43413	(419) 655-2220		
Battery Empire	13049 Triskett Rd	Cleveland	OH	44111	(216) 252-4666		432930
Battery Solutions, Llc	4930 Holtz Dr	Wixom	MI	483932094	2484463001	495399	562920
Bay Alloys Inc	560 Dover Center Rd	Bay Village	OH	44140	(440) 871-5720		
Bay Metal Inc	4100 Congress Pkwy W	Richfield	OH	44286	(330) 659-0900	509342	42393041
BBN Oil Recycling Inc	6442 Metro Ct	Bedford Heights	OH	44146	(440) 786-1888		432930
Bedford Metal Recycling	144 Northfield Rd	Bedford	OH	44146	(440) 439-8044	509312	42393017
Ben Weitsman Of New Castle	526 S Jefferson St	New Castle	PA	16101	(724) 652-6138	509312	42393017
Bennett Recycling	950 Delaware Street	Washington Court House	OH	43160			
Berger's Scrap Metal	23659 Broadway Ave	Bedford	OH	44146	(440) 232-3177		
Berresford Brokerage	13022 Pearl Rd	Strongsville	OH	44136	(440) 572-1595		
BigDumpster.com	7415 Bessemer Ave	Cleveland	OH	44127	(440)519-9200		432930
Bills Auto Salvage	25 Pierce St	Marietta	OH	45750	(740) 373-5254		
Bindery Parts	9070 Norwalk Rd	Litchfield	OH	44253	(330) 722-3747	262105	32212104
Bischof Enterprises Inc		Cleveland	OH		(440) 238-6035		432930
Blue Ocean Plastics, Llc	5500 Walworth Ave	Cleveland	OH				
Blue Ridge Paper Products Inc.	7920 Mapleway Dr	Olmsted Falls	OH	441381626	4402357200	262199	322121
Blue Star Alloys Llc	6739 Cypress # 200	Romulus	MI	48174	(734) 272-4540	509312	42393017
Bluegrass Recycling Inc	1575 Distribution Dr	Burlington	KY	410057300	8592839560	495399	562920
Boggs Recycling Inc	12355 Kinsman Rd # J	Newbury	OH	44065	(440) 564-1161	509312	42393017
Boneyard Recycling	1511 Elm St	Toledo	OH	43608	(419) 243-8778	509312	42393017
Bowman Recycling, Inc.					(234) 207-3414		
Boyas Excavating, Inc.	11311 Rockside Rd.	Valley View	OH	44125	216-524-3620		
Bpi Recycling	1100 N Johnson Rd	Lodi	OH				
Bradish Glass Inc	444 Willow Crossing Rd	Greensburg	PA	15601	7248375100	495399	562920
Brassco LLC	27101 Tungsten Rd	Euclid	OH	44132	(216) 731-1970		
Brightmark	3240 W 800 S	Ashley	IN	46705			
Broadway Iron & Metal Inc.	300 S. Mahoning Ave.	Alliance	OH	44601	(330) 821-8752		
Broadway Scrap Metals	8202 Broadway Ave	Cleveland	OH	44105	(216) 341-8400	509313	
Broken Wheel Auto Parts & Wrecking	4343 W 130th St	Cleveland	OH	44135	(216) 941-4488		
Brookman Auto Parts, Inc.	4 Race St	Washington	PA	153015345	7242224260	495399	562920
Browning-Ferris Industries, Llc	79A Noblestown Rd	Carnegie	PA	151061655	4124292600	495399	562920
Bt Auto Crushing Llc	2401 Blain Hwy	Waverly	OH	45690	(740) 663-2568		
Buckeye Industries	33851 Curtis Blvd., Suite 207	Eastlake	OH	44095	440-942-1605		
Buckeye Metal	3961 Pearl Rd	Cleveland	OH	44109	(216) 351-8494	509312	42393017
Buckeye Paper Co., Inc.	5233 Southway St Sw # 523	Canton	OH	447061943	3304775925	267999	322299
Buckeye Recycling	3483 E Fulton St	Columbus	OH	43227	(614) 235-4886		
Buckeye Waste Industries Inc	1350 Kelly Ave # 3	Akron	OH	44306	(330) 645-9900	509313	42393019
Buckeye Woodland Auto Wrecking	8322 Woodland Ave	Cleveland	OH	44104	(216) 421-2500		
Bulldog Battery	37645 Vine St	Willoughby	OH				
Burns Iron & Metal Co. Inc.	911 N. Front St.	Fremont	OH	43420	(419) 332-2653		
Burrows Paper Corp	101 Commerce Dr	Mount Vernon	OH	43050	(740) 397-2555	261101	32213003
Buschman Corp	4100 Payne Ave # 1	Cleveland	OH	44103	(216) 431-6633	261101	32213003
Butternut Auto & Recycling, Co.	40346 Butternut Ridge Road	Elyria	OH	44035	(440) 458-5220		
Byer Steel Recycling, Inc.	200 W North Bend Rd	Cincinnati	OH	452161728	5139480300	495399	562920
C & D Recycling Inc.	7960 Batavia Rd	Cincinnati	OH	452442518		495399	562920
C&B Rubbish And Recycling Inc	8784 Snow Road	Windham	OH	44288	(330) 326-2800	509313	42393019
C4 Polymers	16625 WREN RD.	CHAGRIN FALLS		44023			
Cabmat	440 Gentry Dr	Aurora	OH	44202	(330) 995-0010	509312	42393017
Cadence Environmental Energy Inc	15400 Pearl Rd Ste 242	Strongsville	OH	44136	(440) 846-1000		56221
Cambridge Iron & Metal	4524 Glenn Hwy	Cambridge	OH	43725	(740) 439-5524	509314	42393020
Camco Recycling Inc	100 Fair St	Dillonvale	OH	43917	7407692366	509302	423930
Campbell Technological Resources, Inc.	220 Lincoln Ave.	Crestline	OH	44827			
Cane Goods Marketing Llc	8209 Station House Rd	Dayton	OH	454582933	9373056968	262100	322121
Canon Mac Metals, Inc.	116 Hoover Ln	Canonsburg	PA	153173326		509302	423930
Capital Waste, Inc.	14390 Wyoming St	Detroit	MI	482382351	3133502825	495399	562920
Capitol Waste & Recycling Services, Llc	321 Dering Ave	Columbus	OH	432072955	6144459900	495399	562920
Caraustar Industries	4031 Spartan Dr	Oregon	OH	43616	(419) 690-0524	267901	32229909
Caraustar Industries	460 Knox Ct	Minerva	OH	44657	(330) 868-4111	267901	32229909
Caraustar Industries	7960 Lorain Ave	Cleveland	OH	44102	(216) 281-7000	267901	32229909
Caraustar Industries, Inc.	3024 Charter St	Columbus	OH	432284606	6145295535	263100	322130
Caraustar Industries, Inc.	310 W Water St	Baltimore	OH	431051276	7408624167	263100	322130
Caraustar Industries, Inc.	5500 Wooster Pike	Cincinnati	OH	452262227	5138717112	263100	322130
Caraustar Industries, Inc.	7777 Saint Clair Ave	Mentor	OH	440605237		263103	322130
Caraustar Industries, Inc.	202 Montrose West Ave # 315	Copley	OH	443212923	3306657700	267999	322299
Caraustar Industries, Inc.	2601 E River Rd	Moraine	OH	454391533	9372989969	495399	562920
Caraustar Recycling	3400 Vega Ave.	Cleveland	OH	44113	216-961-5060		
Carbon Plate Steel Products	4250 E 68Th St	Cleveland	OH	44105	(216) 641-2218	509313	
Carleton Iron & Metals	116 Pine	Carleton	MI	48117	(734) 654-9100	509313	42393019
Carrolls Truck Wrecking	2064 Nazor Rd	Gallon	OH	44833	(419) 683-2448		
Carson Scrap Metal Co	5706 Force Rd	Shreve	OH	44676	(330) 567-3553	509313	42393019
Center West Plastics LLC	2045 Sperrys Forge Ct	Westlake	OH	44145	(440) 892-0472		
Centor Inc.	1899 N Wilkinson Way	Perrysburg	OH	439511685	5673368094	263103	322130
Central Coated Products Inc	2025 Mccrea St	Alliance	OH	44601	(330) 821-9830	262101	32212103
Central Core, Inc	9450 Newton St.	Minerva	OH	44657	(330) 868-7811	509313	42393019
Central Ohio Metal Exchange	812 Charles St	Gallon	OH	44833	(419) 462-2220	509312	42393017
Central Ohio Recy & Salvage	668 Woodlawn Ave	Bucyrus	OH	44820	(419) 562-0087	509312	42393017
Century Trading Co Inc	1224 West Main St	Van Wert	OH	45891	(419) 238-5232		
Certify Recycle	510 Ohio Blvd	Louisville	OH	44641	(330) 860-6879	509312	42393017
Chemtrom Corp	35850 Schneider Ct	Avon	OH	44011	(440) 937-6348	509323	42393016
Cheney Pulp And Paper Company	1000 Anderson St	Franklin	OH	450052571	9377469991	262100	322121
Chuck'S	1849 Waverly Ave	Youngstown	OH	44509	(330) 799-6204	509312	42393017
Cimino Box & Pallett Company	8500 Clinton Rd.		OH	44144	216-961-7377		
Cindus Corporation	515 Station Ave	Cincinnati	OH	452156899	5139489951	267905	322299
Circleville Scrap Metal Llc	21239 Us Rt 23N	Circleville	OH	43113	(614) 313-0708		
City Barrel & Drum	2881 E 91st St	Cleveland	OH	44104	(216) 464-8696		432930
City Of Akron	146 S High St Ste 209	Akron	OH	443081424	3303752650	495399	562920
City of Lakewood Division of Refuse & Recycling	12920 Berea Rd	Cleveland	OH	44111	(216) 252-4322		56221
City Of Pittsburgh	3001 Railroad St	Pittsburgh	PA	152011507	4122552780	495399	562920
City Recyclers	2525 S Beech Daly St	Dearborn Heights	MI	48125	(313) 908-7780	509312	
City Recycling Inc	1943 Mack Ave	Detroit	MI	48207	(313) 831-3696	509313	42393019
Clean Tech Recycling	500 Dunham St	Dumdee	MI				

Appendix F
Unverified Potential Processors and End Users

Cleveland Bulk Material Transfer LLC	2070 W 3rd St	Newburgh Heights		44105	(216) 344-3911		56221
Cleveland Industrial Recycling	3325 Middle Rd	Ashtabula	OH	44004	(440) 992-3783	509312	42393017
Cleveland Wire-Metal Recycling	5347 Meadow Wood Blvd	Cleveland	OH	44124	(440) 460-0418	509312	42393017
Cim Pallet Recycling, Inc.	4311 Janitrol Rd Ste 150	Columbus	OH	432281389	6142725761	495399	562920
Close The Loop, Inc.	2053 Meridian Pl	Hebron	KY	410489542	8597571115	495399	562920
Cmc Daymark Corporation	12830 S Dixie Hwy	Bowling Green	OH	434029697	4193542591	267904	322299
Cnaincraft Iron & Metals, Llc	4801 Chaincraft Rd	Garfield Heights	OH	44125	(216) 518-1144		
Cohen Cincinnati	4538 Kellogg Ave.	Cincinnati	OH	45226	(513) 422-3696		
Cohen Dayton East	1797 Valley St.	Dayton	OH	45404	(937) 866-0777		
Cohen Dayton West	5940 West Third St.	Dayton	OH	45417	(937) 866-0777		
Cohen Hamilton	105 Black St.	Hamilton	OH	45011	(513) 422-3696		
Cohen Headquarters	1723 Woodlawn Ave.	Middletown	OH	45044	(513) 422-3696		
Cohen Norwood	5038 Beech St.	Norwood	OH	45212	(513) 422-3696		
Cohen Sardinia	1390 Oak Leaf Rd.	Sardinia	OH	45171	(513) 422-3696		
Cohen Sharonville	12175 Reading Rd.	Sharonville	OH	45241	(513) 733-0606		
Cohen Springfield	1075 James St.	Springfield	OH	45503	(937) 325-9289		
Cohen Troy	3655 West St. Rt. 571	Troy	OH	45373	(937) 698-5195		
Cohen Washington Courthouse	1206 South Fayette St.	Washington Court House	OH	43160	(937) 866-0777		
Cohen West Carrollton	5101 Farmersville West Carrollton Rd.	West Carrollton	OH	45342	(937) 470-4533		
Coleman'S Recycling,Llc	595 West Main St	Oak Hill	OH	45656			
Columbia Sales Inc	2233 Warwood Ave	Wheeling	WV	260037155	3042772233	267905	322299
Columbus Auto Shredding Inc	2181 Alum Creek Dr	Columbus	OH	43207	(614) 443-2683		
Commonwealth Computer Recycling Lic	1628 Roseytown Rd Ste 9	Greensburg	PA	156017584	8669252354	495399	562920
Company Wrench-Oakwood Village Branch	525 Golden Oak Pkwy	Bedford		44146	(440) 439-4567		432930
Compass Trading Llc	6706 Grandview Dr	Independence	OH	44131	(216) 520-3299	509313	42393019
Compton Recycling	2551 Compton Rd	Cincinnati	OH	45231	(513) 521-3289		
Conley Paper Packaging	1312 4Th St Se	Canton	OH	44707	(330) 456-8243	262101	
Connolly Recycling Ctr	4119 N Ridge Rd	Perry	OH	44081	(440) 259-8222	509312	42393017
Constellium	4805 E 2nd St	Muscle Shoals	AL	35661			
Container Compliance Corp	5151 Denison Ave	Cleveland	OH	44102	(216) 961-0035	509312	42393017
Container Printing Supply Inc	7400 Hub Pkwy	Valley View	OH	44125	(330) 468-2992	262105	32212104
Cooper Kurtz Recycling Dispose	5335 Strausser St Nw	North Canton	OH	44720	(330) 451-6224	509312	42393017
Cooper Scrap & Salvage	10996 Chillicothe Pike	Jackson	OH	45769	(740) 288-1100		
Coopers	39828 State Route 143	Pomeroy	OH	45640	(740) 742-1100		
Corpad Company, Inc.	555 Park Ave E	Mansfield	OH	449052871	4195227818	263100	322130
Corr Choice Inc	846 3Rd St Nw	Massillon	OH	44647	(330) 833-5705	267903	
Corvus Librilooop	1771 East 30th St.	Cleveland	OH	44114	419-971-6261		
Corvus Recycling LLC	5315 Commerce Pkwy W	Parma		44130	(216) 265-7944		432930
Coshocton Recycling Inc	47359 Cr 496	Coshocton	OH	43812	(740) 622-6276	509312	42393017
Countryside Recycling Service Inc.	1236 Lincoln Ave N.W.	Carrollton	OH	44615	(330) 627-8130	509312	42393017
Crd Metals	120 West Drive	Lodi	OH	44254	(216) 221-7171		
Crispin Auto Wrecking Inc	629 New Haven Ave	Newark	OH	430556428	7403454730	509302	423930
Cronimet Corp	10 Pilarsky Way	Aliquippa	PA	15001	(724) 375-5004	509313	42393019
Crown & Kornell Corp.	3950 Ben Hur Ave	Willoughby	OH				
Crows Run Recycling	320 Crows Run Rd	Freedom	PA	15042	(724) 709-8553	509312	42393017
Cts Packaging, Inc.	1730 Russell St	Covington	KY	410113363	8592915700	263103	322130
Cullison Scrap Metals	10841 Salem Road	Athens	OH	45701	(740) 593-3950		
Cunningham Scrap Metal And Roots	10770 St Rt 550	Vincent	OH	45784	(740) 678-2941		
Cyano Corp	819 Park Ave 819 Park Ave	Detroit	MI	48217		495399	562920
Cyclemet, Inc.	2405 Harrison Rd	Columbus	OH	432043509	6142760202	509302	423930
D & L Recycling Llc	708 Marks Rd # 204	Valley City	OH	44280	(330) 225-7507	509312	42393017
D & R Recyclers Inc	1919 Clark St	Hamilton	OH	450115813	5138965200	495399	562920
D&J Scrap Metals	621 Plumvalley St	Bellefontaine	OH	43311	(937) 599-5208		
D&S Auto Parts	1834 St Rte 125 Suite A	Hampersville	OH	45130	(937) 379-1969		
D. Cohen & Sons Inc	2670 E 37th St	Cleveland		44115	(216) 391-0405		
Da Ming International Metals., Inc	1000 Joyce Ave	Columbus	OH	43219			
Dale Kunkle Farms	25038-S	Fayette	OH	43521			
Dan Foster'S Auto Recycling	735 E Lake St	Ravenna	OH	44266	(330) 296-1050	509312	42393017
Dana Industrial Scrap Corp.	30150 Lakeland Blvd.	Wickliffe	OH	44092	(440) 944-1353		
Daniel Cohen Enterprises, Inc.	152 Stone Creek Dr	Oxford	OH	450569758	5138964547	509302	423930
Daniels & Miller, Inc.	242 N Hamilton Ave	Greensburg	PA	156012115	7248341500	509302	423930
Daniels Metal Company	501 West 2Nd St	Waverly	OH	45690	(606) 928-8033		
Daniels Metal Company	5411 Roush Rd.	Hillsboro	OH	45133	(606) 928-8033		
Danner'S Auto Wrecking	371 County Highway 37	Sycamore	OH	44882	(419) 927-6154	509313	42393019
Darling International	1002 Beltline	Cleveland		44109	(216) 351-3440		432930
Daves Core And Recycling	24 4Th Street Garage	Chauncey	OH	45719			
David Hirschberg Company	211 Longworth St	Cincinnati	OH	452154665	5138210514	509302	423930
David Hirschberg Company	209-229 Longworth St.	Lockland	OH	45215	(513) 821-0514		
David Worshil Inc	1936 Baldwin Ave Ne	Canton	OH	44705	(330) 453-9117		
Davidow Sons Company Inc	357 Bellevue Rd	Pittsburgh	PA	152292118	4127611881	509301	423930
Davidson Converting Inc	1611 Frost Rd	Streetsboro	OH	44241	(330) 626-2118	261101	32213003
Decco Alloys, Inc.	1261 Industrial Parkway N	Brunswick	OH	44212	(330) 273-5445		
Descenzo'S Rubbish Removal	4140 Trent Ave	Cleveland	OH	44109	(216) 631-0022	509312	42393017
Detroit Iron & Metal	8300 Dix St	Detroit	MI	48209	(313) 841-5550	509313	42393019
DHWorldwide, Inc	448 Geiger St.	Berea	OH	44017	440-378-6899		
Dille Road Recycling	1423 Dille Rd	Euclid	OH	44117	(216) 383-9000	509312	42393017
Diproinduca Usa	2528 Medina Rd	Medina	OH	44256	(330) 722-4442	509312	42393017
Diver Steel City	590 Himrod Ave Youngstown	Youngstown	OH	44501	(330) 744-5083	509313	42393019
Diversified Alloy & Metal	1315 Poland Ave	Youngstown	OH	44502	(330) 744-1040	509313	42393019
Diversified Converter Materials, Inc	8650 Seward Rd	Fairfield	OH	450119716	5137711574	267999	322299
Diversified Resources Us Inc	400 Refractories Dr Nw	Warren	OH	444831970	3308470536	495399	562920
Diversipak, Inc.	838 Reedy St	Cincinnati	OH	452022216	5133217884	263103	322130
Dlubak Glass Co	11567 County Highway 110	Upper Sandusky	OH	43351	(419) 294-4466	509312	42393017
Dmmex	27201 Ryan Rd	Warren	MI	48092	(586) 558-9707	509313	42393019
Dominion Nickel Alloys Ltd	17083 Woodmere Dr	Chagrin Falls	OH	44023	(440) 708-0485	509313	42393019
Domtar Inc	3269 Malory Cir Nw	Canton	OH	44708	(870) 898-2711	262101	32212103
Downtown Metals And Recycling	423 W Pershing Street	Salem	OH	44460	(330) 506-0611		
Downtown Paper-Metal Recycling	3511 W Fort St	Detroit	MI	48216	(313) 963-7664	509307	42393031
Dpcrushing	241 Careys Run Rd	West Portsmouth	OH	45663	(740) 858-6437		
Dpourt Recycling	443 Richmond Park W # 310D	Richmond Heights	OH	44143		509312	42393017
Drayton Iron & Metal, Inc.	5229 Williams Lake Rd	Waterford	MI	483293557	2486731269	509302	423930
Drx	975 Taylor Street	Elyria	OH	44035	(440) 315-4606		
DSI Metals	12005 Prospect Rd	Strongsville		44149	(440) 268-9490		
Dte Energy Co	4005 W Fort St	Detroit	MI	48209	(313) 297-2191	509341	42393040
Dundee Automotive Inc	8448 Camp Rd Nw	Dundee	OH	44624	(330) 852-4134	509320	
Duracorp, Llc	7787 Graphics Way	Lewis Center	OH	430358000	7405493336	262108	322121
E B Eddy Paper Inc	1700 Washington Ave	Port Huron	MI	480603462	8109820191	262108	322121
Earthworks System LLC	33200 Bainbridge Rd Ste E	Solon		44139	(440) 349-3434		432930
Eastside Metals	16800 S. Waterloo Rd.	Cleveland	OH	44110	(216) 486-7788	509313	42393019

