

CITY OF UNIVERSITY HEIGHTS, OHIO

Final ***Solid Waste Collection Analysis***

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Prepared by:

GT
ENVIRONMENTAL

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I. INTRODUCTION

The City of University Heights (from herein referred to as City) population (approximately 12,938 ¹) currently provides backdoor/side door solid waste collection services (trash and recycling) and curbside yard waste collection for its residents. The City is interested in evaluating its solid waste collection services to identify operational efficiencies, cost savings and alternative collection systems. The City hired GT Environmental, Inc. (GT) to conduct a Solid Waste Collection Analysis (Study) in 2009 with the purpose to assist the City in determining if operational changes or enhancements can be made to save money while still maintaining a high level of service to its residents. In addition, the study will also identify alternative collection programs. In 2019, the City hired GT to update the 2009 Study. The following report consists of the same general format as the 2009 Study with updates and new information added where appropriate.

¹ According to the Ohio Department of Development, Office of Strategic Planning.

The Study consisted of evaluating the following:

- Existing City Collection Program
- Analysis of City Collection Routes
- Analysis and Comparison of Solid Waste Collection Programs from Similar Municipalities in Cuyahoga County to the City
- Economic Analysis of Privately Contracted Curbside Collection Programs in Cuyahoga County
- Conclusions and Suggested Alternatives

II. SOLID WASTE COLLECTION ANALYSIS

A. EXISTING COLLECTION PROGRAM EVALUATION

GT developed a detailed information and data request that was submitted to the City and is included in Appendix A. Based on the information submitted and interviews with the Service Director and his staff, the following section summarizes the existing solid waste collection program for the City.

The City is a suburban community with a population of 12,938 and a total of 4,272 households with trash and recycling service. The City, through its Service Department, provides side/back door trash and recycling service and curbside yard waste collection. The following section summarizes the trash, recycling and yard waste services.



1. TRASH COLLECTION PROGRAM

The City provides a very unique system of trash collection for its residents. Through the use of Kubota utility vehicles, residential trash is collected from the back or side door areas of each residence. In 2018, the City collected 4,542 tons of trash.

This system involves two Kubota vehicles, each servicing two sides (generally) of the street and a rear load packer truck. The rear load packer trucks travels down each street ahead of the Kubota vehicles. The driver of the rear load packer truck will dump the Kubota vehicle loads into the packer, place recyclables from the Kubota's onto a central area of the street for later pick-up, collect bulk items and may also collect materials from the side or back door of residences and assist in large loads.

The Kubota vehicles travel to each household, up the driveway, to where the trash and recyclables are stored. Each Kubota vehicle has a dump bed to accumulate trash. When the Kubota vehicles have filled up their dump bed, they move to the rear load packer and dump their load into the larger truck.

The following table summarizes the equipment used to collect trash in the City.

Truck #	Type (Side, Rear, Front Load, Other)	Capacity	Age	Purchase Price
21-1	Rear Load	25 yds	18	\$41,900
21-2	Rear Load	25 yds	11	\$117,000
21-3	Rear Load	25 yds	17	\$43,000
21-4	Rear Load	25 yds	11	\$117,000
21-5	Rear Load	25 yds	1	\$156,800
21-6	F-250/ liftgate	6 yds	4	\$29,000
21-7	Rear Load	25 yds	18	\$50,500
21-8	F-250/ liftgate	6 yds	2	\$29,000
21-9	Rear Load	25 yds	1	\$222,000
201	Kubota	2 yds	1	\$14,800
202	Kubota	2 yds	2	\$15,300
203	Kubota	2 yds	3	\$14,200
204	Kubota	2 yds	4	\$15,000
206	Kubota	2 yds	6	\$12,900
208	Kubota	2 yds	1	\$14,800

In total, the City has invested over \$800,000 in collection equipment to operate its solid waste program. The City does not owe any money on the capital equipment listed above.

2. RECYCLING COLLECTION PROGRAM

The City recycling program is a dual stream system which involves the collection of fiber (newspaper) separately from containers (aluminum cans, plastic and metal food

containers). The City collected approximately 335 tons per year of the following recyclable materials.

- # 1 through # 5 & # 7 Plastics
- Glass
- Aluminum
- Tin
- Steel
- Newsprint
- Magazines



The City uses a manual system to collect recyclables and requires the residents to bag the materials prior to pick-up. Residents must place their bagged recyclables next to their trash containers each week for collection at either their side door area or in front of the garage.

The City also uses the same Kubota vehicles as the trash collection program. The recyclables are placed in an open top container mounted to the front of the Kubota. The Kubota operator may also place recyclables in the cab or on top of the collected trash depending on volumes. Once the Kubota is full of trash and recyclables, the recyclables are placed at the curb for pick-up by a separate rear load packer truck.



Finally, the City also stages a 40-yard roll-off box at the Service Department yard for residents to drop-off fiber materials (newspaper, magazines, cardboard, junk mail, office paper, and boxboard,). This program is part of the Cuyahoga County Solid Waste Management District's Paper Cooperative. In 2018, the City collected 22.00 tons of fiber materials from this program. In 2018, the City spent \$1,242.85 in hauling fees for the materials at an average cost per ton amount of \$56.49.

3. *YARD WASTE COLLECTION PROGRAM*

The City's yard waste program involves the collection of grass, brush, tree limbs and mixed yard waste at the curb. Yard waste is placed at the curb weekly and collected by a separate truck. In 2018, the City collected 1,228 tons of mixed yard waste. The City paid Kurtz Bros. Inc. \$15,625 (approximately \$125 per load) to accept the yard waste from the City collections in 2018. The City transfers yard waste in a 25 cubic yard packer truck. The City is charged \$2/cubic yard for leaves and \$10/cubic yard for brush and mixed yard waste bags. Yard waste generated from independent tree trimming contractors was also generated but not tracked by the City.

4. SPECIAL MATERIALS COLLECTION PROGRAM

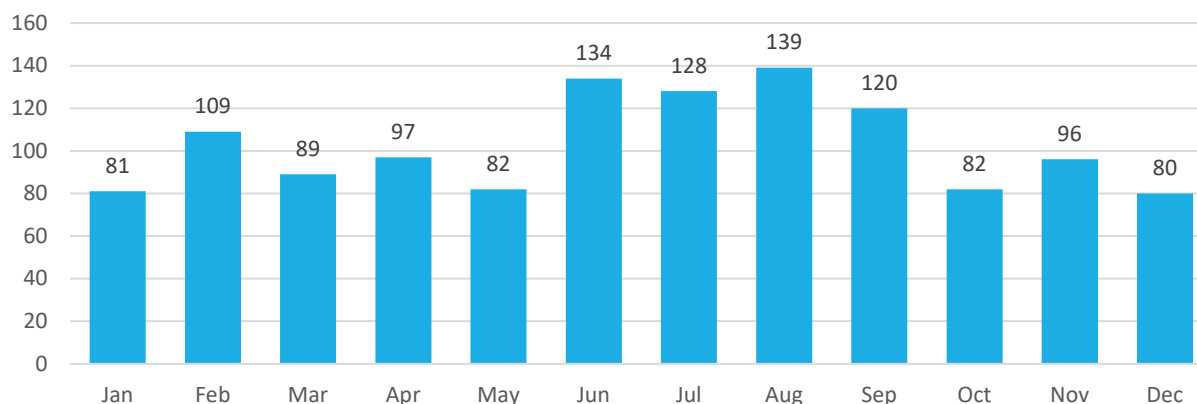
The City collected special materials such as appliances, Freon containing appliances, tires and bulk items such as furniture. Residents pay a fee of \$10.00 for these collection services and are required to call the Sanitation Department to schedule the service. In 2018, a total of 1,651 special pick-ups were requested with a total revenue amount of \$18,350.

5. CUSTOMER SERVICE/COMPLAINT MANAGEMENT

Customer service issues are handled by the City through a dedicated employee who answers the phone and records the complaint. Most complaints are from missed pick-ups. Other complaints may include property damaged caused by the collection crews or questions about the collection service.

Once the City has completed its normal trash and recycling routes, the crews are then instructed to go back to houses that were missed for various reasons. These could be from gates being locked to cars in the way of the Kubotas to other reasons. In 2018, the City had 1,237 missed pick-ups.

The following chart summarizes the missed pick-ups by month in 2018:



The average monthly missed pick-ups in 2018 were 103 with the weekly average at 26 and the per route average at 3. As a comparison to the 2009 data, the City average 128 monthly missed pick-ups and a weekly average of 4 per route.

6. VEHICLE MAINTENANCE

The City employs two mechanics to maintain the fleet of equipment for the service department as well as the other departments in the City. Each day, the lead mechanic (not the driver of the equipment) performs the required pre-trip inspection for each vehicle scheduled for service that day. Any routine maintenance that is required is scheduled and performed as needed.

7. CITY OPERATING REVENUES

The City operates its Service Department as an integrated service funded through the City's general fund. Residents are not charged directly for trash, recycling and yard waste services. The only revenue that is directly generated from the Division's operations is from the sale of fiber materials collected from the curbside recycling program and from special pick-up of bulk materials. The following table summarizes the City's Service Department's revenue in 2018.

2018 City Revenue Sources

Description	Revenue Totals
Recyclable Revenue	\$689.60
Special Pick-Ups	\$18,350.00
Total	\$19,039.60

The tax revenue to support operations was not available at the time of this report development.

8. CITY OPERATING COSTS

The following table summarizes the estimated expenses for both trash and recycling services in the City of University Heights.

2018 City Expenses

Description	Total
Labor/Benefits	\$930,140
Disposal/Processing	\$184,778
Overhead	\$44,131
Maintenance	\$58,165
Total	\$1,217,214

The City does not operate as an enterprise fund entity as all of the expenses for trash and recycling services are covered by general fund monies. The City's net expenses are reduced by the revenue received from the sale of fiber materials from their program and from special bulk pick-ups.

Based on the 2018 reported expense to operate the department, the cost per household per month for the service provided is calculated to be \$23.74. This compares to the same calculation performed in 2009 of \$18.89 per household per month. The 2018 calculation is an increase of 20% over 2009.

9. MATERIAL FLOW

Trash

The City transfers all of the collected trash and transports to Republic Services – dba – Browning Ferris Industries of Ohio, 30300 Pettibone Road, Glenwillow which is approximately 29 miles round trip from the City’s trash routes. The City assigns one driver (recycling route driver) to haul all loads to the transfer station. Most trash routes require more than one packer truck load to complete the route. The standard process for each route is to switch packer trucks at lunch time with an empty truck. Then the assigned employee runs the full truck to the transfer station. In 2018, the total trash delivered to the transfer station was 4,542 tons at a total cost of \$184,778.

Recyclables

The City delivers the collected recyclables from its curbside recycling program to Kimble Transfer & Recycling, 8500 Chamberlain Road, Twinsburg which is approximately 40 miles round trip from the City’s recycle routes. In 2018, the City delivered approximately 292 tons of recyclables to Kimble Transfer & Recycling at no cost. The City also delivered approximately 22 tons of fiber materials to Greif for a cost to the City of \$1,242.85

B. ROUTE STUDY

In order to understand how the current collection program operates, GT and the City conducted a detailed analysis of the trash collection routes operated by the City in 2009. The analysis included the following criteria:

- Number of routes per day;
- Number of employees per route;
- Mileage driven per vehicle;
- Service/stop times;
- Set-out Rates;
- Service/Stop Counts;
- Repeated collection stops;
- Waste generated on an average per household basis;
- Residential trash and recyclables set-out levels per week;
- Other baseline economic parameters; and
- Crew drive time to the disposal/processing facility from the end of routes.

The following table summarizes the general route data supplied by the City for the trash routes:

Day	# of Routes	# of Pick-Ups Per Day/Route	Avg. Tons Collected/Day	Hours to Complete	Staff Per Route
Monday	2	1,047/524	23.71	6-7	3
Tuesday	2	1,070/535	23.71	6-7	3
Wednesday	2	1,087/544	23.71	6-7	3
Thursday	2	1,068/534	23.71	6-7	3
Friday	N/A	N/A	N/A	N/A	N/A
Total	8	4,272	94.84	24-48	N/A

The following table summarizes the general route data supplied by the City for the recycling routes:

Day	# of Routes	# of Pick-Ups Per Day/Route	Avg. Tons Collected/Day	Hours to Complete	Staff Per Route
Monday	1	Varies	1.875	3	1
Tuesday	1	Varies	1.875	3	1
Wednesday	1	Varies	1.875	3	1
Thursday	1	Varies	1.875	3	1
Friday	N/A	Varies	N/A	N/A	N/A
Total	4	Varies	7.5	12	1

GT conducted a follow-up route analysis on June 12, 2019 to determine what general changes and conditions exist for the trash, recycling and yard waste collection program. GT observed the B route for Wednesday.

In 2009, GT analyzed the following routes:

- Monday (Crew B)
- Tuesday (Crew A)
- Thursday (Crew B) routes.
- In addition, the City conducted a route analysis (Crew A) on Wednesday, using GT's route analysis forms. The following section summarizes the analysis.

1. SET-OUTS

GT and the City counted each resident that set-out trash and or recyclables for each route studied during the analysis in 2009. The following table summarizes the results:

2009 Route Analysis Set-Outs						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A		431	457		444	453
B	465			458	462	

The average set-outs observed for all routes were 453. The following table summarizes the route followed by GT in 2019:



2019 Route Analysis Set-Outs						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A						504
B			504		504	

2. PASS-BYS

GT counted each residential unit serviced by the City for each route studied during the route analysis in 2009. The following table summarizes the total residential units not serviced (pas-bys) by the City for the routes studied:

2009 Route Analysis Pass-Bys on Route						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A		121	115		118	95
B	70			75	72	

GT conducted a one-day analysis of the Wednesday B in 2019:

2019 Route Analysis Total Homes on Route						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A						31
B			31		31	

3. TOTAL HOMES ON ROUTES

2009 Actual Total Homes by Route							Actual	
Route	Monday	Tuesday	Wednesday	Thursday	Total	Avg.	Actual House Counts	% Set-Out
A		552	572		1,124	562		98.6%
B	570			533	1,103	534	1117	98.7%

2019 Actual Total Homes by Route							Actual	
Route	Monday	Tuesday	Wednesday	Thursday	Total	Avg.	Actual House Counts	% Set-Out
A								
B			535			535	544	98.3%

4. ROUTE TIME

GT and the City calculated the actual time each crew spent on the routes minus break time and lunch for each route studied during the analysis. The following table summarizes the results:

2009 Route Time (Start to Finish)(Hours)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A		6.65	6.03		6.34	6.73
B	7.68			6.57	7.13	

2019 Route Time (Start to Finish)(Hours)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A						4.38
B			4.38		4.38	

5. TIME PER SET-OUT

GT and the City calculated the actual time each crew spent on each set-out for each route studied during the analysis. The following table summarizes the results:

2009 Time Per Set-Out (Total Route Time)(Seconds)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A		56.47	48.29		52.38	54.18
B	59.48			52.48	55.98	

2019 Time Per Set-Out (Total Route Time)(Seconds)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A						51.9
B			51.9		51.9	

A separate time study on 30 consecutive stops was conducted for comparison purposes. The results showed an average time per set-out of 47.01 seconds.