**Appendix F
Unverified Potential Processors and End Users**

Eco Solutions 2000 Inc	24300 Southfield Rd # 220	Southfield	MI	480752820	2484833170		495399	562920
Edgerton Auto Salvage	06018 U.S. Highway 6	Edgerton	OH	43517				
Edison Automotive	1529 Mckinley Ave	Columbus	OH	43222	(614) 274-1118			
Edward L Verdecchia Co	449 Vermont Ave	Erie	PA	16505	(814) 461-0941		509313	42393019
Ekman Recycling Group	1800 NJ-34	Wall Township	NJ					
Elg Haniel Metals Corp.	369 River Rd	Mckeesport	PA	151323882	4126729200		509302	423930
Elliott'S Scrapping	7090 County Road 11	Risingsun	OH	43457	(419) 457-0101		509313	42393019
Elm Recycling Llc	1242 Mount Vernon Rd	Newark	OH	430553037	7403663340		495399	562920
Empire Recycling Inc	1261 Babbitt Rd	Euclid	OH	44132	(216) 732-9300			
Engtrans & Components, Llc	1440 E 55Th St	Cleveland	OH	441031308			495399	562920
Envirite Of Ohio, Inc.	2050 Central Ave Se	Canton	OH	447073540	3304566238		495399	562920
Environmental Coordination	129 Ash Stop Rd	Evans City	PA	16033	(724) 432-3278		509312	
Environmental Enterprises Inc	4650 Spring Grove Ave	Cincinnati	OH	452321920	5135411823		495399	562920
Environmental Protection Services, Inc.	4 Industrial Park Dr	Wheeling	WV	260036565	3042321590		495399	562920
Environmental Transfer Syst	300 Martin Luther King Blvd Sw	Warren	OH	44485	(330) 395-8333		509312	42393017
Environmental Wood Solutions, Inc.	3500 Giddings Rd	Lake Orion	MI	483591304	2483919446		495399	562920
Envirosolutions, Inc.	1837 River Cities Dr	Ashland	KY	411027847	7033780600		495399	562920
Envision Waste Services LLC	4451 Renaissance Pkwy	WarrensVille Heights	OH	44128	(216) 831-1818			562920
Ernie'S Auto Wrecking	12795 S. Dixie Hwy	Bowling Green	OH	43402	(419) 352-4984		509312	42393017
Essex Trading Company of Ohio LLC	18051 Jefferson Park Ste 101	Middleburg Heights	OH	44130	(440) 891-4105			
E-Town Recycling	10978 Hwy 50	North Bend	OH	45052	(513) 353-1200			
Ettkin Scrap Iron And Metal Co.Inc	161 Stonecreek	Mayfield Heights	OH	44143	(440) 449-0249		509313	42393019
Everclear Of Ohio Ltd.	3700 Oakwood Ave Ste C	Austintown	OH	445153045	3307922120		495399	562920
Everest Manufacturing, Inc	23800 Research Dr	Farmington Hills	MI	483352627	3134012608		267907	322299
Evergreen Environmental Corp	20545 Center Ridge Rd # 122	Rocky River	OH	44116	(440) 331-2100		509313	42393019
Evergreen Plastics Inc	202 Watertower Dr	Clyde	OH	43410	(419) 547-1400		509323	42393016
Evergreen Recycling	6525 Wales Rd	Northwood	OH	43619	(419) 666-2640		509312	42393017
Evolution E-Cycling, Llc	2235 Mary St Ste A	Pittsburgh	PA	152032222	4123903450		495399	562920
Extreme Green Recycling	18460 Syracuse Ave	Cleveland	OH					
Fairfield Core & Recycling Llp	233 Whiley Ave	Lancaster	OH	43130	(740) 277-7907			
Falls Recycling, Llc	1536 1St St Unit A	Newton Falls	OH	444441186	3308720402		495399	562920
Fargo Aluminum	4037 County Road 15	Marengo	OH	43334	(614) 512-5254			
Farrell Scrap Inc	13911 Aspen Oval	Cleveland	OH	44133	(440) 877-0855			
Ferro Corp	7050 Krick Rd	Bedford	OH	44146	(440) 232-9227		516207	42461008
Ferrous Environmental Recycling Corporation	3319 Greenfield Rd	Dearborn	MI	481201212	3135848210		495399	562920
Fex Processing, Llc	2200 Commercial Avenue	Mingo Junction	OH	43953	(740) 535-8148		509314	42393020
Fiber Corr Mills Llc	670 17Th St Nw	Massillon	OH	44647	(330) 837-5151		263102	
Fibercore, Llc	15625 Saranac Rd	Cleveland	OH	441102427	2162492100		495399	562920
Filtafry					440-600-1745			
Fireside Recycling	2412 Tiffin Ave.	Sandusky	OH	44870	(419) 483-2653			
First Street Recycling Inc	1322 East First Street	Dayton	OH	45403	(937) 223-7231			
Fisher And Sons Llc	979 Peters Rd	Fort Recovery	OH	45846	(937) 968-5363			
Fishman J & Son		Highland Park	MI	48203	(313) 866-1085		509313	42393019
Fitzsimmons Metal Co Inc	1654 Butler Plank Rd	Glenshaw	PA	151161730	4124868587		509302	423930
Five Star Metals	41465 Dequindre Rd # 202	Troy	MI	480854057			509302	423930
Flag City Recycling Llc	7654 Co. Rd. 223	Findlay	OH	45840	(419) 427-1110			
Flesher Brother Iron & Metal	1511 Cty. Rd. 74	Mingo Junction	OH	43938	(740) 535-1902		509313	42393019
Fluid Recycling Services Co Llc	37623 Pembroke Ave	Livonia	MI	481521050			495399	562920
Fluorescent Recycling, Inc.	7260 Neville Ave.	Cleveland	OH	44105	216-341-1500			
For Nature Sake Recycling	12257 Rd. 9-K	Ottawa	OH	45875	(419) 523-4707			
Forest Island Recycling Inc.	3300 Denton St	Hamtramck	MI	48211	3138715000		509302	423930
Four Wheels Junkyard and Company	1160 E 134th St	Cleveland	OH	44110	(216) 539-1733			
Fpt Canton	1514 Maple Ave Ne	Canton	OH	44705	(330) 456-9649		509314	42393020
Fpt-Pontiac Division, L.L.C.	500 Collier Rd	Auburn Hills	MI	483261410	2483358141		509302	423930
Franklin Iron & Metal Corp.	1939 E 1St St	Dayton	OH	454031131	9372538184		509302	423930
Franklin Recycling	338 Grant St	Franklin	PA	16323	(814) 437-4100		509312	42393017
Freedman David Inc	893 S Dix St	Detroit	MI	48217	(313) 842-8800		509313	42393019
Freedom Conway Recycling Llc	2001 Crows Run Rd	Conway	PA	15027	(724) 775-1460		509312	42393017
Friction Metals Llc	320 London Rd.	Delaware	OH	43015	(740) 225-5116		495399	562920
Fritz Enterprises Inc	23550 Pennsylvania Rd	Taylor	MI	48180	(734) 283-7272		509313	42393019
Frontier Fibers, Inc.	30700 Edison Dr	Roseville	MI	480661554	7166360802		509301	423930
Ftc Metals Inc	8825 Kings Orchard Trl B	Chagrin Falls	OH	440235610	4405509545		509302	423930
Ftp Massillon Llc	741 3Rd St Nw	Massillon	OH	44647	(330) 830-8600		509313	
Full Cycle Organics								
Funk Sac Llc	19120 Old Detroit Rd # 9	Rocky River	OH	44116			509312	42393017
G I R Of Huron	36543 S Huron Rd	New Boston	MI	48164	(734) 753-9183		509312	42393017
G&M Pallet & Skid Company	4201 Lakeside Ave	Cleveland	OH	44114	(216) 881-1414			423930
Gage Products Co	821 Wanda St	Ferdale	MI	48220	(248) 541-3824		509312	42393017
Gale'S Recycle It	354 Florence Ave	Dover	OH	44622	(330) 343-1555		509313	42393019
Galloway Bros., Inc	2717 Old Railroad	Sandusky	OH	44870	(419) 626-8492		509313	42393019
Garden Street Iron & Metal	2885 Spring Grove Avenue	Cincinnati	OH	45225	(513) 721-4660			
Garden Street Iron & Metal, Inc	7500 New Haven Road	Harrison	OH	45030	(513) 738-2678			
Gateway Recycling	4223 E 49Th St	Cleveland	OH	44125	(216) 341-9082		509312	42393017
G-Cor Automotive Corp.	2100 Refugee Rd	Columbus	OH	43207	(614) 443-6735			
Gemini Fiber Corp	11145 Industrial Pkwy Nw	Bolivar	OH	44612	(330) 874-4131		262101	32212103
General Data Company, Inc.	4354 Ferguson Dr	Cincinnati	OH	452451667	5137527978		267904	322299
General Environmental Management Llc	16533 Chillicothe Rd	Chagrin Falls	OH	440234335			495399	562920
General Mill Supply Company	50690 General Mill Dr	Wixom	MI	483932085	2486680800		509302	423930
General Recycling Of Ohio Llc	400 Bartram Avenue	Marion	OH	43302	(740) 383-4011			
Genesis Concepts Unlimited, LLC	1330 N Main St # 1	Orrville	OH	44667	(330) 682-5600			
Geo Source	1631 East Ave	Erie	PA	16503	(814) 451-0847		509312	42393017
Georgia-Pacific Llc	3265 Gilchrist Rd	Mogadore	OH	442601247	3307944444		262100	322121
Gfl Environmental Real Property Inc	26999 Central Park Blvd # 200	Southfield	MI	480764174	8888774996		261103	322110
Gibraltar Recycling	15701 Vreeland Rd	Trenton	MI	48183	(734) 672-6210		509312	42393017
Gibson Iron+Metal	6664 Sprout St.	Ravenna	OH	44366	(330) 297-1771			
Gibson Machinery LLC	181 Oak Leaf Oval	Oakwood	OH	44146	(440) 439-4000			423930
Girard Recycling	426 Hartzell Ave	Girard	OH	44420	(330) 545-5191		509312	42393017
Glass Recyclers	6465 Wyoming St	Dearborn	MI	48126	(313) 584-3434		509312	42393017
Gle Scrap Metal	22200 Sherwood Ave	Warren	MI	48091	(586) 754-7300		509313	42393019
Glg Industries, Llc	1045 Crescent Street	Youngstown	OH	44502	(330) 480-9810			
Global Metal Recycling	23349 Dequindre Rd	Hazel Park	MI	48030	(248) 978-8045		509312	42393017
Global Resources And Provisions Corp.	9709 Reading Rd Ste 1	Cincinnati	OH	452153515	5132472270		509302	423930
Global Transport Salvage-Rcvry	15001 Livernois Ave	Detroit	MI	48238	(734) 334-3406		509320	42393018
Glr Solutions, Inc.	40680 Garfield Rd Ste 1A	Clinton Township	MI	480384016	5867897696		495399	562920
Go Green America Recycling Llc	204 Ivy St	Weirton	WV	26062	(740) 535-2071		509312	42393017
Go Green PC	4548 Renaissance Pkwy	WarrensVille Heights	OH	44128	(216) 591-1671			423930
Goebel Wrecking Co.	18414 State St. 34	Bryan	OH	43506	(419) 636-7111			
Golden Recyclers	3043 Bourke St	Detroit	MI	48238	(313) 635-2896		509312	
Goodwill'S Green Works Inc	6421 Lynch Rd	Detroit	MI	48234	(313) 499-3100		509312	42393017

Appendix F
Unverified Potential Processors and End Users

Gps Metals, Inc.	301 Wide Dr	Mckeessport	PA	151351019	4127510500		509302	423930
Graphic Packaging International, Llc	6385 Cochran Rd	Solon	OH	441393961	4402484370		263103	322130
Graphic Paper	1111 N Main St	Mansfield	OH	449039718	4195264123		267999	322299
Grasan Equipment Company, Inc.	440 S Illinois Ave	Mansfield	OH	449071809	4195264440		495399	562920
Great Lakes Advanced Recycling	30615 Groesbeck Hwy	Roseville	MI	480666	(810) 779-1310		509312	42393017
Great Lakes Auto Recycling	4990 Lane Rd	Perry	OH	44081	(440) 259-3368		509312	42393017
Greco Steel Products, Inc.	1024 Keene St	Springdale	PA	151441715	7242744844		509302	423930
Green Earth Recycling Llc	2932 Brice Rd.	Brice	OH	43109	(866) 717-7222			
Green Innovations Llc	5755 Granger Rd # 435	Cleveland	OH	44131	(216) 341-4000		509312	42393017
Green Light Pallet & Recycling Llc	13563 Reitz Rd	Perrysburg	OH	435518901	4194429624		495399	562920
Green Line Polymers		Findlay	OH					
Green Living Sciences	1331 Holden St	Detroit	MI	48202	(313) 744-2294		495311	56292001
Green Vision Materials, Inc.	11220 Kinsman Rd	Newbury	OH	440659676	4405645500		495399	562920
Greenlight Pallet & Recycling Llc	1769 E Broadway St	Northwood	OH	436053818	4199440800		495399	562920
Greenstar	1535 Exeter Rd	Akron	OH	44306	(330) 784-1167		509312	42393017
Greenville Recycling	192 S Mercer St	Greenville	PA	16125	(724) 373-8176		509312	42393017
Gregory's Recycling	524 1/2 Second Street	Greenfield	OH	45123	(937) 509-3189			
Greif Inc	777 3Rd St Nw	Massillon	OH	44647	(330) 833-2884		267903	322299
Greif Paper, Packaging & Services Llc	425 Winter Rd	Delaware	OH	430158903	7405496000		263100	322130
Grove Recycling Services, Inc.	12860 Evergreen Rd	Detroit	MI	482233439	3132725335		495399	562920
Grubbs Auto Wrecking	1279 Route 18	Burgettstown	PA	15021	(724) 947-4821		509313	42393019
Grunts, Llc	4 E Waterloo St	Canal Winchester	OH	431101138	6149494753		495399	562920
Guernsey Scrap Recycling, Inc.	130 Peters Ave.	Byesville	OH	43723	(740) 732-4807			
Guernsey Scrap Recycling, Inc.	28087 State Route 7	Marietta	OH	45750	(740) 732-4807			
Guernsey Scrap Recycling, Inc.	45198 Cornstalk Rd.	Caldwell	OH	43724	(740) 732-4807			
H & H Metals Co.	29131 Michigan Ave	Inkster	MI	481412046	7347288050		495399	562920
H&G Enterprises Llc	1191 James River Tpke	Milton	WV	255419650	3043905746		495399	562920
Haggerty Metal Company	14015 N Haggerty Rd	Plymouth	MI	481704214	7344590960		495399	562920
Hamilton Scrap Processors, Inc	134 Hensel Pl	Hamilton	OH	450111508	5138633474		509301	423930
Hamtramck Recycling Llc	3333 Hamtramck Dr	Hamtramck	MI	48211	(313) 871-5000		509312	42393017
Hana's Beauty Supply	4992 Turney Rd	Garfield Heights	OH	44125	(216) 883-6000		509312	42393017
Hanna Paper Recycling (Midwest), Inc	4287 Dues Dr	West Chester	OH	452461001	5132000269		495399	562920
Happy Endings Recycling	221 Goodell St	River Rouge	MI	48218	(313) 427-8905		509312	42393017
Harper Direct Llc	5100 Schenley Pl	Greendale	IN	470252181	2142455026		262107	322121
Harrington Electric Co	3800 Perkins Ave	Cleveland		44114	(216) 361-5101			
Harris Paper Crafts Inc	266 E 5Th Ave	Columbus	OH	432012818	6142992141		267999	322299
Harry Masser Company Inc	3103 Lamb Ave	Columbus	OH	432192374	6144713195		509302	423930
Harry's Metals	888 Hazel St	Akron	OH	44305	(330) 762-7300		509313	42393019
Harsco Metals Bri Llc	1300 Braddock Ave	Braddock	PA	151041743	4123515420		495399	562920
Harvard Road Transfer Station	3227 Harvard Ave	Newburgh Heights		44105	(216) 429-2229			56221
Harvey'S Towing	10923 Us 19 #19	Waterford	PA	16441	(814) 873-0399		509313	42393019
Hawk'S Scrap	875 Dearborn Storage Yard	Toledo	OH	43608	(419) 297-6133		509313	42393019
Hayslip'S Recycling	171 South Mulbury St	Wilmington	OH	45177	(937) 403-3735			
Hazel Street Recycling	963 Hazel St	Akron	OH	44305	(330) 258-2040		509313	42393019
Hcc Corporation, Llc	201 Lindsay Rd	Zelienople	PA	160638917	7244530623		495399	562920
Hebron Scrap Metal Recycling	106 Burch St.	Hebron	OH	43025	(740) 452-9351		495399	562920
Hegemier Enterprises Inc	402 N Water St	Wapakoneta	OH	458951656	4197382003		495399	562920
Heritage-Crystal Clean, LLC	601 Towpath Trl	Cleveland		44147				
Herman Strauss, Inc.	1 35Th And Mcculloch Sts	Weirton	WV	26062	3047480699		495399	562920
Hermiz & Sons	26440 Bunert Rd	Warren	MI	48089	(586) 445-3300		509320	
Hess Brothers Scrap Metal	556 S. Columbus St.	Lancaster	OH	43130	(740) 654-3685			
Highland Supply, Inc	294 W Wardlow Rd	Highland	MI	483573843	2487148355		263103	322130
Hillsboro Scrap & Metal Inc	4501 Us Highway	Hillsboro	OH	45133	(937) 364-3200			
Hi-Way 101 Auto Parts	63 North State Route 101	Tiffin	OH	44883	(419) 447-7041			
Hmf Recycling Facility Llc	38000 Industrial Park	Lisbon	OH	44432	(330) 424-0720		509312	42393017
Hmi Inc.	1725 Hunters Path Ln	Pittsburgh	PA	152413154			509302	423930
Hollo'S Papercraft	1878 Pearl Rd	Brunswick	OH	44212	(330) 225-0911		267998	32229903
Holub Recycling, Inc.	470 N.Arlington St.	Akron	OH	44305	(330) 252-5655			
Homan Oil Co	10216 Adelaida Ave	Cleveland		44111	(216) 631-0477			423930
Honest Scales Llc	15535 Burton Windsor Rd.	Middlefield	OH	44062	(440) 632-3083		509312	
Horwitz & Pintis Co.	1604 Tracy St	Toledo	OH					
Howard'S Salvage Yard	13326 Cynthia Rd	Hillsboro	OH	45133				
Howland-Trumbull Recycling Ctr	3590 N River Rd Ne	Warren	OH	44484	(330) 856-7330		509312	42393017
Hox Recycling Inc	4510 Township Road 307	Millersburg	OH	44654	(330) 674-6868		509312	42393017
Hpj Industries, Inc.	118 N Main St	Bowling Green	OH	434022418	4192781000		495399	562920
Hukill Environmental Serv ices	7013 Krick Rd	Cleveland		44146				
Huron Reclamation Inc	28100 Bredow Ave	Romulus	MI	48174	(734) 783-1590		509312	
Huron Valley Steel Corporation	1650 W Jefferson Ave	Trenton	MI	481832136	7344793500		509302	423930
I H Schlezinger	2040 Parsons Avenue	Columbus	OH	43207	(614) 252-1188			
I. Schuman Co.	22500 Alexander Rd.	Bedford	OH	44146	440-439-2300			
Ibc North America, Inc.	4545 Clawson Tank Dr	Clarkston	MI	483462581	2486258700		263103	322130
ICAN Plastics	33200 Bainbridge Road	Cleveland		44139				
Idm Llc	143 Boardman Canfield Rd	Youngstown	OH	44512	(330) 757-1210		495311	56292001
Ifco	3685 Alum Creek Dr	Columbus						
Ill Sons Towing Hauling & Salvage Llc	9350 Hoenie Rd	Celina	OH	45822	(419) 363-2277			
Imco Recycling Of Oh Inc	731 Newport Ave	Uhrichsville	OH	44683	(740) 922-2373		509312	42393017
Ims Electronics Recycling, Inc.	1635 Watkins Rd	Columbus	OH	432073323	7707764210		495399	562920
Independence Excavating	5720 Schaaf Rd	Independence		44131	(216)524-1700			423930
Infinity Recycling Llc	44057 N Groesbeck Hwy	Clinton Township	MI	480361123	2489392563		261103	322110
Infoshred.Net	23800 Corbin Dr	Cleveland		44128	(216) 663-8910			
Inline Label Company	4720 Emerald Way	Middletown	OH	450448962	5132175662		267904	322299
Innovative Recycling	352 South St	Galion	OH	44833	(419) 468-2988		509312	42393017
Innovative Recycling	725 W. Main St.	Crestline	OH	44827	(419) 683-2988			
In-Plas Recycling Inc.	4211 Crawford Ave	Cincinnati	OH	452231838	5135419800		495399	562920
Integrated Recycling Indstrs	449 Spruce St	Wyandotte	MI	48192			509312	42393017
Integrity Metals	355 Lake Rd	Medina	OH	44256	(330) 721-1992		509312	42393017
Inteq Corp	35800 Glen Dr	Willoughby	OH	440952263	4409530550		495399	562920
Intercity Auto Wrecking	7140 Northfield Rd	Walton Hills		44146	(216) 706-9905			
Interface Carpet		Cleveland	OH		440-725-2240			
Intergroup International LTD.	1111 East 200th St.	Euclid	OH	44117	216-862-9289			
International Paper	1241 W 2nd St	Maysville	KY	41056				
International Paper Co	29088 Solon Rd	Solon	OH	44139	(440) 519-1461		262101	32212103
Interstate Paper Supply Company, Inc.	103 Good St	Roscoe	PA	15477	7249382218		267999	322299
Inter-State Recycling Inc Wrhs	1134 Branchton Rd	West Sunbury	PA	16061	(724) 794-4460		509312	42393019
Interstate Shredding, Llc	27 Furnace Lane	Girard	OH	44420	(330) 545-5477		509313	42393019
Ipmc Acquisition Llc	9125 W Jefferson Ave	Detroit	MI	482092659			262100	322121
Iron Mountain	1275 East 40th St.	Cleveland	OH	44114	800-899-4766			
Ivan Young	476 Piper Rd	Mansfield	OH	449051323	3308141267		495399	562920
J & L Metals	2000 Old Butler Rd	New Castle	PA	16101	(724) 654-9669		509313	42393019