6. WEIGHT PER ROUTE

GT calculated the actual weight of trash collected for each route studied during the analysis. The following table summarizes the results:

2009 Weight Per Route (Tons)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A		10.63	14.91		12.77	12.54
B	15.17			9.46	12.32	

2019 Weight Per Route (Tons)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A & B			22.49		22.49	22.49

7. WEIGHT PER SET-OUT

Based on the overall weight of each route and the number of set-out, GT was able to calculate the total weight per set-out. The following table summarizes the results:

2009 Weight Per Set-Out (Pounds)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A		49.33	65.25		57.29	55.28
B	65.25			41.31	53.28	

2019 Weight Per Set-Out (Pounds)						Average
Route	Monday	Tuesday	Wednesday	Thursday	Average	
A & B			42.08			42.08

8. GENERAL OBSERVATIONS

GT and the City recorded numerous general observations while following the crews on each of the routes in 2009. The following section summarizes the comments and observations:

- Collected recycle bags are accumulated in piles every 5th house or more depending on volume
- Kraft bags (yard waste) are brought to the curb, if not they are disposed of or left by the Kubota driver
- Kubota drivers are required to go into each driveway to check for trash and recyclables, even if there were none placed out as they cannot determine from the street if materials are left out
- Kubotas have to drive against traffic and perform u-turns in front of traffic in certain areas of the City in order to dump their loads in the packer truck
- Packer truck driver assists Kubota drivers by walking up some driveways to collect trash and recyclables if time allows
- Packer truck driver operates the truck Kubota driver operates the dumping controls, while Kubota driver remains in the Kubota during this process

- If a car is in the way in the driveway or a gate is closed/locked, the Kubota driver has no choice but to skip the house
- Cardboard is collected for recycling
- Some drivers do not wear safety vests while outside their vehicles
- Some recyclables are thrown out with the trash (rare) if they are not in blue bags
- Overloaded scooters have a tendency to scatter litter onto the roadway that is not always detected by the crew
- Some route areas have homes with very short driveways where the trash and recyclables are only a few feet away from the curb
- Some route areas have long driveways or driveways that have a semi-steep incline
- Major roadways such as Cedar, Belvoir and Warrensville present unique difficulties for the crews because of traffic

The following additional comments were captured from the 2019 route analysis:

- A significant amount of cardboard is not recycled even though it is source separated by residents
- Recyclables are still bagged as a direct result of side door service. Bags are being eliminated in other recycling programs to decrease contamination
- Bulk or large items along with yard waste are placed at curb
- Routes finished after 2nd break, crews then went on call back pick-ups and special pick-ups
- One of the recycle drivers is utilized to swap out trash trucks on route or during breaks to bring the trash to the transfer station, thus keeping the trash routes operating without having to directly go to the transfer station

C. COMPARABLE MUNICIPALITY EVALUATION

GT selected 10 municipalities in Cuyahoga County to compare their solid waste collection operations to the City's. Nine of the communities selected offered curbside services and 2 offered side/back door services. The following communities were sent an information request (see Appendix A) in June of 2019:

- Brook Park
- Brooklyn
- Highland Heights
- Independence
- Lakewood
- Lyndhurst
- Mayfield Heights
- Pepper Pike
- Shaker Heights
- South Euclid

Seven of the ten cities that were sent a survey, the following submitted useable data and information for this Study:

- Brook Park
- Lakewood
- Lyndhurst
- Mayfield Heights
- Pepper Pike
- Shaker Heights
- South Euclid

The following section summarizes the results of the data collected from the two information request efforts.

1. DEMOGRAPHICS

The following section summarizes the demographic similarities and differences with the cities studied and as compared to the City's demographics.

City	Population	Households	Median Household Income
Brooklyn	10,737	4,000	\$40,661
Brook Park	18,533	8,360	\$49,854
Highland Heights	8,405	3,301	\$103,787
Independence	7,167	2,960	\$93,443
Lakewood	50,100	14,000	\$45,098
Lyndhurst	13,484	5,145	\$70,496
Mayfield Heights	22,278	2,337	\$48,936
Pepper Pike	6,333	11,500	\$166,786
Shaker Heights	27,302	9,000	\$49,650
South Euclid	21,473	5,248	\$57,058
University Heights	12,938	4,272	\$71,007

2. TRASH PROGRAM OPERATIONS

Each of the comparable cities was asked a series of questions about their trash collection program ranging from operational information to cost of service. The following section summarizes their Responses:

Collection Program Promotion

Each city studied had some form of promotion, education and awareness for their trash collection program. The following table summarizes their efforts:

City	Collection Program Promotion to Customers
Brooklyn	Website, social media, and mail
Brook Park	No Response
Independence	No Response
Lakewood	Website
Lyndhurst	Website, handouts, and newsletter
Mayfield Heights	No Response
Pepper Pike	Service Dept. newsletter/website
Shaker Heights	Social media, email, etc.
South Euclid	City newsletter and website
University Heights	Newsletter, website, and informational flier given to all new residents

Collection System

Of the 10 cities were sent surveys, 4 offered traditional curbside collection of trash and 1 side/back door service in 2018. The following table summarizes the collection programs by the City.

Community	Hauler	Collection System
Brook Park	Municipal	Curbside
Highland Heights	Kimble	Curbside
Independence	Municipal	Curbside
Lakewood	Municipal	Curbside
Lyndhurst	Municipal	Curbside
Mayfield Heights	Kimble	Curbside
Pepper Pike	Municipal	Back/Side Door
Shaker Heights	Municipal	Back/Side Door
South Euclid	Kimble	Curbside
University Heights	Municipal	Back/Side Door

Customer Complaints

Each city studied manages customer complaints for their trash collection program. The following table summarizes their efforts:

City	Customer Complaints Managed
Brooklyn	Service Director/General Foreman
Lakewood	Phone, email
Lyndhurst	Through the Service Department
Mayfield Heights	Kimble
Pepper Pike	Through an electronic database and hard copy tickets
Shaker Heights	MUNIS Work Order System
South Euclid	Kimble
University Heights	Through the phone operator/dispatcher

Missed Collections

Each city studied manages missed collection stops for their trash collection program. The following table summarizes their efforts:

City	Missed Collection Stops
Brooklyn	If warranted/go back
Lakewood	Truck goes back
Lyndhurst	After route any late/missed stops are collected
Mayfield Heights	Kimble
Pepper Pike	We go back
Shaker Heights	Given to appropriate crew
South Euclid	Kimble
University Heights	Goes back after routes are completed

Collection Days

Most of the cities studied collect five days a week with the exception of Brooklyn and Pepper Pike and the City.

Brooklyn	Lakewood	Lyndhurst	Mayfield Heights	Pepper Pike	Shaker Heights	South Euclid	University Heights
4	5	5	5	4	5	5	4

Routes

Each of the cities studied collected trash manually either at the curb or the side/back door area. Differences in routing and the type of collection service show up in the amount of

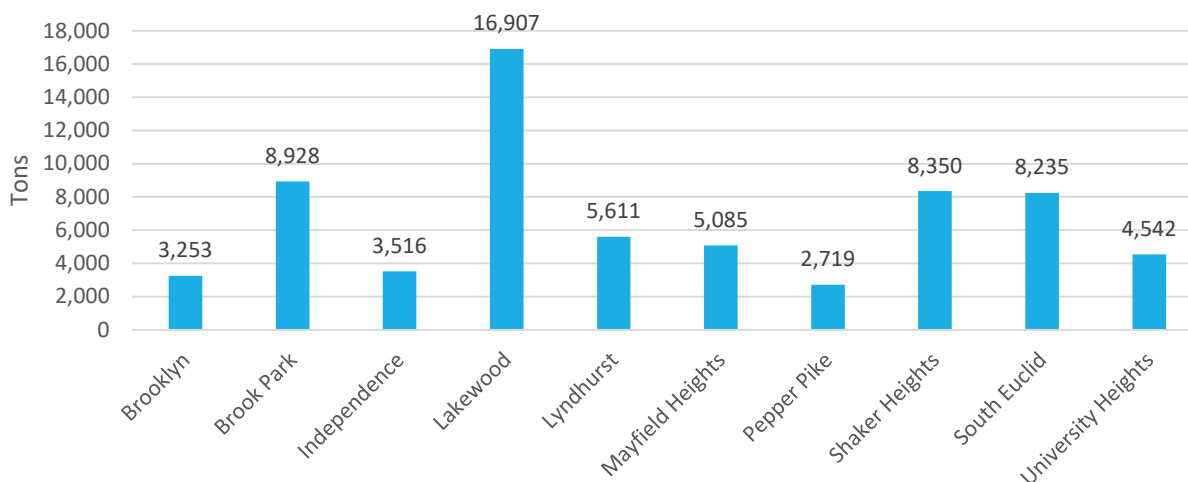
set-outs collected per route as shown in the following chart as well as the number of employees per route; also shown in the second chart below.

City	Stops per Route	# of Sanitation Employees per Trash Route
Brooklyn	1,000	1
Lakewood	Varies	Varies
Lyndhurst	1150-1200	2
Mayfield Heights	N/A	Kimble
Pepper Pike	599	5
Shaker Heights	700	3
South Euclid	N/A	Kimble
University Heights	450-500	3

In general, curbside programs collect more set-outs per route and have fewer employees per route than side/back door programs.

Tonnage Collected

Disposal tonnage varied across the spectrum as each city was unique in regards to population, waste generation habits and recycling program performance. The following chart depicts each of the cities studied along with how that compares to the City of University Heights.



3. RECYCLE PROGRAM OPERATIONS

Collection System

Of the ten cities surveyed, 7 offered traditional curbside collection of trash and 2 side/back door service in 2018. The following table summarizes the collection programs by each City.



Community	Hauler	Collection System
Brooklyn	Municipal	Curbside
Brook Park	Municipal	Curbside
Independence	Municipal	Curbside
Lakewood	Municipal	Curbside
Lyndhurst	Municipal	Curbside
Mayfield Heights	Kimble	Curbside
Pepper Pike	Municipal	Back/Side Door
Shaker Heights	Municipal	Back/Side Door
South Euclid	Kimble	Curbside
University Heights	Municipal	Back/Side Door

Collection Days

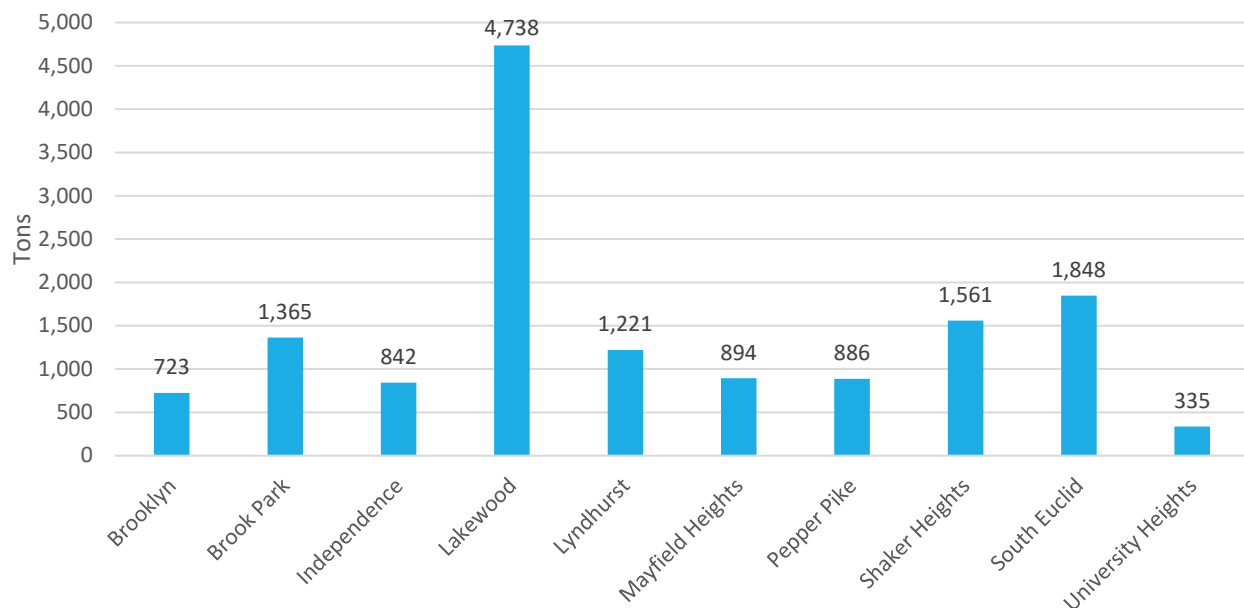
All of the cities studied collect at least four days a week.