Appendix F
Unverified Potential Processors and End Users

J & R Recycling Inc	28599 S Woodland Rd	Pepper Pike		44124	(216) 595-9531			562920
J.C. Recycling	7403 Broadview Rd	Seven Hills		44131	(216) 682-5248			562920
Jack M. Levine & Sons, Inc.	3360 E. 79th St.	Cleveland	OH	44127	(216) 641-3485			
Jackson Recycling	5717 Wales Ave Nw	Massillon	OH	44646	(330) 833-7365	509312		42393017
Janjos Enterprises Llc	6587 State Route 104	Mcdermott	OH	45652	(740) 981-9299			
Jasar Recycling Inc	183 Edgeworth Ave	East Palestine	OH	44413	(330) 426-2538	509312		42393017
Jbi Scrap Recycling	2925 E 55Th St	Cleveland	OH	44127	(216) 441-1770			509312
Jcomp Recycling Inc	1000 Addison Rd	Cleveland	OH	44103	(216) 417-3490			509312
Jee Foods	3371 Hamilton Cleves Rd	Hamilton	OH	450139535	5139171712	495399		562920
Jefferson Belmont Regional	228 Technology Way	Wintersville	OH	43952	(740) 283-8614			509312
Jefferson Recycling	941 State Route 46 S	Jefferson	OH	44047	(440) 576-0107			509312
Jkt, Inc.	641 Griswold St. Ne	Warren	OH	44483	(330) 373-1391			509313
Jmj Paper Inc.	681 Moore Rd Ste D	Avon Lake	OH	440122365	2169418100			262108
John Wray Company	250 E Main St	Monongahela	PA	15063	7242587400			509302
John's Used Auto Parts & Wrecking	10012 Meech Ave	Cleveland	OH	44105	(216) 271-8555			423930
Jolicor Manufacturing Services, Inc	13357 W Star Dr	Shelby Township	MI	483152701	5863235090	495399		562920
Jones Brothers Salvage L.L.C.	6851 Harrison Ave. Cincinnati, Oh. 45247	Cincinnati	OH	45247	(513) 598-6406			
Jose & Sons Recycling, Inc	1016 S. Central Ave	Lima	OH	45805	(419) 979-7640			
Joseph J Brunner Inc	211 Brunner Rd	Zelienople	PA	16063	(724) 775-6665			509312
Joseph Krash Metal Company LLC	25600 Solon Rd	Bedford Heights	OH	44146	(440) 735-5555			
Josh Steel Co	46 6Th St	Braddock	PA	151041997	4123513500			509302
jp Industrial Products Inc	37844 State Route 518	Lisbon	OH	44432	(330) 424-3388			509328
Jt's Recycling Ltd	2322 State Rd	Ashtabula	OH	44004	(440) 993-0020			509312
Junior's Core And Recycling Llc	7015 State Route 7	Kinsman	OH	44428	(330) 876-2673	495399		562920
Just Junk It	13141 National Rd S W	Etna	OH	43068	(740) 927-5384			
K & H Cores	1056 Pebble Rd Se	Carrollton	OH	44615	(330) 627-2670			509312
K Scrap Resources Ltd	110 Hill St	Detroit	MI	48203	(313) 962-0221			509313
Keep It Green Recycling	2133 Wyandotte Ave	Lakewood	OH	44107	(216) 267-7790			
Keiffer Auto Recyclers	5560 Keiffer Ave Sw	Canton	OH	44706	(330) 484-3100	509312		42393017
Kemper Iron & Metal Co.	403 Monroe Street	Bellevue	OH	44811	(419) 483-2340			509313
Ken Greco Company	1609 1/2 Wilson Ave	Youngstown	OH	44506	(330) 707-1577			509313
Keystone Iron & Metal Co Inc	4903 E Carson St	Pittsburgh	PA	152071943	4124621520			509302
Keystone Recycling	4474 Youngstown Kingsville Road	Cortland	OH	44410	(330) 637-2551			
Kimble Transfer & Recycling	8500 Chamberlin Rd.	Twinsburg	OH	44087	330-784-1167			
Kimmel Scrap Iron & Metal Co.	10571 Grand River Ave	Detroit	MI	482042007	3139341100			509302
Kirbys Auto Parts	28 Marriott Street	Richwood	OH	43344	(740) 943-2090			423930
Kirk Battery	5302 Train Ave	Cleveland	OH	44102	(216) 281-9800			432930
Kj Plastics	105 Gravel Pike	Green Lane	PA					
KJ Plastics	105 Gravel Pike	Green Lane	PA	18054				
Kkj Associates	16657 Woodshire Dr	Strongsville	OH	44149	(440) 846-3690			509323
Kkl	10513 Freedom St	Garrettsville	OH	44231	(330) 527-4879			509313
Klor Kleen Inc	3118 Spring Grove Ave	Cincinnati	OH	452251828	5136810060	495399		562920
Knecht'S Auto Recycling	1644 Lincoln Hwy	Bucyrus	OH	44820	(419) 562-9932	509312		42393017
Kohart Recycling	15360 Sr 613 E	Paulding	OH	45879	(419) 399-4144			
Kohart Recycling Of Delphos	905 S. Main St.	Delphos	OH	45833	(419) 399-4144			
Kohart Recycling Of Fostoria	634 Spruce St.	Fostoria	OH	44830	(419) 435-7792			509312
Kraft Wrap Inc	21650 Hoover Rd	Warren	MI	48089	(586) 755-2050	267998		32229903
Krazy Wayne'S Inc		New Philadelphia	OH	44663	(330) 795-7572			509313
Kripke Enterprises, Inc.	2351 Hill Ave	Toledo	OH	43607	(419) 539-9133			
KW Plastics	279 Pike County Lake Rd	Troy	AL	36079				
Kyle Case Metals	1416 Maple Ave Ne	Canton	OH	44705	(330) 438-0055	509313		42393019
L & L Scrap Metals Recycling, Inc	128 Texas Road	Gallipolis	OH	45631	(740) 446-7300			
L & M Copper Recycling Llc	2730 E. Smithville Western Rd	Wooster	OH	44691	(330) 439-3141			509312
L Levine & Co Inc	4670 Paddock Rd	Cincinnati	OH	452291002	5134715900			509302
L&M Recycling	52660 Rt. 124	Racine	OH	45771	(740) 843-1155			423930
Lafayette Recycling	7700 Dix St	Detroit	MI	48209	(313) 843-1312			509313
Lake Erie Recycling Co (Inc)	1011 Matzinger Rd	Toledo	OH	436123822		495399		562920
Lake Erie Transfer Inc	1706 Clay Street	Austinburg	OH	44010	(440) 474-0095			
Lakeside Metals Inc.	15000 Miles Ave.	Cleveland	OH	44128-2370	216-458-7150			
Lancaster Metals And Recycling Llc	402 E Locust St.	Lancaster	OH	43130	(740) 653-6253			
Laser Impressions-Total Laser Care Inc	444 E 200th St	Euclid	OH	44119	(216) 738-4444			432930
Lcd Discounters	2899 Morse Rd	Columbus	OH	43231	(614) 478-0808	495399		562920
Legacy Imaging / Collect Inc	3700 Park East Drive Ste 240	Beachwood	OH	44122	(216) 832-3081			432930
Legacy Polymers					(330) 212-7070			
Legend Smelting And Recycling, Inc	923 Buckeye Ave.	Newark	OH	43055	(740) 344-2387			
Lenmoore Inc.	221 7Th St Ste 304	Pittsburgh	PA	152383206	4122438000	509302		423930
Levine, Jack M and Son Inc	3360 E 79th St	Cleveland	OH	44127	(216) 641-3485			
Liberty Iron & Metal Co	1431 East Ave	Erie	PA	16503	(814) 452-4549			509312
Liberty Tire Svc Of Ohio Llc	14864 Lincoln St Se	Minerva	OH	44657	(330) 868-0097			509312
Lincoln Recycling	33 Mead Ave	Meadville	PA	16335	(814) 724-2241			509312
Linda Allen	336 Breakneck Rd	Connellsville	PA	154259701	7246282028	495399		562920
Linsam Corp	852 Ann Ave	Niles	OH	444462924	3305051218			509302
Little Rocks Towing & Salvage	336 W 46th St	Cleveland	OH	44102				
Lity Scrap Yard	23820 County Road 621	Coshocton	OH	43812	(740) 622-6220			
Livingston & Co., Inc.	2502 Gallia Street	Portsmouth	OH	45662	(740) 353-0763			
Logan Aluminum	6920 Lewisburg Rd	Russellville	KY					
Lorain County Resource Recovery Complex, Republic Waste	43650 Oberlin-Elyria Road	Oberlin	OH	44074	(440) 774-4060			
Lovaglio Consolidated Inc	4046 Westway St	Toledo	OH	436121637		495399		562920
Lowry Metals	65105 Wintergreen Rd	Lore City	OH	43755	(740) 489-5656			
Lowry Metals II	601 Park Cir	Cambridge	OH	43725	(740) 439-9400			42393017
M & M Metals International, Inc.	840 Dellway St	Cincinnati	OH	452293396	5132214411	509302		423930
M&B Recycling Llc	1561 Galatea Rd.	North Baltimore	OH	45872	(419) 257-2636			
M&K Metal Processors Inc	90 Sawyer Pkwy	Mansfield	OH		(419) 822-5188			
M&R Recycling Inc	1272 State Route 28	Loveland	OH	45140	(513) 575-0661			
Mac Salvage	8375 N County Road 31	Tiffin	OH	44883	(419) 618-9766			
Magnet Notes Ltd	946 Kane St # A	Toledo	OH	43612	(419) 593-0060			262101
Manley'S Recycling, Inc.	503 Mill Street	Middleport	OH	45760	(740) 992-3894			32212103
Mann Metals Corp	1011 Decker Rd	Walled Lake	MI	483903219	2489601200	509302		423930
Maple Metal Recycling	5475 Dunham Rd.	Maple Heights	OH	44137	(216) 581-4500			509312
Marca Document Destruction	2387 Harding Hwy E	Marion	OH	43302	(740) 375-6144			509312
Mark Gray Enterprises	464 North Highland Ave	Columbus	OH	43204	(614) 272-0555			509302
Markel Recycling Llc	2381 Plank Rd	Cottleville	MI	48039	(810) 765-4257			509312
Marpac Corp	2301 Georgetown Rd	Kennerdell	PA	16374	(814) 786-7390			509312
Marshall Recycling	3450 Harriett Road	Hillsboro	OH	45133	(934) 644-2400			42393017
Maxwell Recycling Inc.	480 Fifth St. N.E.	Barberton	OH	44203	(330) 848-1815			509312
Maxxum Group, Inc	15422 Detroit Ave	Lakewood	OH	44107	(216)-226-2700			432930
MBK Industries, Inc.	38720 Gaelic Glen	Solon	OH	44139-5933	440-248-4407			
Mcgee Recycling	475 Watt Ave	Barnesville	OH	43713	(740) 425-2222			
Mckee Auto Parts	2205 Beckler Rd	New Marshfield	OH	45766	(740) 753-1100			

Appendix F
Unverified Potential Processors and End Users

McMahan's Wrecking	3378 W 65th St	Cleveland		44102	(216) 961-8502		
McNichols Scrap Iron & Metal	6500 E Mcnichols Rd	Hamtramck	MI	48212	(313) 365-6100	509313	42393019
Medical Equipment Recycling	707 Sharon New Castle Rd	Farrell	PA	16121	(724) 342-3146	509312	42393017
Medina Paper Recycling	370 Lake Rd	Medina	OH	44256	(330) 723-4334	509312	42393017
Mega Plastics Co	10610 Freedom St	Garrettsville	OH	44231	(330) 527-2211	509312	42393017
Merrifield's Iron & Metal, Llc	41 North County Road 43	Republic	OH	44867	(419) 585-5521		
Metal Conversions, Ltd.	849 Crawford Ave	Mansfield	OH		(419) 525-0011		
Metal Management Ohio	2535 Hill Avenue	Toledo	OH	43607	(419) 535-6856		
Metal Management Ohio	27063 State Route 281 E	Defiance	OH	43512	(419) 782-3177		
Metal Management Ohio, Inc.	3100 Lonyo St	Detroit	MI	482091089	3138411800	509302	423930
Metal Recycling	1094 Industrial Pkwy	Medina	OH	44256	(330) 725-8888	509312	42393017
Metal Recycling Services Llc	334 Beechwood Rd Ste 401	Fort Mitchell	KY	410172086	8592928400	509302	423930
Metalcrete Industries	4133 Payne Ave	Cleveland		44103	(440) 526-5601		
Metalic Resources	2116 Enterprise Pkwy	Twinsburg	OH	44087-2212	330-425-3155		
Metalico Annaco	943 Hazel St	Akron	OH	44305	(330) 376-1400	509312	42393017
Metalico Cleveland Llc	3018 E 55Th St	Cleveland	OH	44127	(216) 271-5825	509312	
Metalico Pittsburgh, Inc.	3100 Grand Ave	Pittsburgh	PA	152251502	4127717500	495399	562920
Metalico Youngstown	100 Division Street Ext	Youngstown	OH	44510	(330) 743-9000	509312	42393017
Metalife Resources Inc	16 S Washington St	Donora	PA	150331394		495399	562920
Metals Recycling Technology, Llc	7680 St Rt 127 N	Van Wert	OH	45891	(419) 232-2034		
Metalx, Llc	7300 State Highway 109	Delta	OH	435159450	2602323000	509302	423930
Metro Hardwoods	5901 Train Ave	Cleveland		44102	(216) 651-2345		432930
Metro Materials Corp	4636 Shuster Rd	Columbus	OH	432141934	6144514744	495399	562920
Miamitown Auto Parts And Recycling	6980 State Route 128	Miamitown	OH	45041	(513) 353-0656		
Miamitown Auto Parts And Recycling	8379 Harrison Pike	Cleves	OH	45002	(513) 353-1111		
Michel's Iron & Metal Ltd	35899 Moore Rd	Union Furnace	OH	43158	(740) 603-1332		
Michigan Scrap Metal Co	1411 E 8 Mile Rd	Hazel Park	MI	48030	(248) 543-2500	509313	
Michigan Tire Recycling Llc	6550 Gratiot Ave	Detroit	MI	482071811		495399	562920
Mid Michigan Recycling Llc	24935 21 Mile Rd	Macomb	MI	480425114	5865985807	495399	562920
Midas Metal Recycling Inc	2700 E 10 Mile Rd	Warren	MI	48091	(586) 756-1988	509312	
Middlefield Pallet Inc.	15940 Burton-Windsor Rd.	Middlefield		44062	(440) 632-0553		
Mid-Ohio Sanitation & Recycling Llc	356 Hpm Street	Mount Gilead	OH	43338	(419) 947-7440		
Mid-State Waste Metal Recycling					(419) 362-1446		
Midtown Pallet & Recycle Inc.	1987 Hawthorne St.	Toledo	OH	43606	(419) 241-1311		
Midwest Recycling Inc	26051 Michigan Ave	Inkster	MI	481412497	3132549106	495399	562920
Midwest Steel	13500 Pleasant St	Detroit	MI	48217	(313) 843-2555	509313	42393019
Midwest Steel & Alloy	200 Division Street Ext	Youngstown	OH	44510	(330) 792-0600	509313	42393019
Mike's Free Scrap Removal	244 Church St	Girard	PA	16417	(814) 897-3525	495311	56292001
Milano Industries Inc	28004 Center Oaks Ct # 100	Wixom	MI	483933360		495399	562920
Miles Alloy, Inc.	13800 Miles Ave	Cleveland	OH	441055594	2162458893	495399	562920
Millcraft Paper Co	6800 Grant Ave	Cleveland	OH	44105	(216) 441-5500	262101	3221203
Miller's Metal And Scrap Iron	5372 Co. Rd 49	Huntsville	OH	43324	(937) 592-6768		
Milliron Iron & Metal	2384 St. Rt. 39	Mansfield	OH	44903	(419) 747-6522		
Mindlin Recycling	666 South Riley Blvd	Franklin	OH	45005	(937) 746-2222	509301	423930
Minkin Chandler Corp	15400 Oakwood Dr	Romulus	MI	48174	(734) 229-9200	509313	42393019
Minkin-Chandler Corporation	4630 Kiftsgate Bnd	Bloomfield Hills	MI	483022333	7342299200	509302	423930
Model Graphics & Media Inc.	2614 Crescentville Rd	West Chester	OH	450693819	5135412355	267904	322299
Mohawk Fine Papers Inc.	6800 Center Rd	Ashtabula	OH	440048947	4409692000	262100	322121
Mondi AKrosil, Llc	3165 Wilson Rd	Lancaster	OH	431308144		267999	322299
Mondo Polymer Technologies, Inc.	27620 State Rte 7	Reno	OH	45773	7403769396	495399	562920
Montgomery Iron & Paper Co., Inc.	400 E 4Th St	Dayton	OH	454022110	9372224059	495399	562920
Moore Paper Boxes Inc.	2916 Boulder Ave	Dayton	OH	454144834	9372787327	267999	322299
Morris Brothers LLC	3241 W 65th St	Cleveland		44102	(216) 961-7297		
Moskowitz Bros Inc	5300 Vine St	Saint Bernard	OH	45217	(513) 242-2100		
Mt Clemens Metal Recycling	41495 Irwin Dr	Harrison Township	MI	48045	(586) 468-1563	509312	42393017
Muskingum Iron & Metal Co	345 Arthur St.	Zanesville	OH	43702	(740) 452-9351		
N&R&G Recycling, Inc.	471 Freedom Dr.	Napoleon	OH	43545	(419) 599-1659		
N. A. L. Company, Inc.	112 Mill St	Mount Orab	OH	45154	9374442518	267999	322299
National Container Group	9612 Meech Ave	Cleveland		44105	(216) 271-5700		432930
National Material Recycling	3651 Broadway	Lorain	OH	44053	(440) 233-5500		
National Recycling Llc	70017 Powell Rd	Bruce Twp	MI	480654905	5867522055	495399	562920
National Research Company	55911 Gratiot Ave	Chesterfield	MI	480511221	5867490100	495399	562920
National Salvage Operations Inc	1930 Mckinley Ave	Columbus	OH	432221006	6142769617	509302	423930
National Wrecking Inc	17615 St Clair Ave	Cleveland		44110	(216) 481-4444		
Nationwide Auto Parts And Recycling	3901 South	Toledo	OH	43615	(419) 536-9100		
NEOShred	895 E Tallmadge Ave.	Akron		44310			
New Carlisle Auto Parts Inc	690 Quick Rd	New Carlisle	OH	45344	(937) 845-3236		
New Castle Recycling Inc	215 Gardner Ave	Youngstown	OH	44511	(330) 423-0180	509313	42393019
New Green Legacy Services, Inc.	3715 Parmly Rd	Perry	OH	440819540	4402591763	495399	562920
New Wave Plastics	5500 Walworth Ave	Cleveland		44102	(330) 722-3335		432930
New World Recycling	1079 E. 5Th Ave	Columbus	OH	43201	(614) 398-7857		
Niles Iron & Metal Company Llc	45 W Federal Street	Niles	OH	44446	(330) 545-5477		
Nordenia	8480 Bridleway Way	Columbus	OH	432351492	6149855025	263103	322130
Norlisk Nickel Usa, Inc.	2 Penn Ctr W Ste 330	Pittsburgh	PA	152760110	4127221120	509302	423930
North Canton Metal Recycling	6434 Wise Ave Nw	North Canton	OH	44720	(330) 499-5500	509312	42393017
North Coast Ferrous Supply Inc	8200 Old Granger Rd	Cleveland	OH	44125	(216) 341-1588	509313	42393019
Northcoast Inc. Recycling Specialists	1305 Lloyd Rd	Wickliffe		44092	(440) 943-6968		
Northend Scrap Metal Inc	1106 Grove St	Wyandotte	MI	48192	(734) 282-3955	509313	42393019
Northern Ohio Scrap Svc Corp	2625 Snowberry Ln	Cleveland	OH	44124	(440) 446-1500	509313	42393019
Northwest Ohio Recycling Enterprise, Inc.	13355 Road 2	Pandora	OH	45877	(419) 384-3392		
Northwest Recycling Inc.	12475 County Road H	Bryan	OH	43506	(419) 636-5215		
Nortru, Inc.	421 Lycaste St	Detroit	MI	482143434		495399	562920
Norwalk Waste Materials Co	4957 Us Highway 250 N	Norwalk	OH	44857	(419) 668-3341	509312	42393017
Novex Products Inc	2707 Toledo Ave # B	Lorain	OH	44055	(440) 244-3330	262101	3221203
Novolex Holdings, Inc.	2000 Commerce Center Dr	Franklin	OH	450051477	9377461933	262101	322121
Npr Recycling, Llc	30880 Smith Rd	Romulus	MI	481742105	7347210197	495399	562920
NTR Metals	12315 Plaza Dr	Parma		44130	(216) 265-3629		
Nu-Fold Inc	4444 Lawton St	Detroit	MI	48208	(313) 898-4695	267998	32229903
Oak Hills Carton Co.	6310 Este Ave	Cincinnati	OH	452321450	5139484200	267999	322299
Oew Recycling	2050 E. Williams Road	Columbus	OH	43207	(614) 497-9299		
Ohio Baler Co Inc	3500 Lorain Ave Ste 505	Cleveland		44113	(216) 398-8800		432930
Ohio City Auto, Inc	11408 Snyder Rd.	Ohio City	OH	45874	(419) 965-2410		
Ohio Disposal Systems Inc	980 Wenko Rd	Bedford	OH	441463856		495399	562920
Ohio Energy Source	25405 Broadway Ave Ste 2	Oakwood		44146	(216) 393-9909		432930
Ohio Mattress Recovery And Recycling	38209 Wilson Ave	Willoughby	OH	440947826	4408563685	495399	562920
Ohio Mills Corp	1719 E 39th St	Cleveland		44114	(877) 277-2224		432930
Ohio Recycling Inc.	7837 State Route 274	Chickasaw	OH	45826	(419) 925-4444		
Ohio Scrap Corporation	4840 Us 20A	Delta	OH	43515	(419) 822-8200		
Ohio Waste Material Co	965 Wayside Rd	Cleveland	OH	44110	(216) 481-3200	509306	42393028

Appendix F
Unverified Potential Processors and End Users

Okolona Iron & Metal Llc	18641 County Road N	Okolona	OH	43550	(419) 758-3701		
Omnichem, L.L.C.	2021 S Schaefer Hwy	Detroit	MI	482171239	3138415800	495399	562920
Omnisource Corporation	1500 Old Bowman St	Mansfield	OH	449038805	4197474733	509302	423930
Omnisource Corporation	880 Linden Street	Defiance	OH	43512	(260) 422-5541		
Omnisource-5000	5000 N. Detroit Ave.	Toledo	OH	43612	(419) 537-9400		
Omnisource-Hill Ave	2453 Hill Ave.	Toledo	OH	43607	(419) 537-9400		
Omnisource-Lagrange	1320 Lagrange St.	Toledo	OH	43694	(419) 537-9400		
Omnisource-Lima	1610 East 4Th St	Lima	OH	45802	(419) 537-9400		
Omnisource-Stmarys	4575 Country Road 33A	Saint Marys	OH	45885	(419) 537-9400		
One World Recycling Llc	201 Hill Street	Defiance	OH	43512	(419) 782-8176		
Osbornescrap	328 Sunnydale Rd.	Jackson	OH	45640	(740) 288-1752		
Ossrecycling	21 Mill St	Seville	OH	442739164		495399	562920
Otto By Products	2865 W 3rd St	Cleveland	OH		(216)265-0328		432930
Owens Illinois	1700 State St	Zanesville	OH				
P J Q Corporation	14400 Oakland St	Detroit	MI	482032900	3138676900	495399	562920
Paal Inc	7277 Northfield Rd	Walton Hills	OH	44146	(440) 735-0100		
Pactiv Llc	2120 Westbelt Dr	Columbus	OH	432283820	6147715400	263100	322130
Painesville Recycling	83 Stage Ave	Painesville	OH	44077	(440) 354-5700	509313	42393019
Paper Service Co Inc	12022 Leslie Rd	Lisbon	OH	44432	(330) 227-3546	261101	32213003
Paperworks Industries	455 Factory St	Wabash	IN				
Parts A Plenty Inc	10441 Lyndon St	Detroit	MI	48238	(313) 651-5407	509313	42393019
Patton Recycling	9319 Gallia Pike	Wheelersburg	OH	45694	(740) 574-1859		
Paulette Fur Co. L.L.C.	6210 Canton Rd Nw	Malvern	OH	44644			
Paxar Corporation	7801 Technology Blvd	Dayton	OH	454241574	9376814541	267904	322299
Peerless Oil Service	4787 Columbia Rd	North Olmsted	OH	44122	(216) 777-6629		432930
Pel America	13940 Cedar Rd	University Heights	OH				
Penfield Township Recycling	41012 State Route 18	Wellington	OH	44090	(440) 647-5744	509312	42393017
Penn Pro Manufacturing, Inc.	1561 Hillcrest St	Washington	PA	153011229		262109	322121
Perma-Fix Of Dayton, Inc.	300 Cherokee Dr	Dayton	OH	454178113	9372686501	495399	562920
Perrino Action Carstart Auto Body Shop	21200 St Clair Ave	Euclid	OH	44117	(216) 486-6161		
Perry Scrap Yard	4161 State Rt. 13 Ne	New Lexington	OH	43764	(740) 891-7184		
Pete & Pete Container Service	4830 Warner Rd	Garfield Heights	OH	44125	(216) 524-4191		56221
Pfa-Recycling, Inc.	50150 E Russll Schmidt Bl	Chesterfield	MI	480512443	5869495788	495399	562920
Philippi, H Lee Co Inc	3660 Hyde Park Ave	Cincinnati	OH	452081407		267999	322299
Phil'S Scrap Metals Inc	1351 E 168Th St	Cleveland	OH	441102522	216-664-9000	509302	423930
Phipps Auto Parts	10429 Cozaddale Murdock Rd	Cozaddale	OH	45122	(513) 722-2034		
Phoenix Scrap Metals	813 University Blvd	Steubenville	OH	43952	(740) 457-1001	509313	42393019
Picard Paper Processing Inc	1225 Hook Dr	Middletown	OH	450421734		267999	322299
Pinnacle Recycling	2330 Romig Rd	Akron	OH	44320	(330) 753-7300	509312	42393017
Pita Metals	411 S Fort St	Detroit	MI	48217	(313) 843-3550	509313	42393019
Pittsburgh Roll-Off Service, Inc.	1200 Saw Mill Run Blvd	Pittsburgh	PA	152205314	4123319000	495399	562920
Plastic Materials Inc.	775 Highland Rd	Macedonia	OH	44056	(330) 468-0184		
Plastic Options	2704 Mercer Rd	New Castle	PA	16105	(724) 698-7535	509312	42393017
Plastic Recycling Technology, Inc.	9054 N County Road 25A	Piqua	OH	453567522	9376159286	495399	562920
Polk Scrap Iron & Metal	1900 West Main St.	Zanesville	OH	43701	(740) 452-4174		
Poly Tech Plastics	17030 Peters Rd	Middlefield	OH	44062	(440) 632-5200	509312	42393017
Polynew	3557 State Route 93	Baltic	OH	43804	(330) 897-3202	509328	42393013
Ponz Enterprises	17877 St Clair Ave Ste 7	Cleveland	OH	44110	(440) 463-3464		432930
Pratt Industries	602 Leon Pratt Dr	Wapakoneta	OH	45895	770-918-5678	267903	32229910
Pratt Industries	3050 Anthony Pratt Dr	Valparaiso	IN				
Precious Metals Midwest Refinery Llc	4471 Forest Ave	Waterford	MI	483281113	2486747305	509302	423930
Precision Analytical	4450 Johnston Pkwy	Cleveland	OH	44128	(216) 663-0808		
Premier Metal Services, Llc	33565 Bainbridge Road	Solon	OH	44139	(440) 519-1104		
Premier Recycling Technology	12345 Detroit Ave	Cleveland	OH	44107	(440) 258-9811	509312	42393017
Pressed Paperboard Technologies, Llc	30400 Telg Rd Ste 386	Bingham Farms	MI	48025	2486466500	267902	322299
Prime Time Plastics, Ltd.	20525 Center Ridge Rd # 320	Rocky River	OH	441163443	2167315555	495399	562920
Procex, LTD	880 Cherry St.	Kent	OH	44240	(330) 673-1114		
Progress Metal Reclamation Company	1900 Front St	Ashland	KY	411017707	6063299600	495399	562920
Progressive Iron & Metal	2432 Hayes Ave	Fremont	OH	43420	(419) 334-2266	509314	42393020
Progressive Recovery Inc	1111 Superior Ave E # 1000	Cleveland	OH	441142568	3215760025	495399	562920
Protrade Steel Company, Ltd.	5700 Darrow Rd Ste 114	Hudson	OH	442365026	3306553970	509302	423930
Psc Metals	2700 Hubbard Rd.	Youngstown	OH	44505	(330) 759-2820		
Psc Metals	820 Sherman Ave.	Springfield	OH	45503	(937) 328-3330		
Psc Metals - Alliance, Llc	826 North Webb Avenue	Alliance	OH	44601	(440) 753-5400		
Psc Metals - Wooster Llc	972 Old Columbus Rd.	Wooster	OH	44691	(330) 264-8956		
Psc Metals Inc	5875 Landerbrook Dr # 200	Cleveland	OH	44124	(440) 753-5400	509313	42393019
Psc Metals Inc	4226 E 71st St	Cleveland	OH	44105			
Psc Metals Inc.	2205 Parsons Ave.	Columbus	OH	43207	(614) 443-0518		
Psc Metals- Joyce Llc	1283 Joyce Ave	Columbus	OH	43219	(614) 299-4175		
Psc Metals, Inc.	3101 Varley Ave Sw	Canton	OH	44706	(330) 484-7610		
Psc Metals, Inc. Dbw Warmington Road Recycling	780 Warmington Road	Navarre	OH	44662	(440) 753-5400		
Psc Metals-Akron Llc	1068 Bank Street	Akron	OH	44305	(440) 753-5400		
Pscelyria	800 Infirmary Road	Elyria	OH	44035	(440) 322-1333	509312	42393017
Psix, Llc	185 S Pioneer Blvd	Springboro	OH	450663045	9377466841	267999	322299
Pvs Steel Services, Inc.	Fster Plz Ste 7661	Pittsburgh	PA	15220	4129290177	495399	562920
Pyramid Pallet Recycling Inc	19400 Allen Rd	Melvindale	MI	481222204	3133812681	495399	562920
Q S S Inc	13040 Merriman Rd Ste 200	Livonia	MI	481501816	7344593800	495399	562920
Quaker City Auto Parts Inc.	12550 Route 62 North	Greenford	OH	44460	(330) 332-0512		
Quality Plastics	1302 Irwin Dr	Erie	PA	16505	(814) 459-1084	509311	42393014
Quantum Metals	3675 Taft Drive	Lebanon	OH	45036	(513) 573-0144	509302	423930
Quasar	13550 Aspinwall Ave.	Cleveland	OH	44110	216-986-9999		
R & M Recycling Inc	4103 Lagrange St	Toledo	OH	43612	(419) 269-5000	509312	42393017
R B Vinyl	1336 Seaborn St # 4	Mineral Ridge	OH	44440	(330) 505-1534	509312	42393017
R&Z Cores Llc	22375 Oxford Township Road 105	Newcomerstown	OH	43832	(740) 498-7579		
Ray Kenston Metals Llc	10288 Salem Rd.	Athens	OH	45701	(740) 589-7000		
Ray's Recycling Inc	1210 E Spring St	Saint Marys	OH	458852405	4193946344	495399	562920
Rbg, Inc.	6043 Interstate Cir	Blue Ash	OH	452421434	5132470175	495399	562920
Real Alloy Recycling Inc	3700 Park East Dr # 300	Cleveland	OH	44122	(216) 755-8900	509312	42393017
Re-Cre8 Recycling, Inc.	5533 Sthwyck Blvd Ste 101	Toledo	OH	43614	8889005489	495399	562920
Recycle for Humanity	1192 E 40th St	Cleveland	OH	44114	(216) 881-5174		56221
Recycle It, Usa	414 Burbank	Toledo	OH	43607	(419) 277-1291		
Recycle Solutions	5301 Grant Ave Ste 100	Cleveland	OH	44125	(216) 271-0300		562920
Recycle Zone	28820 Lorain Rd	North Olmsted	OH	44070	(440) 471-4652	509312	42393017
Recycled Plastic Technology	600 E Exchange St.	Akron	OH	44306	330-434-4600		
Recycling And Treatment Technologies, Llc	679 Hardy Rd	Painesville	OH	440774574	2165928352	495399	562920
Recycling Bowling Green	1040 N College Dr	Bowling Green	OH	43402	(419) 352-5446	509312	42393017
Recycling Centers	526 S Main St # 412	Akron	OH	44311	(330) 237-8000	509312	42393017
Recycling Concepts Llc	2694 Northglen Dr	Westlake	OH	44145		509312	42393017
Recycling Coordinators Inc	600 E Exchange St	Akron	OH	44306	(330) 434-4500	509312	42393017