Brooklyn	Lakewood	Lyndhurst	Mayfield Heights	Pepper Pike	Shaker Heights	South Euclid	University Heights
4	5	5	7	4	5	5	4

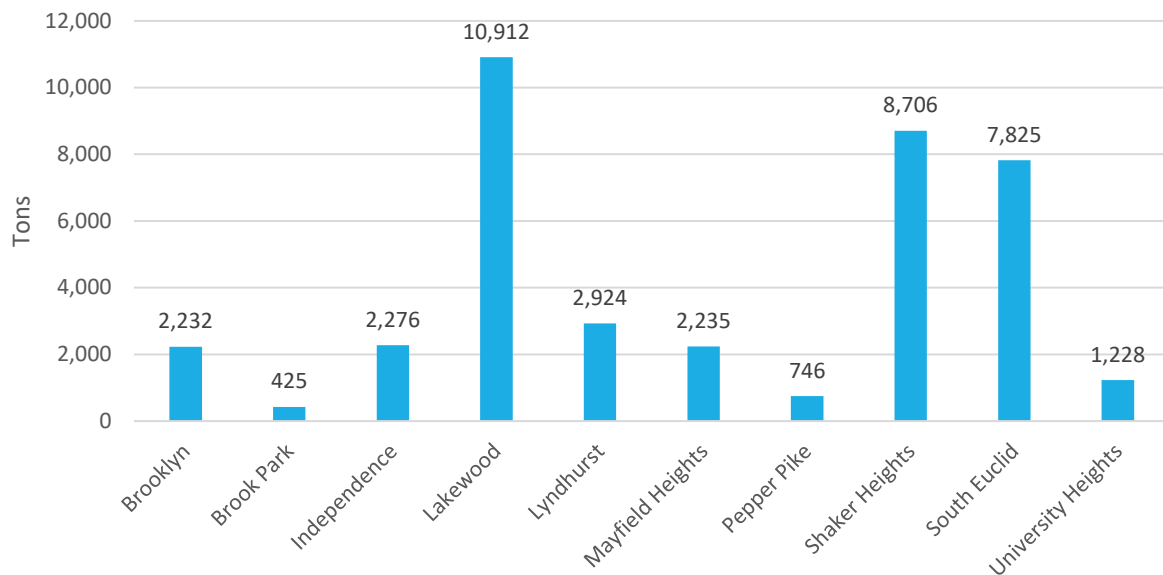
Routes

Recycling routes for each of the cities studied directly mirrors their trash collection routes.

Tonnage Collected for Recyclables



Tonnage Collected for Yard Waste



4. SOLID WASTE PROGRAM COSTS

The cost to operate the trash and recycling collection programs also varied dramatically based on population, waste generation and collection type. The costs represented below include the labor, benefits and operation/maintenance (disposal, insurance, overhead, etc.) costs to operate the solid waste program including trash, recyclables and yard waste.

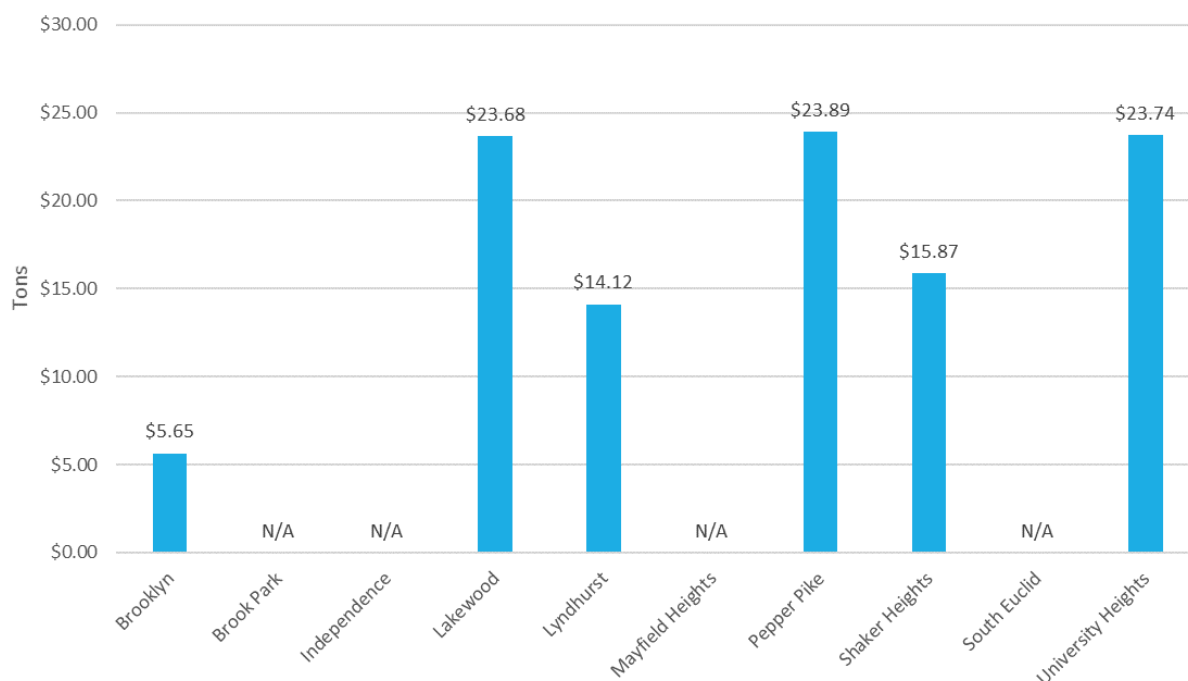
City Comparison - Cost Per Ton



The curbside programs of Brooklyn, Lakewood, and Lyndhurst tended to cost less overall whereas the side/back door programs of Pepper Pike, Shaker Heights and the City were more expensive to operate. Pepper Pike was the lowest cost side/back door program and Brooklyn was the lowest cost curbside program.

The following chart depicts the cost per household per month for the comparable cities for the trash and recycling programs. The actual costs for the program are not charged on a per household basis as all of the comparable cities as well as the City do not directly charge residents for the solid waste service.

City Comparison - Cost Per Household Per Month



In general, curbside programs cost less per household per month than side/back door programs.

III. REGIONAL CURBSIDE ECONOMIC ANALYSIS

GT conducted an economic analysis of the curbside solid waste collection programs offered in Cuyahoga County that used private haulers selected in a competitive process. The analysis compared waste and recycling collection costs on a per household per month basis.

The following table summarizes the data collected:

Community	Collection System		Hauler	Households	2018 Cost/Ton	2018 Tons	2018 Cost/ton x Tons per HH	2018 Cost/HH/Month	Recycle Cost/HH/Month	Yard Waste Cost/HH/Month
	Trash	Recycle								
BAY VILLAGE	Automated	Automated	Republic	6,250	Included	4,711	Included	\$15.80	Included	Included
BEDFORD	Automated	Automated	Kimble (SE Consortium)	4,700	\$42	4,188	3.12	\$13.04	\$3.23	Included
BEDFORD HEIGHTS	Automated	Automated	Kimble (SE Consortium)	2,785	\$42	2,314	2.91	\$12.83	\$3.23	Included
BENTLEYVILLE	Automated	Automated	Waste Management	299	\$42.85	326	3.89	\$14.96	Included	Included
BEREA	Automated	Automated	Republic	5,870	\$38.75	4,362	2.40	\$10.65	\$2.20	\$1.94
BRATENAHL	Automated	Automated	Republic	765	Included	512	Included	\$14.20	Included	Included
BROADVIEW HEIGHTS	Manual	Manual	Rumpke	7,040	\$45.40	7,471	4.01	\$12.01	Included	Municipal Collection
BROOKLYN HEIGHTS	Automated	Automated	Kimble	626	\$42	662	3.70	\$14.50	Included	Municipal Collection
CHAGRIN FALLS TOWNSHIP	Automated	Automated	Kimble	42	\$42	48	4.00	\$13.96	\$0.00	Included
CHAGRIN FALLS VILLAGE	Automated	Automated	Kimble	1,630	\$42	1,481	3.18	\$13.14	Included	Included
EAST CLEVELAND	Manual	Manual	Rumpke	5,319	Included	5,302	Included	\$16.69	Included	Included
EUCLID	Automated	Automated	Kimble	16,463	\$42.64	16,348	3.53	\$12.38	Included	Included
FAIRVIEW PARK	Automated	Automated	Republic	6,300T, 7,856R	\$36.91	4,916	2.40	\$13.32	Included	Included
GARFIELD HEIGHTS	Automated	Automated	Kimble	10,500	\$44.28	11,668	4.10	\$13.37	\$3.17	Included
GATES MILLS	Manual	Manual	Rumpke	960	Included	937	Included	\$27.25	Included	No Collection
GLENWILLOW	Automated	Automated	Republic	217	Included	171	Included	\$0.00	Included	Included
HIGHLAND HEIGHTS	Automated	Automated	Kimble	3,301	\$41.59	3,982	4.18	\$14.03	Included	Included
HUNTING VALLEY	Automated	Automated	Waste Management	300	Included	316	Included	\$34.36	Included	Included
LINNDALE	Manual	Manual	Rumpke	75	Included	46	Included	\$13.39	Included	No Collection
MAPLE HEIGHTS	Automated	Automated	Waste Management	9,600	Included	9,080	Included	\$13.18	Included	Municipal Collection
MAYFIELD HEIGHTS	Automated	Automated	Kimble	5,145	Included	5,085	Included	\$12.19	Included	Municipal Collection
MAYFIELD VILLAGE	Automated	Automated	Kimble	1,206	\$44.95	1,449	4.50	\$14.67	Included	Municipal Collection
MIDDLEBURG HEIGHTS	Manual	Manual	Republic	5,658	Included	5,209	Included	\$14.83	Included	Municipal Collection
NEWBURGH HEIGHTS	Automated	Automated	Kimble	950	\$46.27	933	3.79	\$13.47	\$3.17	Included
NORTH OLMSTED	Automated	Automated	Republic	10,480	Included	7,869	Included	\$12.83	Included	Included
NORTH RANDALL	Automated	Automated	Rumpke	142	Included	251	Included	\$20.50	Included	Municipal Collection
NORTH ROYALTON	Manual	Automated	Rumpke	9,850	\$44.50	11,195	4.21	\$12.79	Included	No Collection
OAKWOOD	Manual	Manual	Waste Management	1,648	0	1,220	0.00	\$6.73	Included	Included
OLMSTED FALLS	Automated	Automated	Republic	3,100	Included	2,534	Included	\$16.75	Included	Included
OLMSTED TOWNSHIP	Automated	Automated	Republic	3,500	Included	3,107	Included	\$16.75	Included	Included



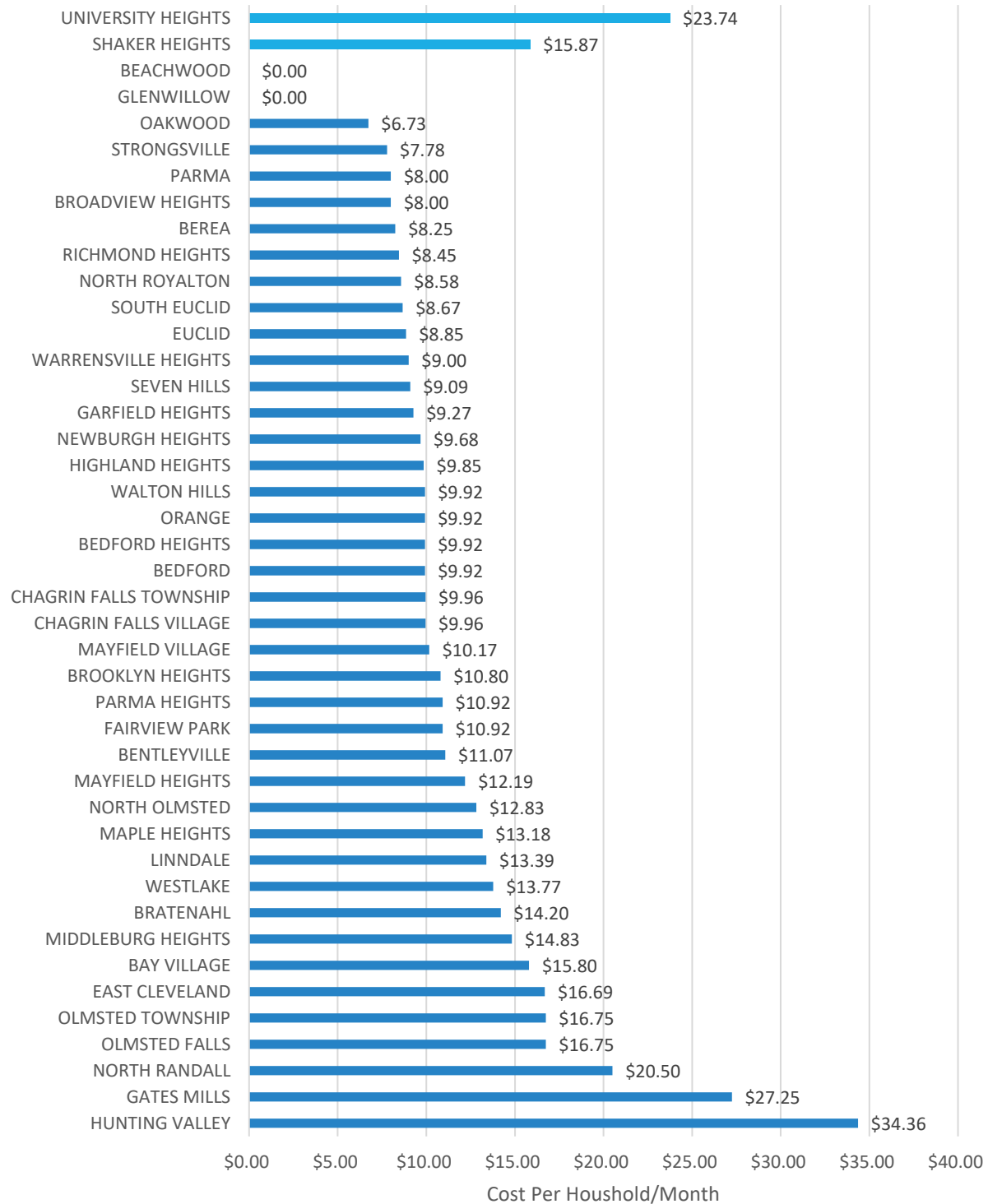
Community	Collection System		Hauler	Households	2018 Cost/Ton	2018 Tons	2018 Cost/ton x Tons per HH	2018 Cost/HH/Month	Recycle Cost/HH/Month	Yard Waste Cost/HH/Month
	Trash	Recycle								
ORANGE	Automated	Automated	Kimble (SE Consortium)	1,260	\$42	1,234	3.43	\$13.35	\$3.23	Included
PARMA	Automated	Automated	Republic	29,317	\$35.20	4,878	0.49	\$8.49	\$2.15	\$1.10
PARMA HEIGHTS	Automated	Automated	Republic	6,140	\$36.91	22,470	11.26	\$22.18	Included	Included
RICHMOND HEIGHTS	Automated	None	Waste Management	3,360	\$45.00	3,966	4.43	\$12.88	No Collection	Municipal Collection
SEVEN HILLS	Automated	Automated	Waste Management	5,270	\$44.65	5,552	3.92	\$13.01	Included	Included
SOUTH EUCLID	Automated	Automated	Kimble	8,700	\$42.57	8,235	3.36	\$12.03	Included	Municipal Collection
STRONGSVILLE	Manual	Manual	Republic	18,673	\$38.83	21,243	3.68	\$11.46	\$1.76	Included
WALTON HILLS	Automated	Automated	Kimble (SE Consortium)	960	\$42	943	3.44	\$13.36	\$3.23	Included
WARRENSVILLE HEIGHTS	Automated	Automated	Kimble	2,974	\$40.37	2,922	3.31	\$12.31	Included	Included
WESTLAKE	Manual	Manual	Rumpke	11,000	Included	13,266	Included	\$13.77	Included	Included
BEACHWOOD	Automated	Automated	Municipal	2,970	Included	N/A	N/A	N/A	Included	N/A
SHAKER HEIGHTS	Manual	Manual	Municipal	10,500	Included	N/A	N/A	N/A	Included	N/A
UNIVERSITY HEIGHTS	Manual	Manual	Municipal	4,272	\$40.68	4,542	Included	\$23.74	Included	Included
Overall Average					\$40.23	5,047	\$3.65	\$14.18		

Forty (68%) of the 59 political subdivisions in Cuyahoga County, contract directly with the private sector to provide curbside trash and recycling services. Seven different haulers provided curbside services to these communities. Yard waste collection varies throughout the county and can be provided by the private sector company or the municipality. The rest of the political subdivisions (19 or 32%) collect trash and recyclables through municipal operations.