Appendix F
Unverified Potential Processors and End Users

Recycling Equipment Solutions	276 Remington Rd # C	Stow	OH	44224	(330) 920-1500	509312	42393017
Recycling Exchange North Inc	2830 Westerville Rd.	Columbus	OH	43224	(614) 444-7299		
Recycling Express, Inc.	7430 Industrial Rd Ste 1	Florence	KY	410422982	8592825200	495399	562920
Recycling Group, Ltd.	630 Shepherd Dr	Cincinnati	OH	452152104	5137699609	495399	562920
Recycling Partnership Inc	127 Public Sq # 2000	Cleveland	OH	44114		509312	42393017
Recycling Today	5811 Canal Rd # 180	Cleveland	OH	44125	(216) 961-4130	509312	
Red Metals Recycling, Inc.	12065 Telegraph Rd	Redford	MI	482391413	3135314009	509302	423930
Reeds Salvage	36521 Royalton Rd	Grafton	OH	44044	(440) 748-2016		
Regency Technologies	6111 Cochran Rd	Solon	OH	44139	(440) 248-3991		423930
Relco Systems	842 Norton Ave	Barberton	OH	44203	(330) 848-0139	509313	42393019
RePoly-QRS	1539 S Vandeventer Ave	St. Louis	MO				
Republic Services	1717 Pennsylvania Ave	Salem	OH	44460	(330) 337-6156	509312	42393017
Republic Waste	3980 Jennings Rd	Cleveland	OH	44109	(216) 741-4013		
Republic Waste Services - Akron Recyclery	964 Hazel St.	Akron	OH	44305	330-434-9183		
Research Alloys Company Inc	W. Goodale Blvd	Columbus	OH	43212	(614) 224-4404		
Reserve Alloys, Llc	4550 Darrow Rd	Stow	OH	442241804	4405191768	509302	423930
Reserve Ventures Inc	8700 Bessemer Ave	Cleveland	OH	44127	(216) 429-0919		423930
Reserved Environmental Services, Llc	1090 Freeport Rd Ste 2	Pittsburgh	PA	152383166	4127843399	495399	562920
Resource Metal Recycling	8509 Freeway Dr	Macedonia	OH	44056	(330) 908-0400	509312	42393017
Resource Reclamation Toledo, Llc	5400 N Detroit Ave	Toledo	OH	436123514	5672022241	495399	562920
Resource Recycling Incorporated	1596 Neubrecht Rd	Lima	OH	458013124	4192222702	495399	562920
Ret3 Job Corps	1814 E 40th St	Cleveland	OH	44103	(216) 361-9991		423930
Return Polymers Properties Ltd	1236 Center Hill Sq Ne	Canton	OH	44714	(330) 494-6040	509312	42393017
Re-Use-It Plastic Recycling, Inc.	25025 Coral Gables St	Southfield	MI	480332403		495399	562920
Revital Polymers	1271 Lougar Ave	Sarnia	ON, CAN				
Rex Metal Recycling Co	9151 Hubbell St	Detroit	MI	48228	(313) 273-1000	509312	42393017
Richmond Recycling Inc	52820 S Yorktown Ct	Chesterfield	MI	480512298	5869496009	509302	423930
Rider Salvage Inc	38781 St Rt 124	Pomeroy	OH	45769	(740) 444-5907		
Ridge Road Transfer Station	3727 Ridge Rd	Cleveland	OH	44144	(216) 664-3162		56221
River Cor	1560 Firestone Pkwy	Akron	OH	44301	(330) 784-1113	261101	32213003
River Metals Recycling Llc	840 Jasper Rd	Xenia	OH	453857831	9373723533	509302	423930
River Metals Recycling Llc	1951 State Avenue	Cincinnati	OH	45204	(859) 292-8400		
River Recycling Industries	4195 Bradley Rd	Cleveland	OH	44109	(216) 459-2100	509314	
River Valley Paper Co	120 E Mill St # 337	Akron	OH	44308	(330) 535-1001	509312	42393017
Rizzo Recycling Services, Llc	414 E Hudson Ave	Royal Oak	MI	480673740	2485414020	495399	562920
RJ Recycling, Llc	1800 Garfield Ave	Parkersburg	WV	261013219	3048653903	509302	423930
RNW Holdings LLC	26949 Chagrin Blvd Ste 305	Beachwood	OH	44122	(216) 831-0510		
Roberts Converting Co., Inc.	113 Northeast Dr	Loveland	OH	451407145	5136836667	267999	322299
Robinett's Auto Junk Yard	12860 Miami Trace Rd.	Greenfield	OH	45123	(937) 981-3362		
Rock Creek Aluminum Inc	2639 E Water St	Rock Creek	OH	44084	(440) 563-3487	509312	42393017
Rock Creek Aluminum-Elyria Div	320 Huron St	Elyria	OH	44035	(440) 322-0072	509312	42393017
Rockside Management Group Inc	20325 Center Ridge Rd # 720	Rocky River	OH	441163572	4408959294	262107	322121
Rogers Recycling	46894 St Rt 154	Rogers	OH	44455	(330) 227-0089		
Roman'S Salvage	2564 Perry Hwy	Clarks Mills	PA	16114	(724) 253-3214	509313	42393019
Rosby Resource Recovery	54 E Schaaf Rd	Cleveland	OH	44131	(216) 661-6102	509312	42393017
Ross Bros. Salvage Inc.	106 Tilden Ave.	Mount Vernon	OH	43050	(740) 397-9334	509312	42393017
Roundbottom Recycling	5100 River Valley Rd.	Millford	OH	45150	(513) 248-4435	495399	562920
Royal Oak Recycling Cleveland	16065 Industrial Pkwy	Cleveland	OH	44135	(216) 325-1500	509312	42393017
Royal Oak Recycling-Pittsburgh Llc	4830 Grand Ave	Pittsburgh	PA	152251522	4123292590	495399	562920
Royal Paper Stock Company Inc	1300 Norton Rd	Columbus	OH	432283640	6148514714	495399	562920
Rpgg Inc	400 Westlake Dr	Ashland	OH	44805	(419) 289-2757	509312	42393017
Rsr Partners, Llc Dba Regency Technology							
RUF US Inc	31336 Industrial Pkwy Ste 5	North Olmsted	OH	44070	(440) 779-2747		423930
Rumpke	3131 E Royalton Rd	Broadview Heights	OH	44147	(216) 447-1122		562920
Rumpke Consolidated Companies, Inc.	3990 Generation Dr	Cincinnati	OH	452514906	8008288171	495399	562920
Rumpke Of Kentucky Inc	1374 Bryan Griffin Rd	Butler	KY	410068851	8594727339	495399	562920
Rumpke Recycling - Chillicothe	990 Eastern Avenue	Chillicothe	OH	45601	(513) 851-0122		
Rumpke Recycling - Circleville	1097 Us Route 22 West	Circleville	OH	43113	(513) 851-0122		
Rumpke Recycling - Dayton	1300 East Monument Avenue	Dayton	OH	45402			
Rumpke Recycling - Mt Vernon	301 Columbus Road	Mount Vernon	OH	43050			
Rumpke Transportation Company, Llc	553 Vine St	Cincinnati	OH	45202	5132424600	495399	562920
Rumpke Waste Remvl & Recycling	2175 Stiving Road Exd	Mansfield	OH	44903	(419) 528-4490	509312	42393017
Rumpke Waste, Inc.	170 Noble Rd E	Shiloh	OH	448789723	4198950058	495399	562920
Ryan'S Recycling	3571 W County Rd 38	Tiffin	OH	44883			
Sagamore Soils	2001 East Barlow Rd.	Hudson	OH	44236	330-656-5720		
Salem Metal Recycling Llc	275 Elm Ave	Salem	OH	44460	(330) 332-4607		
Sandusky Steel & Supply Co	1943 Milan Rd	Sandusky	OH	44870	(419) 626-4245	509313	42393019
Sappi North America, Inc.	1717 Dixie Hwy Ste 150	Ft Wright	KY	410112770	8594269200	267999	322299
Sass Automotive & Wrecking	2487 W 25th St	Cleveland	OH	44113	(216) 696-7636		
Saxon, Inc.	811 Woodward Hts	Ferndale	MI	482201463	2483982000	267904	322299
Scheetz Recycling	240 South Main S.T.	Killbuck	OH	44637	(330) 231-2742		
Schlafer Iron & Steel Inc	1950 Medbury St	Detroit	MI	48211	(313) 925-8200	509313	42393019
Schupan	2619 Miller Rd	Kalamazoo	MI	49001			
Schwartz Iron And Metal Co	20300 Mount Elliott St	Detroit	MI	482342743		509302	423930
Scioto Farm Supply Inc.	273 Seney Rd.	Chillicothe	OH	45601	(740) 772-5252		
Scott Recycling	320 E. Second Street	Chillicothe	OH	45601	(865) 540-1520		
Scrap Dynamics Corp	11 W Garfield Rd	Aurora	OH	44202	(330) 995-0025	509313	42393019
Scrap Exchange Inc	9 Aurora St # 5	Hudson	OH	44236	(330) 655-5577	509312	
Scrap Inc	5175 County Road 65	Gibsonburg	OH	43431	(419) 334-3686	509312	42393017
Scrap Masters	9973 Firestone Rd	Homerville	OH	44235		509312	42393017
Scrap Processors LLC	6600 Clement Ave	Cleveland	OH	44105	(216) 823-4151		
Scrap Recyclers Llc	1201 E 8 Mile Rd	Hazel Park	MI	48030	(248) 629-9695	509312	
Scrap Solutions LLC	6565 Maplewood Rd Ste 203	Mayfield Heights	OH	44124	(440) 646-9960		
Scrapcom, Inc.	3301 Monroe Ave.	Cleveland	OH	44113	(216) 823-4151		
Scratch-Off Systems, Inc.	2457 Edison Blvd	Twinsburg	OH	440872340	2166497800	267904	322299
Seagate Container Corp	1604 Tracy St	Toledo	OH	436053426	4196664608	495399	562920
Secure Ohio	7255 Free Ave	Bedford	OH	441465427	4402525194	495399	562920
Secure Recycling	8001 Moving Way	Mentor	OH	44060			
Secured Paper Solutions Ltd	5875 Landerbrook Dr Ste 200	Mayfield Heights	OH	44124	(216) 646-9764		56221
Selogy Scrap Co	1534 Hess Rd Nw	Massillon	OH	44647	(330) 833-3012	509313	42393019
Seneca Landfill, Inc	121 Brickyard Rd	Mars	PA	160462911	7246251511	495399	562920
Servicemaster Recycling	5280 W 161st St	Brookpark	OH	44142	(216) 271-7223		423930
Shaker'S Auto Recycling & Tires	1808 Lagonda Ave.	Springfield	OH	45503	(937) 926-4075		
Shenango Valley Recycling	329 S Dock St	Sharon	PA	16146	(724) 342-1030	509312	42393017
Shermans Metal Recycling, Inc.	1001 East Main Street	Newark	OH	43058	(740) 344-4620		
Sherman'S Valley Recycling Llc	332 Thomas Rd	Ligonier	PA	156582510		495399	562920
Sherwin Metal Recycling	6120 N. Detroit Avenue	Toledo	OH	43612	(419) 724-1081		
Shipmaster Co	6975 Bessemer Ave	Cleveland	OH	44127	(216) 341-8994	509312	
Shore To Shore, Inc.	8170 Washington Vlg Dr	Dayton	OH	454581848	9378661908	267904	322299

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Unverified Potential Processors and End Users**

Shredding Network	29325 Clayton Ave	Wickliffe		44092				
Shred-It	5480 Cloverleaf Pkwy	Valley View		44125	(440) 243-8500			432930
Sierra Metals	224 Cedar Hill Rd.	Lancaster	OH	43130	(740) 653-8765			
Signode Industrial Group Llc	396 Wards Corner Rd # 100	Loveland	OH	451409060	5132482990	267999		322299
Sikora Metals Inc	12850 Mount Elliott St	Hamtramck	MI	48212	(313) 366-6311		509313	42393019
Silicon Alley Recyclers	24835 Ryan Rd	Warren	MI	48091	(248) 613-1419		509312	42393017
Silver's Metal Company	1401 Woodland St	Detroit	MI	482111057	3138679188		495399	562920
Simple Recycling	5425 Naiman Pkwy	Solon	OH	44139	(866) 835-5068		509312	42393017
Sims Borthers Recycling - Columbus	697 N James Road	Columbus	OH	43219	(740) 387-9041			
Sims Brothers Recycling - Bellefontaine	512 Plumvalley St	Bellefontaine	OH	43311	(740) 387-9041			
Sims Brothers Recycling - Delaware	65 London Road	Delaware	OH	43015	(740) 387-9041			
Sims Brothers Recycling - Marion	1011 S Prospect Street	Marion	OH	43302	(740) 387-9041		509312	42393017
Singleton Auot Parts & Recycling	3305 St Rt 743	Moscow	OH	45153	(513) 876-9900			
Six Recycling Corporation	505 Maple St	East Liverpool	OH	439203515	3303851452		509302	423930
Skyline International Corporation	3690 Lacon Road Ste.A	Hilliard	OH	43026	(614) 527-7303			
Skyline Metals	3701 Duss Ave	Ambridge	PA	15003	(724) 242-5237		509313	42393019
Slats And Nails Pallets, Inc.	10465 Sandyville Ave Se	East Sparta	OH	44626	3308661008		495399	562920
Slc Recycling Industries	8701 E 8 Mile Rd	Warren	MI	48089	(586) 759-6600		509314	
Slesnick Iron And Metal	927 Warner Road Se	Canton	OH	44707	(330) 453-8475		509302	423930
Slippery Rock Salvage	214 Gardner Ave	New Castle	PA	16101	(724) 658-4880		509313	42393019
Smart Papers Holdings Llc	601 N B St	Hamilton	OH	450132909	5138695583		262199	322121
Smart Way Recycling Of Southfield, Llc	13000 W 8 Mile Rd	Oak Park	MI	482373242	2483999201		495399	562920
Smurfit-Stone Container Corp.		Chicago	IL					
Sojo Eco Recycling					(740) 596-7134			
Solomon'S Scrap & Salvage	7299 Salem Unity Rd	Salem	OH	44460	(330) 337-0491		509312	42393017
Sonnec Electronics Recycling	3550 Main St Rear	Weirton	WV	26062	(386) 873-6898		509312	42393017
Sonoco Products Company	59 N Main St	Munroe Falls	OH	442621064	3306888247		263100	322130
Southwest Metals Inc	8122 W Fort St	Detroit	MI	48209	(313) 842-2700		509313	42393019
Spartan Enterprises Inc	3717 Clark Mill Rd	Norton	OH	44203	(330) 745-6088		509319	42393021
Special Pack Inc	5555 Massillon Rd	Canton	OH	447201339	3304583204		262108	322121
Specialty Material And Environmental, Inc.	1473 Delberts Dr	New Eagle	PA	15067	7242582010		495399	562920
Specialty Steel Products, Inc.	103 Yost Blvd Ste 200	Pittsburgh	PA	152214865	4122712575		495399	562920
Speedie Recycling	7021 Eberhart Rd Nw	Dover	OH	44622	(330) 878-1371		509312	42393017
Springfield Recycling Llc	1620 East Pleasant	Springfield	OH	45501	(937) 322-4118			
S-S Recycling-Demolition	1199 W 4Th St	Ontario	OH	44906	(305) 801-8076		509312	
Stalloy Metals Inc	17718 S Waterloo Rd	Cleveland	OH	44119	(800) 321-6914			
Stanco Equipment Co., Inc.	14 Ruthman Dr	Dry Ridge	KY	410359784	8597432502		509302	423930
Star Recycling	52 E Broadway St	Jackson	OH		(740) 286-3752			
Stark C & D Disposal Inc	7280 Lisbon St E	Canton	OH	447302006	3304886161		495399	562920
Starrett Core	12764 Old Gallia Pike	Portsmouth	OH	45662	(740) 574-6010			
State Metal Co	444 S Campbell St	Detroit	MI	48209	(313) 842-0860		509313	
State Paper & Metal Co Inc	1118 W Central Ave	Toledo	OH	43610	(419) 243-5567		509312	42393017
Steel City Iron & Metal Corp	687-703 Wilson Ave	Youngstown	OH	44506			509302	423930
Stein, Inc	1034 Holmden Ave	Cleveland	OH	44109	(216) 621-1600			
Stericycle Inc	210 Hayes Dr Ste C	Independence	OH	44131	(216) 661-2193			56221
Stoffer'S Recycling	10835 Fayette Street	Martins Ferry	OH	43935	(740) 633-2806			
Stoneborough Recycling	494 Billy Boyd Rd	Stoneboro	PA	16153	(724) 376-2019		509312	
Strategic Materials, Inc.	2323 W 3Rd St	Cleveland	OH	441132508	2816472700		495399	562920
Strauss Industries, Inc.	35Th & Mccolloch St	Wheeling	WV	26003	3042328770		495399	562920
Streetsboro Metal Recycling	10380 State Route 43 # A	Streetsboro	OH	44241	(330) 995-0340		509312	42393017
Stump'S Converting	742 W Mansfield St	New Washington	OH	44854	(419) 492-2542		261101	32213003
Sugar Ridge Inc	41850 Oberlin Elyria Road	Elyria	OH	44035	(440) 322-0597			
Summit Packaging Solutions Llc	8080 Beckett Center Dr # 203	West Chester	OH	450695036	7194818400		263103	322130
Summit Resources Group	7476 Whitemarsh Way	Hudson	OH	44236	(330) 653-3992		509313	42393019
Superior Packaging Of Toledo, Llc	2970 Airport Hwy	Toledo	OH	43609	(419) 380-3335			
Synagro Midwest, Inc	4515 Infirmiry Rd	Miamisburg	OH	453421235	9373840669		495399	562920
T & J Scrap Metal	369 State Route 279	Oak Hill	OH	45656	(740) 876-2112			
T&B Recycling	116. N. Town St.	Wilkesville	OH	45695	(740) 688-1838			
Tabb Packaging		Dundee	MI					
Taylor Iron & Metal, Inc	10 3Rd Ave W	Huntington	WV	257011117	3045256390		509302	423930
Taylor Recycling Inc	8767 Holland Rd	Taylor	MI	48180	(313) 291-7410		509312	42393017
Tc Recycling Llc	159 Tci Park Dr	Grove City	PA	16127			509312	42393017
Tekni-Plex Inc.	1445 Timber Wolf Dr	Holland	OH	435288302	4194912399		267902	322299
Temple-Inland Warehouse	1756 Enterprise Pkwy	Twinsburg	OH	44087	(330) 405-3197		262101	32212103
Texas Aluminum Recycling Llc	6150 Parkland Blvd # 260	Mayfield Heights	OH	44124			509312	42393017
The Air Force United States Department Of	1 Arena Park Dr Bldg 293	Dayton	OH	454174678	9372579973		495399	562920
The City Mission	5310 Carnegie Ave	Cleveland	OH	44103	(216) 431-3510			432930
The David J Joseph Company	300 Pike St Fl 3	Cincinnati	OH	452024222	5136218770		509302	423930
The Gas House-Propane Co	7125 Krick Rd	Walton Hills	OH	44146	(440) 439-4474			432930
The Jb Green Team	115 S 3Rd St Ste 101	Steubenville	OH	439522968	7402666899		495399	562920
The Metal Connection	13682 State Route 118	New Weston	OH	45348	(937) 338-3041			
The Metal Reclaim Group Llc	533 N Nelson Rd	Columbus	OH	432192949	6144780808		495399	562920
The Paper Exchange Inc	2504 College Park Rd	Allison Park	PA	151014105	4123257075		267999	322299
The Peltz Group	965 Wayside Rd	Cleveland	OH	44110	(216) 661-8999			432930
The Smith-Lustig Paper Box Manufacturing Company	22475 Aurora Rd	Bedford	OH	441461270	2166210453		263103	322130
Thorwald Holdings, Inc.	866 Mill Park Dr	Lancaster	OH	431302572	7407569271		263103	322130
Three Rivers Recycling, Llc	825 Behan St	Pittsburgh	PA	152331611	4123221155		509302	423930
Thundercor	313 W Broadway	North Baltimore	OH	45872	(419) 788-3171			
Timco Tire Recycling Llc	4072 N Huntington St	Medina	OH	44256	(330) 523-6048		509312	42393017
Tms		Cuyahoga Heights	OH					
TNT Rubbish Disposal and Waste Systems LLC	7515 Grand Division Ave	Garfield Heights	OH	44125	(216) 271-9001			56221
Town And Country Auto Parts	10080 Cinn-Zanes Rd	Amanda	OH	43102	(740) 969-2112			
Trans Global Recycling, Inc.	3206 Old Farm Ln	Commerce Township	MI	483901656		495399		562920
Transpol Recycling Inc	9145 Vincent St	Hamtramck	MI	48211	(313) 571-3080		509312	42393017
Transworld Parts Exchange Inc	2131 E 36th St	Cleveland	OH	44115	(216) 431-3340			
Tri County Pallet	900 Flora Ave	Akron	OH	44314	330-848-0313			
Tri State Recycling Center	301 Wabash Avenue	Mingo Junction	OH	43938	(740) 535-0301			
Tri State Salvage Co	100 Lawson Ave	Huntington	WV	257051932	3045235872		509302	423930
Tri-Arrows Aluminum	12501 Plantside Dr	Louisville	KY	40299				
Triple Arrow Industries,Inc.	1973 Corvair Ave	Columbus	OH	43207	(614) 437-5588			
Triple Crown Animal Bedding, Inc	4710 Beidler Rd	Willoughby	OH	440944604	4409467454		267909	322299
Triplet Auto Recyclers Inc	1435 Triplett Blvd	Akron	OH	44306	(330) 733-6333		509312	42393017
Tymex Plastics Inc	5300 Harvard Ave	Cuyahoga Heights	OH	44105	216-429-8950			432930
Tyroler Scrap Metals	5227 Sweeney Ave	Cleveland	OH	44127	(216) 641-2535		509313	42393019
U Metco Inc	8651 E 7 Mile Rd	Detroit	MI	48234	(313) 366-1010		509312	
Ubcr, L.L.C.	4820 Holtz Dr	Wixom	MI	483932086	2485292600		495399	562920
Unidig Inc	21600 Quinn Rd	Clinton Township	MI	48035	(586) 791-4010		509312	42393017
Unipaper Recycling Company	73 Noblestown Rd Ste D	Carnegie	PA	151061676	4124298522		495399	562920
United Alloys & Metals, Inc	1177 Joyce Avenue	Columbus	OH	43219	(614) 299-0545		509302	423930