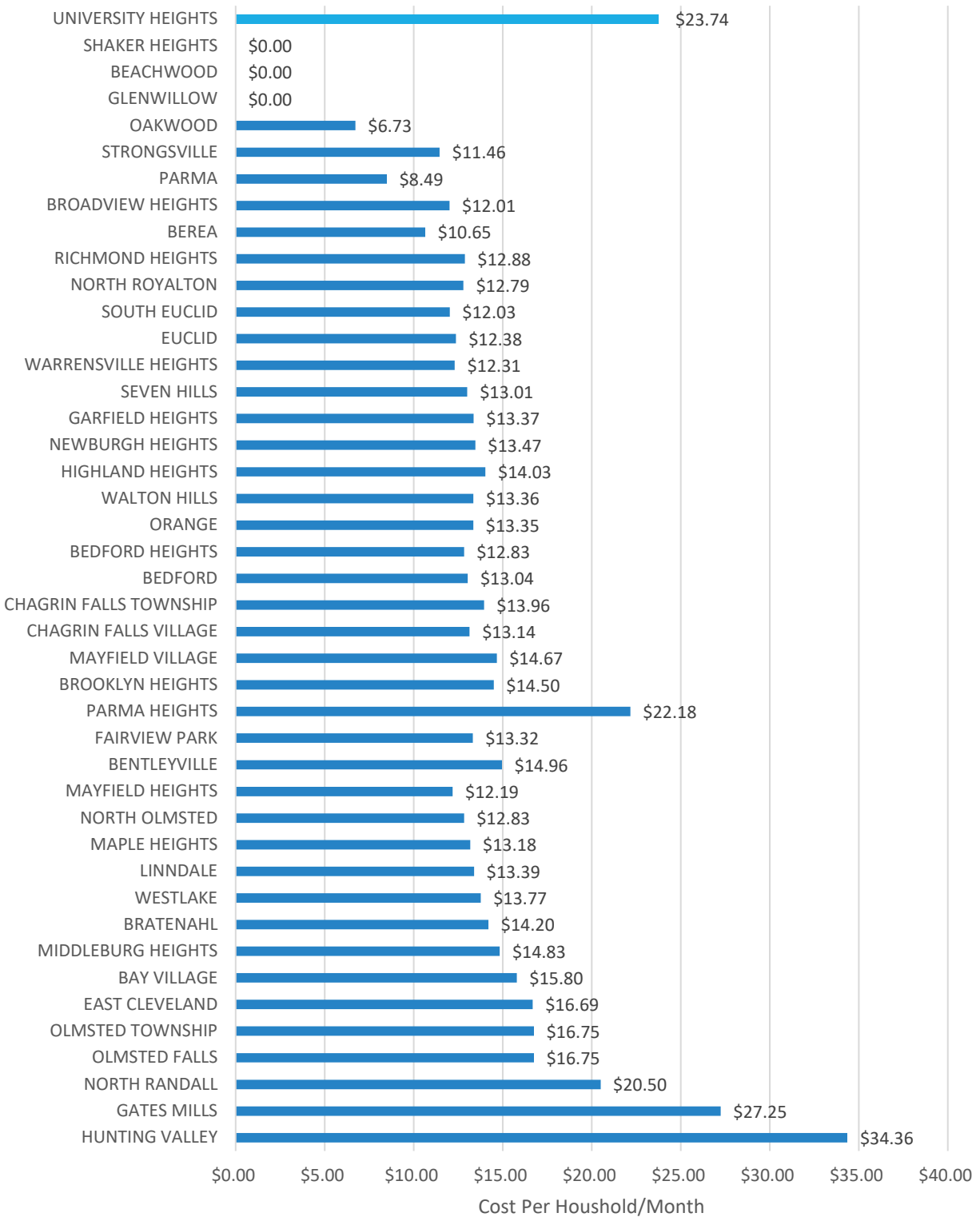
The following chart (see next page) summarizes the data from the table above:

Cuyahoga County Curbside Collection Analysis - Private Sector:

Base Cost Per Household



Base + Disposal Cost Per Household



The overall average cost per household per month for contracted waste and recycling collection was \$14.18.

South Euclid Bid vs Actual

The City of South Euclid went out for bid for collection services in 2012 for a 5-year contract with extensions. These prices include weekly collection of solid waste:

- Manual: unlimited solid waste, and one 64-gallon recycling cart.
- Automated: one 96-gallon solid waste cart, monthly bulk collection, and one 64-gallon recycling cart.

2017 Estimated Cost/Unit	Manual - Base Bid	Automated - Alternate A	Manual - Alternate B	Automated - Alternate C	2018 Estimated
Number of Households	8,700	8,700	8,700	8,700	8,700
Price per Residential Unit per Month	\$7.00	\$6.41	\$6.94	\$6.35	\$8.67
Disposal Cost Per ton	\$41.61	\$41.61	\$41.61	\$41.61	\$42.57
Estimated Disposal Cost per unit/Month (based on 2018 8,234.53 tons)	\$3.28	\$3.28	\$3.28	\$3.28	\$3.36
Automated Recyclables Collection per Residential Unit per Month	None	None	\$2.42	\$2.13	Included
2017 Estimated Cost/Unit	\$10.28	\$9.69	\$12.64	\$11.76	\$12.03

The table above shows that the 2018 estimated cost is not far from the 2017 estimate. The City recently bid out their program and received the following results in 2020 for full automated collection for trash and recycling:

Description	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Bid Price	\$14.87	\$15.32	\$15.78	\$16.25	\$16.90

Solid Waste and Yard Waste Programs

GT conducted an analysis of the curbside solid waste collection programs and the yard waste collection programs offered in Cuyahoga County. The analysis compared private waste collection, hauler of yard waste collection, and if the yard waste collection was included with the cost for trash collection service.

The following table summarizes the data collected:

Community	Trash Hauler	Yard Waste Hauler	Price Included with Trash?
HUNTING VALLEY	Waste Management	None	None
GATES MILLS	Rumpke	None	None
NORTH RANDALL	Rumpke	Municipal	Taxes
OLMSTED FALLS	Republic	Republic	Included
OLMSTED TOWNSHIP	Republic	Republic	Included
EAST CLEVELAND	Rumpke	Rumpke	Included
BAY VILLAGE	Republic	Republic	Included
MIDDLEBURG HEIGHTS	Republic	Municipal	Taxes
BRATENAHL	Republic	Republic	Included
WESTLAKE	Rumpke	Rumpke	Included
LINNDALE	Rumpke	None	None
MAPLE HEIGHTS	Waste Management	Municipal	Taxes
NORTH OLMSTED	Republic	Republic	Included
MAYFIELD HEIGHTS	Kimble	Municipal	Taxes
BENTLEYVILLE	Waste Management	Waste Management	Included
FAIRVIEW PARK	Republic	Municipal	Included
PARMA HEIGHTS	Republic	Republic	Included
BROOKLYN HEIGHTS	Kimble	Municipal / Kurtz Bros.	Taxes
MAYFIELD VILLAGE	Kimble	Municipal	Taxes
CHAGRIN FALLS VILLAGE	Kimble	Municipal / Kimble	Included
CHAGRIN FALLS TOWNSHIP	Kimble	Municipal / Kimble	Included
BEDFORD	Kimble	Kimble / Municipal	Included
BEDFORD HEIGHTS	Kimble	Kimble / Municipal	Included
ORANGE	Kimble	Kimble / Municipal	Included
WALTON HILLS	Kimble	Kimble / Municipal	Included
HIGHLAND HEIGHTS	Kimble	Kimble	Included
NEWBURGH HEIGHTS	Kimble	Kimble	Included

Community	Trash Hauler	Yard Waste Hauler	Price Included with Trash?
GARFIELD HEIGHTS	Kimble	Kimble	Included
SEVEN HILLS	Waste Management	Waste Management	Included
WARRENSVILLE HEIGHTS	Kimble	Kimble	Included
EUCLID	Kimble	Kimble	Included
SOUTH EUCLID	Kimble	Municipal	Taxes
NORTH ROYALTON	Rumpke	None	None
RICHMOND HEIGHTS	Waste Management	Municipal	Taxes
BEREA	Republic	Republic	\$1.94/hh/mo
BROADVIEW HEIGHTS	Rumpke	Municipal	\$1.75/cy
PARMA	Republic	Republic	\$1.02/hh/mo
STRONGSVILLE	Republic	Republic	Included
OAKWOOD	Waste Management	Municipal	Taxes
GLENWILLOW	Republic	Republic	Included
BEACHWOOD	Municipal	Municipal	Included
SHAKER HEIGHTS	Municipal	Municipal	Included
UNIVERSITY HEIGHTS	Municipal	Municipal	Included

A. NEW PROGRAM OPTIONS

Based on the data and information collected and the observations made by GT, the following options are offered for consideration by the City that would require significant changes to its existing program. These alternative collection programs would require additional investigation and debate by City Council.

1. CURBSIDE COLLECTION

Curbside collection can occur in a variety of ways including manual, semi-automated and automated systems. The following table summarizes the current systems being utilized in the Northern Ohio region:

Method	# of Crew	Trash Containers	Size	Recycle Containers	Size
Manual	2-3	Bags, Cans, Small Wheeled Carts	< or = to 30 Gallons	Bags, Bins	12-18 Gallon
Semi-Automated	1-2	Wheeled Carts	48-96 Gallon	Wheeled Carts	30-48 Gallon

Method	# of Crew	Trash Containers	Size	Recycle Containers	Size
Automated	1	Wheeled Carts	48-96 Gallon	Wheeled Carts	30-48 Gallon

The following section briefly discusses each collection system:

Manual Curbside Collection

This system requires 2-3 employees (1 driver and 1-2 collectors) to manually empty trash cans and recycle bins into rear load or side load packer trucks. Trash containers can range from resident provided bags and < or = 30 gallon cans or City provided containers, again no greater than 30 gallons in size. Recycle containers can include the current blue bags all the way up to 30 gallon cans. The typical manual collection recycling system uses 18 gallon recycle bins.



Semi-Automated Curbside Collection



This system requires 2-3 employees (1 driver and 1-2 collectors) to manually roll user or City provided wheeled carts to the rear/side load packer truck where a tipper mechanism lifts the cart and dumps into the truck. Trash containers can range from resident provided 30-96 gallon wheeled carts or City provided containers. Recycle containers can include the current blue bags all the way up to 96-gallon wheeled carts. The typical semi-automated collection system uses 96-gallon wheeled carts for trash and 48-64 gallon wheeled carts for recyclables. Recycling could also be collected manually with bags or bins since a separate truck would be used for the recycle routes.

Automated Curbside Collection

This system usually requires only 1 employee to drive the truck and operate the automated lift arm. 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. Trash containers can range from resident provided 48-96 gallon wheeled carts or City provided containers. Recycle containers usually include 48-96 gallon wheeled carts.



Recycling could also be collected manually with bags or bins since a separate truck would be used for the recycle routes.

2. ECONOMIC ANALYSIS

The research conducted in this Study indicates that from a cost of service standpoint, curbside collection is more efficient and cost effective. The average cost per household per month for public sector curbside programs covered in this study was \$13.60. The average cost for contracted private sector curbside programs in Cuyahoga County was \$14.18. The overall cost of the City's side/back door program was \$23.74 and the average cost for other public sector side/back door programs covered by this study was \$21.25. With this said, when factoring in the costs listed above, the City could save substantial dollars by either converting to a curbside program with City crews or by contracting directly with the private sector to provide the service. The following table summarizes the costs listed above and the estimated overall cost to operate the program:

Collection Program	Operator	Cost per Household (HH) per Month	City HH	Total Costs	Potential Annual Savings
Side/Back Door	City's Average	\$23.74	4,272	\$1,217,214	\$0
Side/Back Door	Average Public Sector	\$21.17	4,272	\$1,085,216	\$131,999
Curbside	Average Public Sector	\$18.90	4,272	\$968,868	\$248,346
Curbside	Average Private Sector	\$14.18	4,272	\$727,165	\$490,050

Although this study did not delve into the satisfaction and performance of the programs that yielded the averages above, GT is confident that, overall, because of the sheer number of curbside programs in Cuyahoga County and the State of Ohio, one can be satisfied that curbside programs can be offered to the public in a cost effective manner that provides great service.

The following table summarizes the full economic costs of converting to a curbside collection program with manual to fully automated collection systems.