Appendix F
Unverified Potential Processors and End Users

United Meter Buyers	216 E Aurora Rd	Northfield	OH	440672021	3304316596	509302	423930
United Salvage Co Inc	921 Hazel St	Akron	OH	44305	(330) 253-6218	509313	42393019
United Truck & Auto Llc	777 E 143rd St	Cleveland		44110	(216) 541-4065		
Universal Environmental Services Llc	7550 Empire Dr	Florence	KY	410422922	8596479192	495399	562920
Universal Tire Recycling Inc	19106 Livernois Ave	Detroit	MI	48221		509312	42393017
Upco Waste Service, L.L.C.	4900 Mccarthy Dr	Milford	MI	483813945	2485293153	495399	562920
Upmc Horizon Med Eqpt	2200 Memorial Dr	Farrell	PA	16121	(724) 983-8737	509312	42393017
Urban Elsass & Son, Inc	600 E Statler Rd	Piqua	OH	45356	(937) 773-3337	509302	423930
Urban Lumberjacks of Cleveland	1310 E 49th St, First Floor	Cleveland		44114	(216) 502-2095		423930
Us 20 Metals	1640 Us 20	Norwalk	OH	44857	(419) 668-2425		
V K F Incorporated					(440) 238-2061		
Valley Converting Co	405 Daniels St	Toronto	OH	43964	(740) 537-2152	262101	32212103
Valley Metal Recycling, Inc	2449 Valley St	Dayton	OH	45404	(937) 233-4880		
Van'S Iron & Metal, Inc.	103 South Street	Steubenville	OH	43952	(740) 535-0550		
Variety Recycling	130 Crystal Ave.	Findlay	OH	45840	(419) 422-4441		
Vegas Metals Recycling Inc	5966 St Rte 128	Cleves	OH	45002	(513) 353-0082		
Vendetta Towing	3227 Superior Ave	Cleveland		44114			
Venter Inc (Dba Aluminum & Metal Exchange)	515 Ashland Rd Mansfield	Mansfield	OH	44905	(419) 522-3965		
Veolia Es Technical Solutions, L.L.C.	4301 Infirmary Rd	Miamisburg	OH	453421231	9378596101	495399	562920
Veritiv Corp	3101 S Gulley Rd # A	Dearborn	MI	48124	(313) 563-7333	262101	32212103
Verso Paper Holding Llc	8540 Gander Creek Dr	Miamisburg	OH	453425439	8778557243	262199	322121
Veteran Salvage	3944 Colony Rd Cleveland OH 44118				(216)881-6861		
Vexor Technology Inc	955 W Smith Rd	Medina	OH	44256	(330) 721-9773	509312	42393017
Victor Metals Inc	29309 Clayton Ave	Wickliffe	OH	44092	(440) 585-5959	509313	42393019
Viking Paper Co	5148 Stickney Ave	Toledo	OH	43612	(419) 729-4951	267903	32229910
Vince Refuse Service, Inc	301 Neosha Ave	Springfield	OH	455054965	9373234504	495399	562920
Vito'S Salvage	6440 E Davison St	Detroit	MI	48212	(313) 369-2218	509313	42393019
Vivo 3 Metal Trading Co.	340A North Meridian Rd.	Austintown	OH	44509	(330) 793-8329		
Vogel Disposal Service, Inc.	120 Hutchman Rd	Mars	PA	160463704	7246259000	495399	562920
W W R Recycling	1040 E 1st St	Dayton	OH	454021307	9372224920	495399	562920
W/S Packaging Group, Inc.	1720 James Pkwy	Heath	OH	430564027	7409292110	267904	322299
Wadsworth Recycling	9950 Rittman Road	Wadsworth	OH	44281	(330) 334-6900		
Walshonding Recycling	20298 Township Road 411	Walshonding	OH	43843	(740) 502-7074		
Walker Recycling	15812 Miles Ave	Cleveland	OH	44128	(216) 295-1343	509312	42393017
Wall Street Recycling	6751 Wall St	Ravenna	OH	44266	(330) 296-8657	509313	42393019
Wallick Scrap Metal	6474 Baertown Rd Nw	Dover	OH	44622	(330) 878-5931		
Walls Junkyard	49056 Glencoe Whitney Road	Belmont	OH	43718	(740) 695-6700		
Ward'S Recycling, Llc	1320 Reed Rd	Marietta	OH	457507736	7403742552	495399	562920
Waste Alternatives Inc	350 Pittsburgh Ave	Mount Vernon	OH	43050	(740) 397-0790	509312	42393017
Waste Free Llc	23333 Sherwood Ave	Warren	MI	480915362	2483105978	495399	562920
Waste Management	2625 E Broadway St	Northwood	OH		(419) 389-4950	509312	42393017
Waste Management	3956 State Route 412	Vickery	OH	43464	(419) 547-7791	509312	42393017
Waste Management	5505 Center Rd	Lowellville	OH	44436	(330) 536-6746	509312	42393017
Waste Management	90 Race St	Meadville	PA	16335	(814) 333-2900	509312	42393017
Waste Management	12200 E 13 Mile Rd # 120	Warren	MI	48093	(586) 574-2760	509312	42393017
Waste Management Of Michigan, Inc.	36860 Van Born Rd	Wayne	MI	481841555		495399	562920
Waste Management of Ohio	6705 Richmond Rd	Solon		44139	(440) 439-3555		56221
Waste Management Of Ohio	1535 Exeter Rd.	Akron	OH	44306	330-784-1167		
Waste Management Of Ohio	7450 Oakleaf Rd.	Oakwood	OH	44146	440-786-1300		
Waste Management Of Ohio, Inc.	1046 W Walnut St	Canal Winchester	OH	431109757	6148335290	495399	562920
Wausau Paper Towel & Tissue Llc	700 Columbia Ave	Middletown	OH	450421931	5134242999	262101	322121
Waverly Metals Group	9329 State Route 220	Waverly	OH	45690			
Wayco Recycling Ctr	7679 Burbank Rd	Wooster	OH	44691	(330) 345-1236	509313	
Wayne Disposal, Inc.	49350 N Interstate 94	Belleville	MI	48111	7346972200	495399	562920
Wayne Signer Enterprises, Inc	6545 Wiehe Rd	Cincinnati	OH	452374217	5138411351	263103	322130
Webb Wrecking	4791 West Sandusky	West Millgrove	OH	43467	(419) 957-2596		
Weingold Scrap Svc	3455 Campbell Rd	Cleveland	OH	44105	(216) 641-1071	509313	
Weirton Recycling Ctr	3924 Main St	Weirton	WV	26062	(304) 748-1407	509312	42393017
Weiser Recycling Inc	35900 Clinton St	Wayne	MI	481842075	7347212056	495399	562920
Welsh Recycling Inc	400 S Westwood Ave	Toledo	OH	43609	(419) 690-4377	509312	42393017
West Carrollton Converting, Inc.	400 E Dixie Dr	West Carrollton	OH	454491827	9378593621	262100	322121
West Park Recycling Co Llc	401 Lowell St	Elyria	OH	44035		509312	42393017
West Side Metals Corp	6400 Stock Ave	Cleveland		44102	(216) 961-3166		
Western Reserve Battery Corp	7580 Northfield Rd	Bedford		44146	(440)439-7911		432930
Western Reserve Recycling	19250 Cranwood Pkwy	Warrensville Heights		44128	(216) 518-0400		432930
Western States Envelope Company	1347 Jamiie Ave	Erlanger	KY	410183115	8592831300	262106	322121
Westpark Recycling Co. Llc	4574 Michael Ave	North Olmsted	OH	44070	(216) 407-2192		
Westrock	975 N Freedom St	Ravenna	OH	44266	(330) 297-5817	265201	32221901
Westrock	177 Angell St	Battlecreek	MI				
Westrock Cp, Llc	1015 Marion Rd	Columbus	OH	432072558	6144456850	263100	322130
Westrock Rkt, Llc	1770 Worldwide Blvd	Hebron	KY	410488641	8595862363	263103	322130
Westside Metals	6400 Stock Ave.	Cleveland	OH	44102-5514	216-961-3166		
Whetstones Recycling	10022 Strt, 13	Thornville	OH	43076	(740) 974-4006		
Wilkoff & Sons, Llc	2700 E. 47th Street	Cleveland	OH	44104	(216) 832-1064	509313	
Willies Recycling Llc	1825 E Mansfield St Rear	Bucyrus	OH	44820	(419) 562-9258		
Willig Tire Recycling Llc	91 High St	Seville	OH	44273		509312	42393017
Willio Self Stor	4141 Palmetto Dr	Willoughby	OH	44094	(440) 953-2323	509340	42393039
Willoughby Iron And Waste Materials Llc	3884 Church Street	Willoughby	OH	44094	(440) 946-8990	509302	423930
Wilmington Iron & Metal Company Inc.	2149 Us Route 68 South	Wilmington	OH	45177	(937) 382-3867		
Winston Brothers Iron & Metal	17384 Conant St	Detroit	MI	48212	(313) 891-4410	509313	42393019
WM Recycle America	7450 Oak Leaf Rd	Bedford		44146	513-490-4490		56221
Woodstock Products	2914 Broadway Ave	Cleveland		44115	(216) 641-3811		423930
World Resoure Recovery Systems Of Ohio Inc	16700 Saint Clair Ave	Cleveland	OH	441102964		495399	562920
World Wide Recyclers Inc.	3755 S High St	Columbus	OH	432074011	6145543296	261103	322110
Wyandot County Solid Waste	11385 County Highway 4	Carey	OH	43316	(419) 396-3541	509312	42393017
Wyatt'S Tire Removal	3755 Cleveland Rd	Wooster	OH	44691	(330) 345-3000	509312	42393017
Xtreme Auto Recycling	983 N Woodland Ave	Clyde	OH	43410	(419) 547-2367	509312	42393017
Yellow Recycling LLC	13400 S Woodland Rd	Cleveland		44120	(216) 921-2229		56221
Zacks Recycling Llc	708 Filmore St	Napoleon	OH	43545	(419) 592-4791		
ZeroLandfill	3631 Perkins Ave.	Cleveland		44114			