City of University Heights Curbside Collection Program Economic Analysis for Trash and Recycling						
Item	Comments	Current Costs	Manual Costs	Backyard Trash/Manual Bin Recycle	Semi-Automated Costs	Automated Costs
Capital Costs						
New or Updated Trash Trucks	Purchase price of a new truck	\$0	\$0	\$0	\$0	\$325,000
	Purchase price of truck flippers	\$0	\$0	\$0	\$7,500	\$0
	Number of new trucks required	0	0	0	2	2
	Truck Costs	\$0	\$0	\$0	\$15,000	\$650,000

City of University Heights Curbside Collection Program Economic Analysis for Trash and Recycling						
Item	Comments	Current Costs	Manual Costs	Backyard Trash/Manual Bin Recycle	Semi-Automated Costs	Automated Costs
New or Updated Recycle Trucks	Purchase price of a new truck	\$0	\$0	\$0	\$0	\$325,000
	Purchase price of truck flippers	\$0	\$0	\$0	\$7,500	\$0
	Number of new trucks required	2	0	0	1	1
	Truck Costs	\$0	\$0	\$0	\$7,500	\$325,000
Recycle Carts	Cost per cart (48-64 gallon)/ Bin (18-22 gallon) including Shipping, Assembly and Distribution	\$0.00	\$0.00	\$20.00	\$52.00	\$52.00
	Number of cart/bin required	0	0	4,486	4,486	4,486
	Recycle Container Costs	\$0	\$0	\$89,712	\$233,251	\$233,251
Trash Carts	Cost per cart (64-96 gallon) including Shipping, Assembly and Distribution	\$0.00	\$0.00	\$0.00	\$52.00	\$52.00
	Number of carts required	0	0	0	4,486	4,486
	Trash Cart Costs	\$0	\$0	\$0	\$233,251	\$233,251
Total Capital Costs		\$0	\$0	\$89,712	\$489,002	\$1,441,502
Annual Costs						
Annualized cost of capital debt retirement (3% interest-10 year payback)	Vehicles and containers	\$0	\$0	\$10,517	\$57,326	\$168,988
Employees	Number of staff	13	10	14	10	7
	Average Cost Per Employee	\$71,549	\$81,422	\$72,371	\$81,422	\$88,654
Total Employee Costs		\$930,140	\$814,216	\$1,013,196	\$814,216	\$620,580
Supplies/Equipment/Maintenance		\$58,165	\$58,165	\$58,165	\$58,165	\$58,165
Overhead Costs		\$44,131	\$44,131	\$44,131	\$44,132	\$44,131
Trash/MRF Disposal and Processing Costs		\$184,778	\$184,778	\$184,778	\$184,778	\$184,778
Total Annual Program Cost		\$1,217,214	\$1,101,290	\$1,327,616	\$1,158,616	\$1,094,092
Cost Per Capita						
University Heights Population		12,938	12,938	12,938	12,938	12,938
Annual Cost Per Capita		\$94.08	\$85.12	\$101.31	\$89.55	\$84.56
Cost Per Households						
# of Households Participating		4,272	4,272	4,272	4,272	4,272
Annual Cost Per Household		\$284.93	\$257.79	\$306.83	\$271.21	\$256.11
Monthly Cost Per Household		\$23.74	\$21.48	\$25.57	\$22.60	\$21.34
Savings over Current Program		N/A	9.52%	-8.50%	4.81%	10.12%
Cost Per Households (20% Increase in Cost Estimate)						
# of Households Participating		4,272	4,272	4,272	4,272	4,272
Annual Cost Per Household		\$284.93	\$309.35	\$368.20	\$325.45	\$307.33



City of University Heights Curbside Collection Program Economic Analysis for Trash and Recycling						
Item	Comments	Current Costs	Manual Costs	Backyard Trash/Manual Bin Recycle	Semi-Automated Costs	Automated Costs
Monthly Cost Per Household		\$23.74	\$25.78	\$30.68	\$27.12	\$25.61
Savings over Current Program		N/A	-8.57%	-26.92%	-14.22%	-7.86%

Assumptions

The assumptions for this economic model are that the curbside trash routes would cover 800 homes per route so a total of 5 routes a week would be required or 1 per day. Then for recycling, the general rule of thumb is >2 trash routes equal 1 recycle route so a total of 2 recycle routes would be required to service the City. That leaves a total of 7 routes for trash and recycling over a five-day period. Capital investments are calculated at 3% interest on a ten-year payback.

The costs per household per month are shown as calculated using the economic model. The following table depicts the potential cost savings over the current side/back door program:

Curbside Program Option	Operator	Calculated Cost/HH/Month	City HH	Total Costs (based on 2018)	2023	2028	Potential Annual Savings (based on 2018)	Potential Annual Savings (based on 2023)	Potential Annual Savings (based on 2028)
Side/Back Door	City's Average	\$23.74	4,272	\$1,217,214	\$1,379,118	\$1,540,315	\$0	\$0	\$0
Rear Load - Existing Trucks	City	\$21.48	4,272	\$1,101,290	\$1,082,867	\$1,205,135	\$115,924	\$296,251	\$335,181
Backyard Trash/Manual Bin Recycle	City	\$25.57	4,272	\$1,310,788	\$1,487,457	\$1,653,744	(\$93,574)	(\$108,339)	(\$113,429)
Semi-Automated	City	\$22.60	4,272	\$1,158,616	\$1,294,127	\$1,438,089	\$58,598	\$84,991	\$102,226
Automated	City	\$21.34	4,272	\$1,094,092	\$1,211,622	\$1,326,795	\$123,122	\$167,496	\$213,520

Each option that is a change from the current City operation projects a cost savings over the period of 2018 – 2028 ranging from \$58,000 to \$335,000 annually except for the back yard trash/manual recycle bin option which shows an increase in cost from \$93,000 to \$113,000.

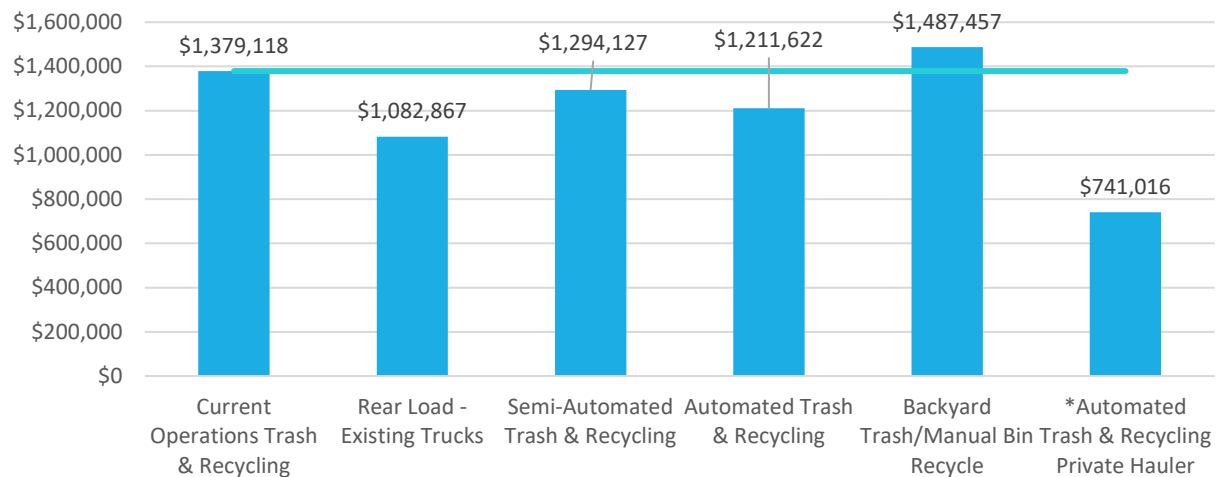
The following table assumes a 20% increase in estimated costs as a worst-case scenario:

Curbside Program Option	Operator	Calculated Cost/HH/Month	City HH	Total Costs (based on 2018)	2023	2028	Potential Annual Savings (based on 2018)	Potential Annual Savings (based on 2023)	Potential Annual Savings (based on 2028)
Side/Back Door	City's Average	\$23.74	4,272	\$1,217,214	\$1,654,942	\$1,848,379	\$0	\$0	\$0



Curbside Program Option	Operator	Calculated Cost/HH/Month	City HH	Total Costs (based on 2018)	2023	2028	Potential Annual Savings (based on 2018)	Potential Annual Savings (based on 2023)	Potential Annual Savings (based on 2028)
Rear Load - Existing Trucks	City	\$25.78	4,272	\$1,321,548	\$1,299,441	\$1,446,162	(\$104,334)	\$355,501	\$402,217
Backyard Trash/Manual Bin Recycle	City	\$30.68	4,272	\$1,572,946	\$1,784,949	\$1,984,493	(\$355,732)	(\$130,007)	(\$136,115)
Semi-Automated	City	\$27.12	4,272	\$1,390,339	\$1,552,953	\$1,725,707	(\$173,125)	\$101,989	\$122,671
Automated	City	\$25.61	4,272	\$1,312,910	\$1,453,947	\$1,592,154	(\$95,696)	\$200,995	\$256,224

Current Program Compared to Other Options (Projected 2023)



Additional analysis was requested by City Council outside of the scope of this project. This information and analysis is included in Appendix D.

IV. CONCLUSIONS AND SUGGESTED ALTERNATIVES

GT has prepared specific suggested alternatives to the existing program in 2009. Some of the original suggested alternatives are still relevant and have been included in this section from 2009. In addition, GT has prepared several options for consideration that would require dramatic change to the City's current system of solid waste collection in 2009. GT updated, added to or amended the suggested alternatives based on additional and updated data and information from the 2019 evaluation.

GT and the City understand that the current program is stagnate and underperforming with regards to recycling. Tax revenues for the City are stable and not growing even though the cost to provide solid waste services has continued to increase over the years. The City has done a great job maintaining and improving the overall program over the years to control cost and improve efficiencies. With all of these efforts, the reality is the side door service costs significantly more than curbside services and recycles less. The suggested alternatives in this section provide options for additional improvement to the

existing services and complete overhaul options to improve efficiencies, reduce cost and increase recycling.

A. EXISTING PROGRAM IMPROVEMENTS

Based on the data and information collected in 2009 and 2019 and the observations made by GT, the following suggested alternatives are offered for consideration by the City for improvements and/or changes to its existing program:

1. PROGRAM PROMOTION, EDUCATION AND AWARENESS

Suggested Alternative 1.1 – The City’s web page for trash collection should be enhanced with the tools and information available from the Cuyahoga County Solid Waste District community tool kit which is offered on their web site. The Cuyahoga County Solid Waste District has prepared a detailed community tool kit for recycling programs. Detailed outreach and education documents, logos, icons and other communication products are available within this tool kit. The City should sign up for the tool kit and utilize as much of the information and tools as possible.

Using the tool kit would assist the City in updating its web site, brochures and other education and outreach efforts.

2. CUSTOMER SERVICE

Suggested Alternative 2.1 – The City should consider conducting a customer service survey. The survey could consider the following questions depending on what suggested alternatives the City is considering:

- Satisfaction with current set-out time requirements (related to missed pick-ups)
- Satisfaction with current trash, recycle, special pick-up and yard waste services offered
- Thoughts on curbside services for trash and recycle
- Premium service fee for side door service
- Other questions as identified

The survey would be designed to assist the City in making decisions on any potential changes in the solid waste collection programs.

3. TRASH PROGRAM

Suggested Alternative 3.1 – The City should consider re-routing the entire city to obtain the best efficiency for trash routes. Previous studies of this nature have demonstrated cost savings of between 10% and 25%. These savings 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 landfill;
- Reduced number of routes and vehicles; and
- Reduced overtime and other factors.

There are numerous computer aided modeling programs available that can be used to assist the City. This suggestion would be required if the City moves towards curbside services for trash and recycling.

Suggested Alternative 3.2 – The City should require residents that have gates or significant driveway parking issues to bring their trash to the curb to reduce missed pick-ups and call backs. Currently, if a gate on the driveway is closed or there are cars in the driveway, the Kubota drivers cannot determine if trash is placed at the side/back door. This issue can turn into a missed pick-up requiring the crew to go back after they have completed their routes.

Suggested Alternative 3.3 – If the City transitions to curbside trash services, the City will need to provide side door services to residents that meet the requirements of the American with Disabilities Act. Additional residents may also be considered for side door service based on criteria related to disability, age or capability to move containers to the curb.

Suggested Alternative 3.4 – If the City transitions to curbside trash services, the City could offer a side door service for those residents that do not meet the requirements discussed in Suggested Alternative 3.3 for a fee.

4. *RECYCLE PROGRAM*

The City's recycling program performs, according to the Cuyahoga County Solid Waste District 2018 report, is rated 4th out of the 59 political subdivision in the County at 5% recycling. GT feels this performance is a product of the collection system employed and the education and outreach offered by the City. To increase recycling from 5% to 10-15%, where most curbside recycling programs in the County perform, the City should consider changes to the program. The following section summarizes changes to the existing program. Section 6 offers suggested alternatives to change the current program to curbside where increased recycling would occur.

Suggested Alternative 4.1 – Carboard recycling, although offered, is often time not accepted by the crews because of the capacity of the Kubotas for recyclables. The current collection system involves the use of two 45-gallon containers located on the from of the Kubota. The containers are not large enough to hold larger cardboard and even the volume of recyclables collected. If the City does not transition to curbside recycling services, the Kubotas should be modified to include a single large rectangular container

attached to the front to replace the 45-gallon containers. This new larger container could hold more recyclables and large cardboard.

This issue is also being compounded by the “Amazon Effect” where so many residents are purchasing goods and products online and thus are generating more cardboard.

Suggested Alternative 4.2 – With the upcoming ban on plastic bags from Cuyahoga County, the City should consider alternate collection methods for recyclable. The ban passed by Cuyahoga County goes into effect on January 1, 2020. The ban includes plastic bags and paper bags that are not 100 percent recyclable or made from at least 40 percent of recycled material. It includes exemptions for bags for restaurant leftovers or carry-out orders, bags consumer bring with them, or bags for newspapers, dry-cleaning, meat, pet waste, prescriptions, or partially-consumed bottles of wine and bags for hazardous materials, such as certain chemicals bought at home supply stores. Bags are the primary contaminant at local and regional recycling facilities. Bagged recyclables are hard to process and can sometime not be emptied by the recycling facilities resulting is the materials being landfilled. Most, if not all of the major recyclers are asking or requiring that recyclables are not to be bagged and should be collected loosely.

The City should consider providing 18-22 gallon recycle totes to residents to place their recyclable into without bagging the materials. The recycle totes could then be emptied into the Kubotas by City crews.

Suggested Alternative 4.3 – The City should consider modifying its packer truck fleet to be able to hold the collected recyclables from each route, especially if the Kubotas are not modified as suggested in 4.1. Currently, the City of Shaker Heights conducts its recycling program in this manner. They modified the packer trucks with a separate compartment in the front of the main packer body to hold collected recyclables. This modification costs roughly \$30,000 per truck back in 2009 several years ago.



5. *PAPER PROGRAM*

Suggested Alternative 5.1 – Since the City pays to recycle the paper and paper products at the service garage, GT suggest eliminating this program if the curbside option is implemented in 8.1.

If the program is not implement in 6.1, GT suggests promoting the paper program to include cardboard to try and capture the cardboard that is landfilled from the side door service limitations.

6. MAJOR PROGRAM CHANGES

Suggested Alternative 6.1 – The City should consider transitioning the side door service to curbside service. The table below shows the average costs for the current program and other side door and curbside programs. The table also shows the calculated savings to the City if the City offered curbside programs either with or without City crews.

Collection Program	Operator	Cost per Household (HH) per Month	City HH	Total Costs	Potential Annual Savings
Side/Back Door	City's Average	\$23.74	4,272	\$1,217,214	\$0
Side/Back Door	Average Public Sector	\$21.17	4,272	\$1,085,216	\$131,999
Curbside	Average Public Sector	\$18.90	4,272	\$968,868	\$248,346
Curbside	Average Private Sector	\$14.18	4,272	\$727,165	\$490,050

To further refine the above table to specific financial estimates for the City to offer a curbside program, the following table summarizes the estimated costs for manual, semi-automated and automated curbside services:

Curbside Program Option	Operator	Calculated Cost/HH/Month	City HH	Total Costs	Potential Annual Savings
Current Operations Trash & Recycling	City's Average	\$23.74	4,272	\$1,217,214	\$0
Rear Load - Existing Trucks	City	\$21.48	4,272	\$1,101,290	\$115,924
Semi-Automated Trash & Recycling	City	\$22.60	4,272	\$1,158,616	\$58,598
Automated Trash & Recycling	City	\$21.34	4,272	\$1,094,092	\$123,122
Backyard Trash/Manual Bin Recycle	City	\$25.57	4,272	\$1,310,788	(\$93,574)
*Automated Trash & Recycling Private Hauler	Average Public Sector	\$13.76	4,272	\$705,432	\$511,782
**Automated Trash & Recycling Private Hauler Municipal YW	Average Public Sector	\$18.93	4,272	\$970,352	\$246,862

*Average private hauler contracts with private yard waste collection services in Cuyahoga County for 26 communities was \$11.94 per household.

**Average private hauler contracts with municipal yard waste collection services in Cuyahoga County for 9 communities was \$11.81 per household.

Based on the data provided above, GT's Suggested Alternative is for the City to either provide internally or contract with a third party for automated trash and recycling curbside services. The estimated savings range from \$58,000 for public service to over \$510,000 for private service.

Switching to an automated curbside recycling and trash program offers the following benefits:



- Safer for City or contractor personnel
- Increased recycling
- Decreased cost to City
- Allows City to eliminate bagged recyclables to comply with County ban on bags

Perceived negatives for switching are listed as follows:

- Change in service requires residents to adapt to new requirements
- Added container placement responsibilities shifted to residents for curb service
- Capital and maintenance expense for equipment if publicly operated



APPENDIX A

SOLID WASTE QUESTIONNAIRE



Solid Waste Collection Analysis

Municipal Solid Waste Collection Information Request

1. Contact Information

Municipality Name:	Contact:
Address:	Phone:
Email:	Fax:

2. Municipality Demographics

Population:	# of Households:	Median Household Income:
-------------	------------------	--------------------------

3. Customer Service

How are customer complaints managed:
How are missed collection stops handled:
How are missed collection days handled (weather issues):
How is the collection program promoted to residents:

4. Trash Collection Program

of Sanitation Employees Dedicated to Trash Collection:
of Sanitation Employees per Trash Route:

		Yes	No
Collection System:	Curbside Collection:	<input type="checkbox"/>	<input type="checkbox"/>
	Side/Back Door Collection:	<input type="checkbox"/>	<input type="checkbox"/>
	Unlimited Trash Collection	<input type="checkbox"/>	<input type="checkbox"/>
	Weekly Bulk Pick-Up	<input type="checkbox"/>	<input type="checkbox"/>
	On-Call Bulk Pick-Up	<input type="checkbox"/>	<input type="checkbox"/>
	Other Collection System:		

Comments

Equipment System:	Manual Collection:	<input type="checkbox"/>
	Semi-Automated Collection:	<input type="checkbox"/>
	Automated Collection:	<input type="checkbox"/>

Truck #	Type (Side, Rear, Front Load, Other)	Capacity	Age	Purchase Price

Solid Waste Collection Analysis

Municipal Solid Waste Collection Information Request

4. Trash Collection Program (cont.)

Residential Trash Receptacle Size:	Collection Days:
# of Residential Trash Customers:	# of Residential Trash Routes:
Stops per Route:	Time Study Data for Routes:
Vehicle Retirement Period (7, 10 or more years):	
Distance from Routes to Disposal Facility	
Last Time Routes were Revised:	
How were Routes Revised (ie. computer modeling, manually):	
2018 Residential Trash Tons Disposed:	

5. MSW Disposal and Hauling Costs

2018 MSW Disposal Costs:	2018 Labor Costs:
2018 O and M/Overhead/Misc Costs:	2018 Maintenance Costs:
2018 Total Operating Costs:	Cost/Ton Paid for Disposal (including fees):

6. MSW Disposal and Hauling Revenue

Is the Sanitation Department operated as an enterprise fund:	
if not, what other sources of revenue are relied upon (taxes, grants):	
2018 Charge for Residential Service (cost per month/household):	or
2018 Charge for Residential Service (cost per quarter/household):	or
2018 Charge for Residential Service (property tax on each household):	or
2018 Charge Other (bulk items?):	Explain:
Solid Waste Disposal Landfill Used:	or
Solid Waste Disposal Transfer Station Used:	

7. Recycling Collection

of Sanitation Employees Dedicated to Recycle:
 # of Sanitation Employees per Recycle Route:

	Yes	No
Collection System: Curbside Collection	<input type="checkbox"/>	<input type="checkbox"/>
Side/Back Door Collection:	<input type="checkbox"/>	<input type="checkbox"/>
Side/Back Door Yard Waste:	<input type="checkbox"/>	<input type="checkbox"/>
Curbside Leaf:	<input type="checkbox"/>	<input type="checkbox"/>
Curbside Yard Waste:	<input type="checkbox"/>	<input type="checkbox"/>
Other Collection System:		

Solid Waste Collection Analysis

Municipal Solid Waste Collection Information Request

7. Recycling Collection (cont.)

Recyclables System: Single Stream Recycling ☐ ☐
 Dual Stream Recycling ☐ ☐
 Multi-Stream Recycling ☐ ☐

If Single Stream (explain materials accepted):

If Dual Stream (explain materials accepted and sorting required):

If Multiple Stream (explain materials accepted and sorting required):

Comments

Equipment System: Manual Collection: ☐
 Semi-Automated Collection: ☐
 Automated Collection: ☐

Truck #	Type (Side, Rear, Front Load, Other)	Capacity	Age	Purchase Price

Vehicle Retirement Period (7, 10 or more years):

Residential Recycling Receptacle Size: Collection Days:
 # of Residential Recycling Customers: # of Recycling Routes:
 # of Residential Recycling Customers that Participate (at least once/month):
 Stops per Route: Time Study Data for Routes:

Last Time Routes were Revised:

How were Routes Revised (ie. computer modeling, manual):

2018 Residential Recycling Tons:

8. Recyclables Processing and Hauling Costs

2018 Recyclables Disposal Costs:	2018 Labor Costs:
2018 O and M/Overhead/Misc Costs:	2018 Maintenance Costs:
2018 Total Operating Costs:	Cost/Ton Paid for Disposal (including fees):

Solid Waste Collection Analysis
Municipal Solid Waste Collection Information Request

9. Recyclables Processing and Hauling Revenue

Is the Sanitation Department operated as an enterprise fund:
if not, what other sources of revenue are relied upon (taxes, grants):

2018 Charge for Residential Service (cost per month/household): or
2018 Charge for Residential Service (cost per quarter/household): or
2018 Charge for Residential Service (property tax on each household): or
2018 Charge Other (bulk items?): Explain:

2018 Total Revenue from Sale of Recyclables:

Material Recovery Facility Used: or Recycling Broker Used:

Revenue Generated Per Ton for Newspaper:

Revenue Generated Per Ton for Cardboard:

Revenue Generated Per Ton for Mixed Paper:

Revenue Generated Per Ton for Aluminum Cans:

Revenue Generated Per Ton for Tin Cans:

Revenue Generated Per Ton for #1 Plastic:

Revenue Generated Per Ton for #2 Plastic:

Revenue Generated Per Ton for Commingle:

Revenue Generated Per Ton for :

Revenue Generated Per Ton for :

Revenue Generated Per Ton for :

Revenue Generated Per Ton for :

10. Change in Solid Waste of Recyclables Collection

Comments

Community System Changes: Collection Process: ☐
Staff Reductions: ☐
Other: ☐

Cost savings incurred from changing collection program operations:

How was the Program promoted:

Customer complaints:

Overhead and other factors as needed to fully understand each City's collection program:

11. Other Pertinent Information

Please provide any other pertinent information:



APPENDIX B

RESIDENTIAL DATA COLLECTION FORM



City of University Heights

Day: _____
Date: _____
Weather: _____

Route # _____
Vehicle #: _____
Driver: _____

Percent loaded at start: _____
Total Number of Households on Route: _____
Gallons of Fuel Used: _____
of Crew Members: _____

	FIRST LOAD		SECOND LOAD		THIRD LOAD		FOURTH LOAD	
Activity	Time	Mileage	Time	Mileage	Time	Mileage	Time	Mileage
Clock in:								
Pre-trip (inspect, paperwork, meeting, etc.):								
Leave yard:								
Start route:								
Leave route for disposal site:								
Arrive at disposal location scale:								
Arrive at tipping area:								
Disposal Weight:								
Leave disposal location:								
Total Pass-bys								
Total Set-outs - Curbside								
Total Extra Containers								
Arrive back at yard:								
Post-trip (refuel, inspect, paperwork, etc.):								
Clock-out:								

Miscellaneous Time:

Break: Start Time: _____ End Time: _____
Lunch: Start Time: _____ End Time: _____
Break: Start Time: _____ End Time: _____
Breakdown: Start Time: _____ End Time: _____
Breakdown: Start Time: _____ End Time: _____

Comments or problems (weather, traffic, road problems, vehicle breakdown, etc.)

Did driver help on another route? Y N (Circle one)

Route #: _____
Start Time: _____
End Time: _____
Reason: _____

Start Mileage: _____
End Mileage: _____

City of University Heights

Total Number of Curb Refuse Setouts (CLICKER # 1)
Total Number of Passbys (CLICKER # 2 if needed)

Total Number of Curb Refuse Setouts

Total Number of Passbys

Total Number of _____

Total Number of _____

Timed Stops (30 consecutive time samples)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____

18. _____

19. _____

20. _____

21. _____

22. _____

23. _____

24. _____

25. _____

26. _____

27. _____

28. _____

29. _____

30. _____

(START STOPWATCH :When crew member steps off of truck and the vehicle stops)

(STOP STOPWATCH: As soon as the container is emptied into the back of the truck and the vehicle begins forward movement)

Important Notes:



APPENDIX C

INFORMATION REQUESTION – CITY RESPONSE



University Heights Information Request for Solid Waste Collection Analysis

Missed Pick-Ups

Month	2018	2008
Jan	81	130
Feb	109	63
Mar	89	142
Apr	97	152
May	82	149
Jun	134	173
Jul	128	182
Aug	139	143
Sep	120	104
Oct	82	118
Nov	96	71
Dec	80	110

The following table summarizes the equipment used to collect trash in the City.

Truck #	Data Year	Type (Side, Rear, Front Load, Other)	Capacity	Age	Purchase Price
21-2	2008	Rear Load	25 yds	2	\$117,000.00
21-3	2008	Rear Load	31 yds	21	\$35,000.00
21-4	2008	Rear Load	25 yds	2	\$117,000.00
21-9	2008	Rear Load	31 yds	21	\$35,000.00
21-10	2008	Rear Load	31 yds	18	\$45,000.00
201	2008	Scooter	2 yds	3	\$28,864.00
202	2008	Scooter	2 yds	4	\$27,849.00
203	2008	Scooter	2 yds	3	\$28,864.00
204	2008	Kubota	2 yds	2	\$20,899.96
206	2008	Scooter	2 yds	6	\$24,410.00
209	2008	Scooter	2 yds	4	\$27,849.00
21-1	2018	Rear Load	25 yds	18	\$41,900
21-2	2018	Rear Load	25 yds	11	\$117,000
21-3	2018	Rear Load	25 yds	17	\$43,000
21-4	2018	Rear Load	25 yds	11	\$117,000
21-5	2018	Rear Load	25 yds	1	\$156,800
21-6	2018	F-250/ liftgate	6 yds	4	\$29,000
21-7	2018	Rear Load	25 yds	18	\$50,500
21-8	2018	F-250/ liftgate	6 yds	2	\$29,000
21-9	2018	Rear Load	25 yds	1	\$222,000
201	2018	Kubota	2 yds	1	\$14,800

Truck #	Data Year	Type (Side, Rear, Front Load, Other)	Capacity	Age	Purchase Price
202	2016	Kubota	2 yds	2	\$15,300
203	2015	Kubota	2 yds	3	\$14,200
204	2014	Kubota	2 yds	4	\$15,000
206	2013	Kubota	2 yds	6	\$12,900
208	2017	Kubota	2 yds	1	\$14,800

Tax Revenue \$_____

Trash Routes

Day	# of Routes	# of Pick-Ups Per Day/Route	Avg. Tons Collected	Hours to Complete	Staff Per Route
2008	2008	2008	2008	2008	2008
Monday	2	1,104/552	1,411.25	6-7	3
Tuesday	2	1,130/565	1,411.25	6-7	3
Wednesday	2	1,149/574.5	1,411.25	6-7	3
Thursday	2	1,130/565.5	1,411.25	6-7	3
Friday	n/a	n/a	n/a	n/a	n/a
2018	2018	2018	2018	2018	2018
Monday	2	1,047/524	23.71	6-7	3
Tuesday	2	1,070/535	23.71	6-7	3
Wednesday	2	1,087/544	23.71	6-7	3
Thursday	2	1,068/534	23.71	6-7	3
Friday	n/a	n/a	n/a	n/a	n/a