APPENDIX G

Current Public Drop-off Locations



**Appendix G
Public Drop-off Locations**

Name of Drop-off Site	Address	Operated By	Materials Accepted
Fire Station #1	1645 Superior Avenue	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #20	3765 Pearl Rd	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #23	9826 Madison Ave	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #33	3544 W 177th St	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #39	15637 Lorain Ave	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #4	3136 Lorain Ave	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #42	4665 Pearl Rd	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #43	4525 Rocky River Dr	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Fire Station #5	3201 Lakeside Ave	Aluminum Cans for Burned Children of Northeast Ohio	Aluminum cans
Aetna Metal Recycling	8300 Aetna Rd	Aetna Metal Recycling	Aluminum cans, steel cans
American Scrap Mart	3335 W 65Th St	American Scrap Mart	Aluminum cans, steel cans
Carbon Plate Steel Products	4250 E 68Th St	Carbon Plate Steel Products	Aluminum cans, steel cans
North Coast Ferrous Supply Inc	8200 Old Granger Rd	North Coast Ferrous Supply Inc	Aluminum cans, steel cans
Scrapcom, Inc.	3301 Monroe Ave.	Scrapcom, Inc.	Aluminum cans, steel cans
Weingold Scrap Svc	3455 Campbell Rd	Weingold Scrap Svc	Aluminum cans, steel cans
Wilkoﬀ & Sons, Llc	2700 E. 47Th Street	Wilkoﬀ & Sons, LLC	Aluminum cans, steel cans
A & B Metal Recycling	3049 E 55Th St	A & B Metal Recycling	Aluminum cans, steel cans
Aaromet Metals Recycling Llc	3208 West 63Rd Street	Aaromet Metals Recycling LLC	Aluminum cans, steel cans
Able Alloy Inc	3500 West 140	Able Alloy Inc	Aluminum cans, steel cans
Advance Iron And Metal Co.	7007 Quincy Ave.	Advance Iron And Metal Co.	Aluminum cans, steel cans
All City Recycling	17149 Saint Clair Ave	All City Recycling	Aluminum cans, steel cans
All Scrap Salvage Co Inc	3550 W 140Th St	All Scrap Salvage Co Inc	Aluminum cans, steel cans
All Scrap Salvage Co Inc	3550 W 140Th St	All Scrap Salvage Co Inc	Aluminum cans, steel cans
American Metal Recycling	13170 York Road	American Metal Recycling	Aluminum cans, steel cans
Berea Metals	5201 W 164Th St	Berea Metals	Aluminum cans, steel cans
Broadway Scrap Metals	8202 Broadway Ave	Broadway Scrap Metals	Aluminum cans, steel cans
Eastside Metals	16800 S. Waterloo Rd.	Eastside Metals	Aluminum cans, steel cans
Ferrous Processing And Trading Co.	8550 Aetna Road	Ferrous Processing And Trading Company	Aluminum cans, steel cans
Jbi Scrap Recycling	2925 E 55Th St	Jbi Scrap Recycling	Aluminum cans, steel cans
McMahan's Wrecking	3378 West 65Th St	McMahan's Wrecking	Aluminum cans, steel cans
Miles Alloy, Inc.	13800 Miles Ave	Miles Alloy, Inc.	Aluminum cans, steel cans
Psc Metals Inc	4226 E 71st St	Psc Metals Inc	Aluminum cans, steel cans
Tyroler Scrap Metals	5227 Sweeney Ave	Tyroler Scrap Metals	Aluminum cans, steel cans
Antioch Baptist Church	8869 Cedar Avenue	Royal Oak Recycling	Mixed paper, cardboard
Benedictine High School	2900 Martin Luther King Jr. Dr.	Royal Oak Recycling	Mixed paper, cardboard
Bethany Christian Church - Cleveland	3940 Martin Luther King Jr.	Royal Oak Recycling	Mixed paper, cardboard
Brooklyn Heights Church	2005 West Schaaf Road	River Valley Paper Recycling	Mixed paper, cardboard
Buhrer Dual Language Academy	1600 Buhrer Ave	Royal Oak Recycling	Mixed paper, cardboard
Case School	4050 Superior Avenue	Royal Oak Recycling	Mixed paper, cardboard
Charles A Mooney School	3213 Montclair Avenue	River Valley Paper Recycling	Mixed paper, cardboard
Church Of God	3150 West 58Th Street	Royal Oak Recycling	Mixed paper, cardboard
Church Of St Mel	14436 Triskett Avenue	River Valley Paper Recycling	Mixed paper, cardboard
Cleveland Central Catholic High School	6550 Baxter Avenue	Royal Oak Recycling	Mixed paper, cardboard
Cleveland Institute Of Art	11610 Euclid Ave	Royal Oak Recycling	Mixed paper, cardboard
Cleveland Metroparks	3900 Wildlife Way	River Valley Paper Recycling	Mixed paper, cardboard
Cleveland Montessori	12510 Mayfield Road	Royal Oak Recycling	Mixed paper, cardboard
Cleveland Right To Life	4427 State Road	River Valley Paper Recycling	Mixed paper, cardboard
Concilio De Iglesias	2124 West 98Th Street	Royal Oak Recycling	Mixed paper, cardboard
Corey Umc	1117 E 105Th St	River Valley Paper Recycling	Mixed paper, cardboard
Eprep & Village Prep	9201 Crane Avenue	River Valley Paper Recycling	Mixed paper, cardboard
Gala	13442 Lorain Ave	Royal Oak Recycling	Mixed paper, cardboard
Glenville High School	650 E 113Th Street	Royal Oak Recycling	Mixed paper, cardboard
Hannah Gibbons School	1401 Larchmont Road	Royal Oak Recycling	Mixed paper, cardboard
Holy Name Catholic Church And School	8328 Broadway	Royal Oak Recycling	Mixed paper, cardboard
Horizon Educational Center	13700 Triskett Road	Royal Oak Recycling	Mixed paper, cardboard
Horizon Science Academy Cleveland Hs	6000 South Marginal Road	Royal Oak Recycling	Mixed paper, cardboard
John Marshall High School	3952 W 140Th St	River Valley Paper Recycling	Mixed paper, cardboard
Louisa May Alcott Elementary School	10308 Baltic	Royal Oak Recycling	Mixed paper, cardboard
Mary M Bethune School	11810 Moulton Avenue	Royal Oak Recycling	Mixed paper, cardboard
Mary Queen Of Peace Parish & School	4423 Pearl Road	River Valley Paper Recycling	Mixed paper, cardboard
Max Hayes High School	2211 West 65Th Street	Royal Oak Recycling	Mixed paper, cardboard
Metro Catholic School - St Boniface	3555 West 54Th Street	River Valley Paper Recycling	Mixed paper, cardboard
Mt Haven Baptist Church	3484 Martin Luther King Jr Dr.	Royal Oak Recycling	Mixed paper, cardboard
Northeast Ohio Regional Sewer District	3900 Euclid Ave.	Royal Oak Recycling	Mixed paper, cardboard
Olivet Institutional Baptist	8712 Quincy Avenue	River Valley Paper Recycling	Mixed paper, cardboard
Open Door Missionary	8215 Woodland Avenue	River Valley Paper Recycling	Mixed paper, cardboard
Our Lady Of Mount Carmel Church	6928 Detroit Ave	Royal Oak Recycling	Mixed paper, cardboard
Our Lady Of Mt Carmel School	1355 W 70Th St	Royal Oak Recycling	Mixed paper, cardboard

Appendix G
Public Drop-off Locations

Pearl Academy	4850 Pearl Rd	Royal Oak Recycling	Mixed paper, cardboard
Philemon Community Baptist Church	12618 Shaw Avenue	Royal Oak Recycling	Mixed paper, cardboard
Rainey Institute	1705 East 55Th Street	Royal Oak Recycling	Mixed paper, cardboard
Saint Martin De Porres H S Cleveland	6202 St Clair Ave	Royal Oak Recycling	Mixed paper, cardboard
Serrato Corp Dba Cleveland Job Corp	13421 Coit Road	Royal Oak Recycling	Mixed paper, cardboard
Solutions At Work	12117 Berea Road	Royal Oak Recycling	Mixed paper, cardboard
St Jerome School - Cleveland	15100 Lakeshore Boulevard	Royal Oak Recycling	Mixed paper, cardboard
St John Ame Church	2261 East 40Th St	River Valley Paper Recycling	Mixed paper, cardboard
St John Nepomucene	3785 Independence Road	River Valley Paper Recycling	Mixed paper, cardboard
St Leo The Great Church And School	4940 Broadview Road	River Valley Paper Recycling	Mixed paper, cardboard
St Michael The Archangel Church	3114 Scranton Rd	Royal Oak Recycling	Mixed paper, cardboard
St Roccas Church And School	3205 Fulton Road	River Valley Paper Recycling	Mixed paper, cardboard
St Vincent De Paul Society	2145 Broadview Road	River Valley Paper Recycling	Mixed paper, cardboard
Stockyard Community Elementary School	3200 West 65Th Street	Royal Oak Recycling	Mixed paper, cardboard
Waverly Elementary School	1805 W. 57Th Street	Royal Oak Recycling	Mixed paper, cardboard
West Park Masonic Temple	15500 Triskett	Royal Oak Recycling	Mixed paper, cardboard
Westpark Ymca	15501 Lorain Avenue	Royal Oak Recycling	Mixed paper, cardboard
Westside Community School Of The Arts	3727 Bosworth Road	Royal Oak Recycling	Mixed paper, cardboard
Woodland Academy	10615 Lamontier Ave	Royal Oak Recycling	Mixed paper, cardboard
East 55th Street and Euclid Avenue	East 55th Street and Euclid Ave.	City of Cleveland	Mixed paper, cardboard, aluminum cans, steel cans, glass, plastic
Ridge Rd Transfer Station	3727 Ridge Road	City of Cleveland	Mixed paper, cardboard, aluminum cans, steel cans, glass, plastic



APPENDIX H

Residential Survey Answer Summary



**Appendix H
Residential Survey Answer Summary**

Topic	Question	Answer	Count
Past Waste and Recycling Practices	1. Have you participated in the past by recycling items curbside?	Yes	2397
		Not Applicable- I did not have access to curbside recycling	121
		No	22
	2. If you answered "Yes" to question 1 above, how often do you set out your blue cart?	Weekly	1758
		Every other week	485
		Once a month	128
		I don't participate in curbside recycling	92
		Every other month	14
	3. If you answered "Yes" to question 1 above, what items did you recycle curbside? Select all that apply.	Plastic bottles & jugs	2347
		Glass bottles & jars	2300
		Cardboard	2271
		Aluminum, tin, & steel cans	2224
		Newspaper, mixed paper, & paperboard	2015
		Cartons	1704
		Other	164
	4. If you answered "No" to question 1 above, why haven't you participated in curbside recycling? Select all that apply.	Other	98
		Recycle at a drop-off, scrap yard or elsewhere	43
		Inconvenient	11
		Too confusing to separate recyclables from garbage	11
		Cost Related	6
		Not worthwhile or don't have enough recyclables to bother with	6
		Don't think it is important/Don't care	5
	5. Do you, or members of your household, take recyclables to a drop-off collection center now?	No	1758
		Yes	766
		I don't know	16
	6. Who is (are) the most frequent recycler(s) in your household?	Everyone recycles	2099
		Adult(s)	403
		No one recycles	34
		Child(ren)	1
	7. How does your household typically dispose of plastic grocery bags?	Reuse them for other purposes and then place in trash can	1763
		Return them to the grocery store	869
		Other	664
		Put them in the trash can	294
	8. In the past year have you received payment for recycling aluminum, steel, and/or tin cans?	Put them in the recycling bin	128
		No	2258
		Yes	257
		Unsure/Don't remember	24
	9. About how many recyclables does your household generate for curbside recycling in a week?	More than half of the blue recycle bin is filled with recyclables	706
		Half of the blue recycle bin is filled with recyclables	687
		Less than half of the blue recycle bin is filled with recyclables	551
		Blue bin is always completely filled with recyclables	498
		Not applicable- I don't recycle	55
		Prefer not to answer	24
	10. What other waste reduction practices do you do at home? Select all that apply.	Use reusable water bottles and coffee mugs	2028
		Refuse items I do not need (i.e. utensils for takeout, bags at stores, etc.)	1664
		Properly recycle other items that do not go in the curbside bin (i.e. hazardous waste, electronics, paper shredding, single use plastic bags, etc.)	1548
		Take reusable bags to the grocery store	1445
Buy items with less or recyclable packaging (i.e. buying in bulk, etc.)		1306	
Backyard composting or other composting program		1004	
Other		92	
1-2 times/year		839	

**Appendix H
Residential Survey Answer Summary**

	11.How often do you set out bulk items for collection?	3-6 times/year	687	
		Less than 1 time/year	393	
		I do not set out bulk items	276	
		6+ times/year	231	
		I set out bulk items every month	113	
	12.What items do you set out for bulk collection? Select all that apply.	Furniture	1606	
		Yard Waste	1446	
		Appliances	586	
		Tires	201	
	Understanding Recycling and How to Share Program Updates	1.When your household is unsure whether an item is recyclable, what do you do?	Place the item in the trash	1466
			Other	566
			Contact my county, city, or recycling collector	381
Place the item in the recycling bin			137	
2.What are the best sources you have used to find information about recycling? Select all that apply.		Other	1544	
		City website	1413	
		Google or other internet search engine	1408	
		County website	760	
		Neighbors	577	
		Relatives/friends	424	
		Mail	209	
	Billing statement/insert	167		
3.Have you ever visited the City of Cleveland Division of Waste Collection	Yes	1708		
	No	828		
4.What information about waste collection and recycling would you like available when visiting the City of Cleveland website? Select all that apply.	Recycling- Information on what is/is not recyclable in curbside recycling	2203		
	Waste- Collection schedule/collection days and holiday calendar	2009		
	Special waste collection- Information on where/how to dispose of materials (bulk, hazardous waste, electronics, etc.)	1950		
	Waste- Collection setout guidelines	1908		
	Additional locations and opportunities to recycle outside of the city's curbside collection programs	1529		
	Contact information for who to contact with questions	1462		
	Organic waste recycling information	1194		
Other	104			
The Future of Recycling in Cleveland	1.Would you like having the option of opting in or opting out of recycling?	No	1330	
		Yes	755	
		Unsure	445	
	2.Do you know how much you currently pay for waste and recycling services for	No	1665	
		Yes	856	
	3.How much more would you be willing to pay for curbside recycling per month?	Up to \$5/month	701	
		\$5 - \$10/month	633	
		Zero	570	
		Not Applicable- I do not want to pay for recycling	400	
		More than \$10/month	212	
	4.Would you separate out your recyclable materials if requested (i.e. separate streams for cardboard and	Yes	2121	
		Unsure	236	
		No	180	
	5.How often would you prefer curbside recycling be picked up?	Weekly	1720	
		Every 2 weeks	724	
		Monthly	80	
	6.Would you be willing to drive to a central location to drop off your recyclable materials?	No	1070	
Yes		887		
Unsure		584		
7.If you answered "Yes" to Question 6 above, how far would you be willing to	1-3 miles	555		
	3-5 miles	293		

**Appendix H
Residential Survey Answer Summary**

	travel to a central location to drop off recyclable materials?	0-1 miles	245
		5+ miles	104
	8.If you live in an apartment or other household not serviced by the City of Cleveland Division of Waste, would you recycle if the service were made available	Not applicable	1769
		Yes	449
		Unsure	29
		No	18
	1.What is your race/ethnicity?	Caucasian/White	1983
		Prefer not to answer	280
		African American/Black	104
		Other	88
Hispanic/Latino		69	
Asian/Pacific Islander		26	
2.What language do you speak most at home?	English	2473	
	Other	67	
	Spanish	8	
	French	1	
	Chinese (all varieties)	1	
3.What is the highest level of schooling you have completed?	College degree	979	
	Post-graduate studies or higher	942	
	Some college	334	
	High school graduate or equivalent	148	
	Technical/vocational training	77	
	Some high school or less	14	
4.How long have you lived in the City of Cleveland?	21 years or longer	1018	
	11-20 years	435	
	6-10 years	419	
	3-5 years	399	
	1-2 years	175	
	Less than a year	73	
5.What is your current employment status?	Full-time	1687	
	Retired	353	
	Part-time	172	
	Prefer not to answer	97	
	Unemployed	90	
	Other	82	
	Voluntarily out of the workforce	37	
6.Which of the following would encourage you to recycle more? Select all that apply.	Other	2069	
	Information on what is recyclable and what is not	206	
	A recycle container located inside the house	78	
	A fridge magnet with a recyclable items list	64	
	Cost to the City if recycling goals aren't met	59	
	Knowing more about how it helps the City of Cleveland and the environment	35	
	A cart sticker with a recyclable items list	16	
	Emphasis by schools and community groups	12	
	More reminders (mailers, billboards, advertising, etc.)	11	
7.How important is it to you that a business you visit frequently has recycling services?	Extremely important	1107	
	Somewhat important	940	
	Unsure	210	
	Somewhat unimportant	138	
	Not at all important	117	
	10.Do you feel it is the responsibility of the City to provide recycling services for residents?	Yes	2410
	I don't know	71	
	No	48	
	44102	579	

**Appendix H
Residential Survey Answer Summary**

About You	Zip Codes	44111	422
		44113	406
		44109	326
		44135	225
		44144	106
		44105	100
		44120	69
		Other	54
		44119	47
		44110	44
		44106	39
		44103	19
		44114	18
		44107	15
		44115	14
		44108	10
		44127	10
		44128	10
		44134	9
		44121	8
44112	5		
44129	4		
44104	3		
44122	3		
44116	2		
44126	2		
About You	Ward	Ward 3- Councilman Kerry McCormack	458
		Ward 15- Councilman Jenny Spencer (formerly Matt Zone)	439
		Ward 17- Councilman Charles Slife	378
		I don't know my Ward/Councilperson	272
		Ward 13- Councilman Kevin Kelley	219
		Ward 12- Councilman Anthony Brancatelli	155
		Ward 16- Councilman Brian Kazy	155
		Ward 8- Councilman Michael Polensek	88
		Ward 2- Councilman Kevin Bishop	77
		Ward 11- Councilman Brian Mooney	61
		Ward 14- Councilwoman Jasmin Santana	58
		Ward 6- Councilman Blaine Griffin	51
		Ward 4- Councilman Kenneth Johnson	40
		Ward 1- Councilman Joseph Jones	19
		Ward 7- Councilman Basheer Jones	18
		Ward 5- Councilwoman Phyllis Cleveland	15
		Ward 9- Councilman Kevin Conwell	14
Ward 10- Councilman Anthony Hairston	9		
About You	Type of Home	Homeowner- Single Family Home	1754
		Renter- Multi-Family Home (up to 4 units)	220
		Renter- Single Family Home	218
		Homeowner- Multi-Family Home (up to 4 units)	170
		Renter- Multi-Family Residence (more than 4 units)	98
		Other	52
		Prefer not to answer	30
	25 – 34	655	
	35 – 44	626	
	55 – 64	407	

**Appendix H
Residential Survey Answer Summary**

Age	45 – 54	392
	65+	303
	Prefer not to answer	79
	Under 25	77
Gender	Female	1618
	Male	774
	Prefer not to answer	119
	Other	23
Number of People	Two (2)	1146
	One (1)	582
	Three (3)	389
	Four (4)	245
	Five (5)	83
	Six (6) or more	56
	Prefer not to answer	41
Income	\$100,000+	699
	\$50,000 - \$74,999	490
	Prefer not to answer	421
	\$25,000 - \$49,999	386
	\$75,000 - \$99,999	378
	Under \$25,000	164