Recycling Routes

Day	# of Routes	# of Pick-Ups	Avg. Tons Collected	Hours to Complete	Staff Per Route
Monday	1	varies	414.3	3	1
Tuesday	1	varies	414.3	3	1
Wednesday	1	varies	414.3	3	1
Thursday	1	varies	414.3	3	1
Friday	n/a	n/a	n/a	n/a	n/a
2018	2018	2018	2018	2018	2018
Monday	1	Varies	1.875	3	1
Tuesday	1	Varies	1.875	3	1
Wednesday	1	Varies	1.875	3	1
Thursday	1	Varies	1.875	3	1
Friday	n/a	n/a	n/a	n/a	n/a

June 12, 2019 Trash Tons 22.49

June 12, 2019 Recycling Tons 1.21

Description	University Heights	University Heights
Year	2018	2008
Customer Complaints Managed	Through the phone operator/dispatcher	Through the phone operator/dispatcher
Missed Collection Stops	Return to the home to collect refuse after the route is completed	Return to the home to collect refuse after the route is completed
Missed Collection Days (weather)	Delay the missed collection day by one day. (once 2019)	Delay the missed collection day by one day. It rarely happens (twice in the last 17 years)
Collection Program Promotion to Customers	Newsletter, website and informational flier given to all new residents	Newsletter, website and informational flier given to all new residents
# of Sanitation Employees dedicated to trash collection	FT = 3 PT = 4	10
# of Sanitation Employees per Trash Route	FT = 1 PT = 4	3
Trash Collection System		
Curbside	Bulk	Bulk
Side/Back Door Collection	Yes	Yes
Unlimited Trash Collection	No	No
Weekly Bulk Pick-up	Yes	Yes
On-Call Bulk Pick-up	Yes	Yes
Vehicle Retirement period	When they can no longer fix or get parts for the vehicles.	When they can no longer fix or get parts for the vehicles.
Residential Trash Container Size	32 gal	32 gal
Collection Days	4	4
# of Residential Trash Customers	4,272	4,114
# of Residential Trash Routes	8	8
Stops per Route	1,020	1,028
Distance from Routes to Disposal Facility (miles)	13	13
Last Time Routes were Revised	2004	2004
How were Routes Revised	Divided city into 4 equal parts	divided city into 4 equal parts
2018 Residential Trash Tons Disposed	4,553	5,645
2018 MSW Disposal Costs	N/A	\$200,975.59
2018 Labor Costs	\$930,140 .00	\$617,952.93
2018 O and M Costs	\$228,818.75	\$106,489.86
2018 Maintenance Costs	\$58,165.78	\$97,759.59
2018 Total Operating Costs	\$1,217,124.53	\$1,023,177.97
Cost/Ton Paid for Disposal		\$35.95

Description	University Heights	University Heights
Year	2018	2008
Is Sanitation Department Operated as a Enterprise Fund? If not then what other revenue source?	General fund	General fund
2018 Residential Charge per HH	\$0.00	\$0.00
2018 Residential Charge per Quarter	\$0.00	\$0.00
2018 Residential Charge Property Taxes	\$0.00	\$0.00
2018 Residential Charge (other)	Special Pickups \$10.00 1,651/\$18,350	Special pick up (bulk, large quantity) - \$8
Solid Waste Landfill Used		n/a
Solid Waste Transfer Station Used	Republic/BFI- Glenwillow	Allied/BFI - Glenwillow
# of Sanitation Employees dedicated to recycling	1	1
# of Sanitation Employees per Recycling Route	1	1
Recycling Collection System		
Curbside	No	No
Side/Back Door Collection	Yes	Yes
Side/Back Door Yard Waste	No	No
Curbside Leaf	Yes	Yes
Curbside Yard Waste	Yes	Yes
Recyclables System Type	Single stream	Single stream
Materials Accepted	plastic #1 - #2, glass, aluminum, cartons, cans, paper, cardboard	plastic #1 - #7, glass, aluminum, bi-metal cans, steel, newsprint and magazines
Vehicle Retirement Period	When they can no longer fix or get parts for the vehicles.	When they can no longer fix or get parts for the vehicles.
Residential Recycling Container Size	bags	bags
Collection Days	4	4
# of Residential Recycling Customers	4,272	4,114
# of Residential Recycling Routes	4	4
# of Residential Recycling Customers that Participate	n/a	n/a
Stops per Route	n/a	n/a
Last Time Routes were Revised	2004	2004
How were Routes Revised	Divided into 4 equal parts	divided city into 4 equal parts
2018 YW Tons	1,228 / \$10,150	1,998
2018 Paper Coop	22	71
2018 Residential Recycling Tons	335	338
2018 Recycling Processing Costs	included with refuse	included with refuse
2018 Labor Costs	included with refuse	included with refuse
2018 O and M Costs	included with refuse	included with refuse
2018 Maintenance Costs	included with refuse	included with refuse
2018 Total Operating Costs	included with refuse	included with refuse
Cost/Ton Paid for Recycling	+/- \$6.40 / ton	
"Is Sanitation Department Operated as a Enterprise Fund	General fund	General fund
If not then what other revenue source?"	\$0	\$0
2018 Residential Charge per HH	\$0	\$0

Description	University Heights	University Heights
Year	2018	2008
2018 Residential Charge per Quarter	\$0	\$0
2018 Residential Charge Property Taxes	\$0	\$0
2018 Residential Charge (other)	\$0	\$0
2018 Total Revenue from Sale of Recyclables	\$689.60	Waste Management Transfer Station in Oakwood
Material Recovery Facility Used	Kimble- Twinsburg OH	n/a
Recycling Broker Used		10



APPENDIX D

ADDITIONAL ANALYSIS REQUESTED BY CITY



APPENDIX D

ADDITIONAL ANALYSIS AND QUESTIONS FROM CITY COUNCIL

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Question 1: Is there a community that is a better comparison to us than Lakewood with which to make a comparison?	3
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Question 3: Can our current trucks (or least the ones in better condition, if there are any) be retrofitted with the one-arm bandit that works with the large totes?	5
Question 4: projected cost if we maintain back yard pickup but added voluntary curbside recycling	6
Question 5: Fully Automated In-house Curbside Program	7
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Question 8: How many and which cities do what?	13
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Question 10: What effect, if any, do you anticipate FULLY-automated waste collection would have on the number of service workers your department employs?	15
Question 11: What effect, if any, do you anticipate SEMI-automated waste collection would have on the number of service workers your department employs?	16
Question 12: For each of the options presented in the draft report, what portion of the costs does the recycling program represent?	17
Question 13: What do you anticipate the cost-per-ton being when our contract comes up for renewal in June 2020?	18
Question 14: How many more tons of recycling per year over current numbers do you anticipate will be generated by each of the options in the draft report?	19
Question 15: What would the cost be for blue recycling boxes carried to the curb by citizens and manually emptied by service workers?	20

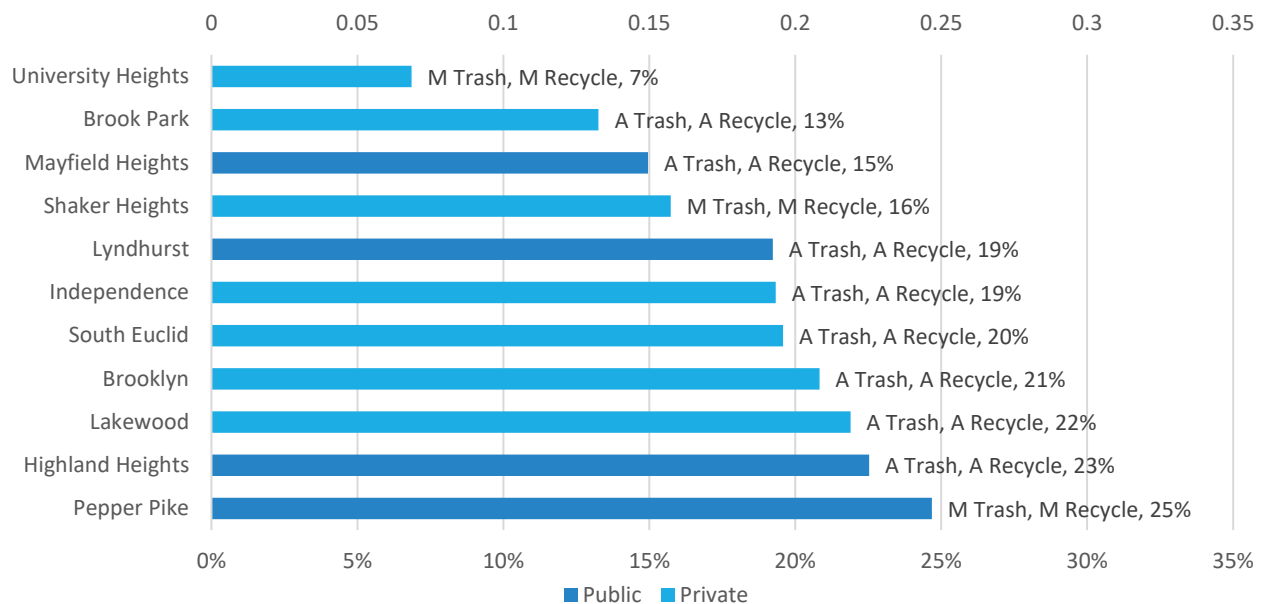
HIGHEST PRODUCTIVITY COLLECTION BY CITY

For trash and recycling collection conducted by the City, the most cost-efficient option is automated curbside collection followed by rear-load curbside collection.

Curbside Program Option	Operator	Calculated Cost/HH/Month	City HH	Total Costs (based on 2018)	2023	2028	Potential Annual Savings (based on 2018)	Potential Annual Savings (based on 2023)	Potential Annual Savings (based on 2028)
Side/Back Door	City's Average	\$23.74	4,272	\$1,217,214	\$1,379,118	\$1,540,315	\$0	\$0	\$0
Rear Load Existing Trucks	City	\$21.48	4,272	\$1,101,290	\$1,082,867	\$1,205,135	\$115,924	\$296,251	\$335,181
Backyard Trash/Manual Bin Recycle	City	\$25.57	4,272	\$1,310,788	\$1,487,457	\$1,653,744	(\$93,574)	(\$108,339)	(\$113,429)
Semi-Automated	City	\$22.60	4,272	\$1,158,616	\$1,294,127	\$1,438,089	\$58,598	\$84,991	\$102,226
Automated	City	\$21.34	4,272	\$1,094,092	\$1,211,622	\$1,326,795	\$123,122	\$167,496	\$213,520

Automated collection is also the most productive when considering recycling performance as shown in the table below:

Comparable Cities 2018 Diversion Rate for Curbside Collection for Recyclables (Recycle/Recycling + Trash)



A = Automated Collection, M = Manual Collection

The City will need to bid out automated trash and rubbish collection in order to obtain actual pricing in order to complete an accurate comparison compared to the estimates in this report which are based on 2018 averages.

University Heights Question Responses

QUESTION 1: IS THERE A COMMUNITY THAT IS A BETTER COMPARISON TO US THAN LAKEWOOD WITH WHICH TO MAKE A COMPARISON?

Is there a community that is a better comparison to us than Lakewood with which to make a comparison? Lakewood is much larger than University Heights so the cost of trash collection will reflect that (they are 6.69 sq miles v. UH at 1.819 sq miles.) Just wondering why that community was chosen as a comparison.

John P. Rach, AIA

Lakewood was chosen as it was one of the most recent cities to convert from backyard pickup to curbside. A per capita cost analysis with cost increases as a percentage would be helpful as it eases the population and size disparity.

GT Environmental

Lakewood was chosen based on location, has automated curbside collection, and operates from a general fund. Lakewood was in the 2008 study and at that time was just beginning to transition from backyard service to curbside service. This transition, and their experience both logistically and financially, would be very beneficially to the City to understand.

2018 Financial Analysis	University Heights	Lakewood
Operation Costs	\$1,217,214	\$3,978,000
Minus 2018 Capital	\$1,217,214	\$3,678,000
Operation Costs Include	*Rubbish Collection *Recycling Collection *Yard Waste Collection *Bulk Collection	* Trash Collection *Recycling Collection *Leaf Collection *Bulk Collection *Yard Waste Collection 10 months of year *Staffed Drop-off Trash/Recycling Facility
Rubbish Tons	4,542	16,907
Recycling Tons	335	4,738
Population	12,938	50,100
Number of Households Serviced	4,272	14,000
Operation Costs/Household/ Month without Capital	\$23.74	\$21.89
Per Capita Costs per Month	\$7.84	\$6.62
University Heights Projected Annual Costs Using Lakewood Per Capita Costs as Basis	\$1,122,315	

QUESTION 2: WHAT WAS THE TOTAL COST OF TRASH COLLECTION OF LAKEWOOD IN 2009 (WHEN THEY CONDUCTED BACK YARD PICKUPS), AND THE TOTAL COST TODAY?

What was the total cost of trash collection of Lakewood in 2009 (when they conducted back yard pickups), and the total cost today? What was their immediate savings after purchasing new trucks and the large cans. A per household cost would also be helpful as it's easier to make comparisons.

GT Environmental

Lakewood had initial program costs with education and truck purchases. Cost savings were realized once staffing was adjusted from 40 to 26. This reduction took several years through attrition and re-assignment.

Other services in their overall budget (\$4 Million) includes, rubbish, recycling, and leaf collection, yard waste collection 10 months of year, and staffed drop-off site year-round. Their drop-off is free to residents of Lakewood. This facility accepts garbage, recycling, and HHW. The site provide service to their large population of multi-family housing. Over 90% of households are serviced via automated collection. Additional collection systems such as manual and semi-automated are utilized based on streets, alleys, and turn arounds. The City services 370 backyard households for seniors, disabilities, etc. (~2%). Lakewood does have parking in street issues and bought a dual packer sideloading trucks.

Lakewood	2008	2018	Difference
Operation Costs	\$4,411,000	\$3,978,000	-10%
Rubbish Tons	19,990	16,907	-15%
Recycling Tons	3,786	4,738	25%
Number of Households Serviced	14,000	14,000	0%
Operation Costs/Household/Month	\$26.26	\$23.68	-10%

University Heights	2008	2018	Difference
Operation Costs	\$1,023,000	\$1,217,214	19%
Rubbish Tons	5,645	4,542	-20%
Recycling Tons	338	335	-1%
Number of Households Serviced	4,114	4,272	4%
Operation Costs/Household/ Month	\$20.72	\$23.74	15%

QUESTION 3: CAN OUR CURRENT TRUCKS (OR LEAST THE ONES IN BETTER CONDITION, IF THERE ARE ANY) BE RETROFITTED WITH THE ONE-ARM BANDIT THAT WORKS WITH THE LARGE TOTES?

Can our current trucks (or least the ones in better condition, if there are any) be retrofitted with the one-arm bandit that works with the large totes?

GT Environmental

Standard rear load packer trucks cannot be outfitted with side load mechanical arms. The trucks can be outfitted with hydraulic flippers on the rear to dump carts (semi-automated).

The Lakewood trucks, which they highly recommended, are triple option Labrie Sideloader which allows the collector to perform automated, semi-automated, or manual collection.

QUESTION 4: PROJECTED COST IF WE MAINTAIN BACK YARD PICKUP BUT ADDED VOLUNTARY CURBSIDE RECYCLING

Projected cost if we maintain back yard pickup but added voluntary curbside recycling (the idea of the continued use of the blue plastic bags, which ultimately end up in a landfill, is disturbing.)

GT Environmental

An additional cost analysis would need detailed information on contracts with recycling tipping fees to finalize this assessment. Projected below are recycling tipping fees which would increase to \$50 per ton. There would be minimal savings based on the current tonnage and miles driven around the City looking for setouts.

Recyclables	2008	2018	Difference	2021
Hauling Fees	Truck Mileage and Maintenance		N/A	
Tipping Fees	\$0	\$0	0%	\$16,750*
Paper Cooperative Hauling Fees	\$2,840	\$1,243	-56%	\$1,243
Paper Cooperative Average Cost per Ton	40	56	41%	56
Paper Cooperative Tons	71	22	-69%	22
Recycling Tons	338	335	-1%	335

*Estimated \$50/ton

Bags are not always opened due to labor and equipment limitations at the recycling facilities. Also, one cannot guarantee the contents of the bag (hidden needles, rubbish, etc.)

One option that the City could do is require the non-landfill materials to be placed at the curb and rubbish remains at the backdoor. There would be little savings, but the value could be that more recyclables could be captured by eliminating them being collected by the Kubotas's which have space limitations. Costs could go up as the recycle drive would have more stops and more volume to collect versus the current system where they consolidate the recyclables in piles on each street.

QUESTION 5: FULLY AUTOMATED IN-HOUSE CURBSIDE PROGRAM

Fully automated curbside in house- How many in house staff would be reduced and what is the savings, number of new vehicles required and their cost, any operational savings (fuel, maintenance) etc.... Basically the calculations of how you arrived at the cost per household.

The following scenario demonstrates an automated program which could be implemented over a 3-year period. Collection would take place 5 days a week with a truck for rubbish and a truck for recycling each day. Additional services for yard waste and bulk item collection services would still continue.

Services

- Rubbish (in-house automated)
- Recycling (in-house automated)
- Bulk (in-house manual)
- Yard Waste (in-house manual)

Staff

	2008	2018	2023
Staffing			
Rubbish Full-time	6	4	1
Rubbish Part-time		3	0
Recycling		1	1
Yard Waste	1	1	1
Bulk	2	2	2
Maintenance	2	2	2
All Staff	10	13	7
Expenses			
Payroll and Benefits	\$617,953	\$930,140	\$702,130

Expenses

Line Item	2008	2018	2023	Notes
Disposal/Processing	\$200,976	\$184,778	\$220,749	
Truck/Cart Debt Loan*			\$168,988*	Over a course of a 10-year loan
Employees	\$617,953	\$930,140	\$702,130	
Overhead	\$106,490	\$44,131	\$44,131	
Maintenance	\$97,760	\$58,165	\$75,615	
Total	\$1,023,178	\$1,217,214	\$1,211,613	
Households Served	4,114	4,272	4,272	
Cost per Household/Month	\$20.73	\$23.74	\$23.63	

Line Item	2008	2018	2023	Notes
Cost per Household/ Month with 20% Cost Increase			\$28.36	

*Loan: Carts: 4,486 (5% extra) for rubbish and recycling for a total of 8,971 at an estimated \$52 per cart and an estimated \$325,000 per truck for 3 trucks (rubbish, recycle, and back up trucks) for a Triple option (Automated, manual & tipper, all on the same body). Total Capital costs estimated to be \$1,441,502 The loan considers 10 years with a 3% interest rate.

QUESTION 6: FULLY AUTOMATED PRIVATE CURBSIDE PROGRAM WITH MUNICIPAL YARD WASTE COLLECTION

Fully automated curbside with an outside contract like the City of South Euclid- How many in house staff would be reduced and what is the savings, number of new vehicles required and their cost, any operational savings (fuel, maintenance) etc.... Basically the calculations of how you arrived at the cost per household.

The following scenario demonstrates an automated program serviced by a private hauler for rubbish and recycling. Additional services for yard waste and bulk item collection services would still be provide by the City.

Services

- Rubbish (private automated)
- Recycling (private automated)
- Bulk (private manual)
- Yard Waste (in-house manual)

Staff

	2008	2018	2023
Staffing			
Rubbish Full-time	6	4	0
Rubbish Part-time		3	0
Recycling		1	0
Yard Waste	1	1	1
Bulk	2	2	0
Maintenance	2	2	1
All Staff	10	13	2
Expenses			
Payroll and Benefits	\$617,953	\$930,140	\$224,547

Expenses

Line Item	2008	2018	2023	Notes
Disposal/Processing	\$200,976	\$184,778	\$0	Yard waste disposal
Contracted Rubbish and Recycling Services			\$705,739*	Average of 9 private hauler contracts in Cuyahoga County
Employees	\$617,953	\$930,140	\$224,547	
Overhead	\$106,490	\$44,131	\$44,131	
Maintenance	\$97,760	\$58,165	\$29,083	Reduce by half.
Total	\$1,023,178	\$1,217,214	\$1,003,501	
Households Served	4,114	4,272	4,272	
Cost per Household/Month	\$20.73	\$23.74	\$19.58	

Line Item	2008	2018	2023	Notes
Cost per Household/ Month with 20% Cost Increase			\$23.49	

*Average private hauler contracts with municipal yard waste collection services in Cuyahoga County for 9 communities was \$11.81 per household.

QUESTION 7: EASY COMPARISON OF THE 2 RETRO FITTING OPTIONS PARTIAL VS FULL?

Easy comparison of the 2 retro fitting options partial vs full?

GT Environmental

Below is a chart to show partial and full retro fit for current trucks:

City of University Heights Curbside Collection Program Economic Analysis for Trash and Recycling					
Item	Comments	Current Costs	Manual Costs	Semi-Automated Costs	Automated Costs
Capital Costs					
New or Updated Trash Trucks	Purchase price of a new truck	\$0	\$0	\$0	\$325,000
	Purchase price of truck flippers	\$0	\$0	\$7,500	\$0
	Number of new trucks required	0	0	2	2
	Truck Costs	\$0	\$0	\$15,000	\$650,000
New or Updated Recycle Trucks	Purchase price of a new truck	\$0	\$0	\$0	\$325,000
	Purchase price of truck flippers	\$0	\$0	\$7,500	\$0
	Number of new trucks required	2	0	1	1
	Truck Costs	\$0	\$0	\$7,500	\$325,000
Recycle Carts	Cost per cart (48-64 gallon) including Shipping, Assembly and Distribution	\$0.00	\$0.00	\$52.00	\$52.00
	Number of cart required	0	0	4,486	4,486
	Recycle Container Costs	\$0	\$0	\$233,251	\$233,251
Trash Carts	Cost per cart (64-96 gallon) including Shipping, Assembly and Distribution	\$0.00	\$0.00	\$52.00	\$52.00
	Number of carts required	0	0	4,486	4,486
	Trash Cart Costs	\$0	\$0	\$233,251	\$233,251
Total Capital Costs		\$0	\$0	\$489,002	\$1,441,502
Annual Costs					
Annualized cost of capital debt retirement (3% interest-10 year payback)	Vehicles and containers	\$0	\$0	\$57,326	\$168,988
Employees	Number of staff	13	10	10	7
	Average Cost Per Employee	\$71,549	\$81,422	\$81,422	\$88,654
Total Employee Costs		\$930,140	\$814,216	\$814,216	\$620,580
Supplies/Equipment/Maintenance		\$58,165	\$58,165	\$58,165	\$75,615
Overhead Costs		\$44,131	\$44,131	\$44,131	\$44,131
Trash/MRF Disposal and Processing Costs		184,778	184,778	184,778	184,778
Total Annual Program Cost		\$1,217,214	\$1,101,290	\$1,158,616	\$1,094,092
Cost Per Capita					
University Heights Population		12,938	12,938	12,938	12,938
Annual Cost Per Capita		\$94.08	\$85.12	\$89.55	\$84.56

City of University Heights Curbside Collection Program Economic Analysis for Trash and Recycling					
Item	Comments	Current Costs	Manual Costs	Semi- Automated Costs	Automated Costs
Cost Per Households					
# of Households Participating		4,272	4,272	4,272	4,272
Annual Cost Per Household		\$284.93	\$257.79	\$271.21	\$256.11
Monthly Cost Per Household		\$23.74	\$21.48	\$22.60	\$21.34
Savings over Current Program		N/A	9.52%	4.81%	10.12%
Cost Per Households (20% Increase in Cost Estimate)					
# of Households Participating		4,272	4,272	4,272	4,272
Annual Cost Per Household		\$284.93	\$309.35	\$325.45	\$307.33
Monthly Cost Per Household		\$23.74	\$25.78	\$27.12	\$25.61
Savings over Current Program		N/A	-8.57%	-14.22%	-7.86%

QUESTION 8: HOW MANY AND WHICH CITIES DO WHAT?

How many and which cities do what?

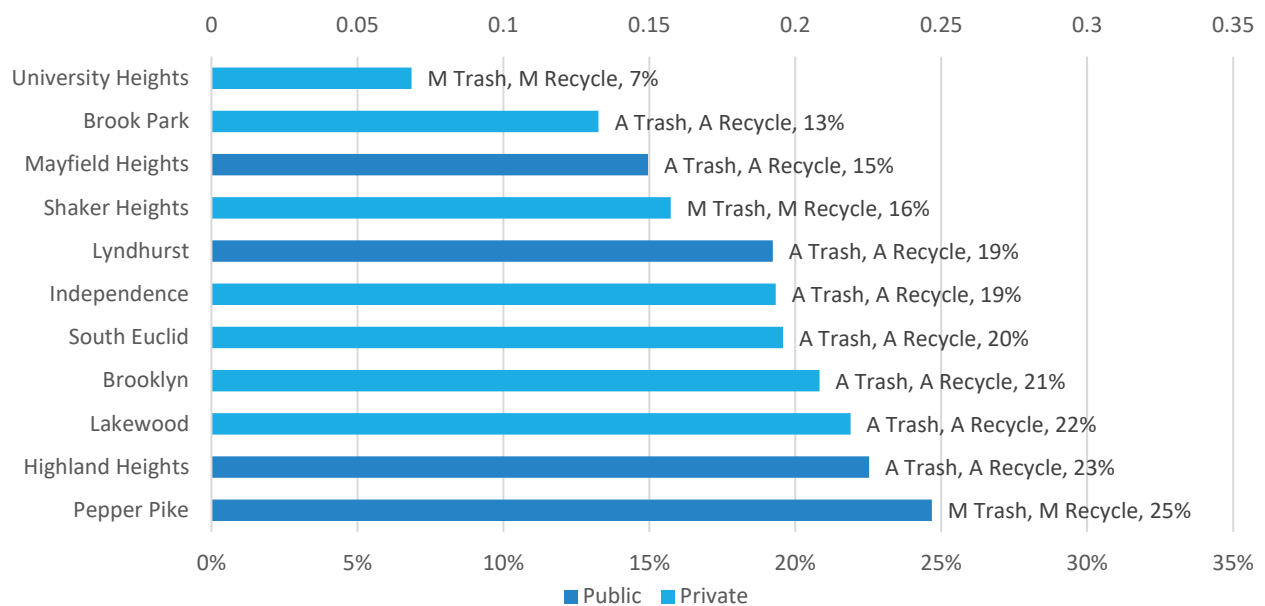
GT Environmental

Akron had moved to semi-automated collection initially then transitioned to automated collection.

The City of Canton is moving from manual curbside collection of trash to semi-automated collection. Recyclables will stay manual.

The following table shows the communities that the Study compared to the City and what system they use along with their recycling performance.

Comparable Cities 2018 Diversion Rate for Curbside Collection for Recyclables (Recycle/Recycling + Trash)



A = Automated Collection, M = Manual Collection

QUESTION 9: WHAT WOULD THE PROJECTED COST INCREASE BE IF WE MAINTAINED BACK YARD PICKUP FOR TRASH BUT ADDED VOLUNTARY CURBSIDE RECYCLING IN SMALL BINS FOR LOOSE RECYCLABLES?

What would the projected cost increase be if we maintained back yard pickup for trash but added voluntary curbside recycling in small bins for loose recyclables?

GT Environmental

A recycling box or bin is estimated to cost \$7-\$8 per bin and a cart is \$40-\$80 depending on the size, quantity, and logos added. In the study, it is estimated \$20 per household to account for supplying 2 bins plus freight. With 4,272 households and estimated extra 5% for replacements puts the cost at \$89,712 for supplying bins to the residents. A recycling 64-gallon cart are about \$52 would cost about \$233,251. Carts are recommended to avoid material debris due to wind and an open top bin. There is only one person dedicated to recycling collection. The following table summarizes this option.

Curbside Program Option	Operator	Calculated Cost/HH/ Month	City HH	Total Costs (based on 2018)	2023	2028	Potential Annual Savings (based on 2018)
Backyard Trash/ Manual Bin Recycle	City	\$25.57	4,272	\$1,310,788	\$1,487,457	\$1,653,744	(\$93,574)

QUESTION 10: WHAT EFFECT, IF ANY, DO YOU ANTICIPATE FULLY-AUTOMATED WASTE COLLECTION WOULD HAVE ON THE NUMBER OF SERVICE WORKERS YOUR DEPARTMENT EMPLOYS?

What effect, if any, do you anticipate FULLY- automated waste collection would have on the number of service workers your department employs?

GT Environmental

Current collection staff is at 13 service workers. Under a fully automated trash and recycling collection, total staff would be 7 workers.

QUESTION 11: WHAT EFFECT, IF ANY, DO YOU ANTICIPATE SEMI-AUTOMATED WASTE COLLECTION WOULD HAVE ON THE NUMBER OF SERVICE WORKERS YOUR DEPARTMENT EMPLOYS?

What effect, if any, do you anticipate SEMI-automated waste collection would have on the number of service workers your department employs?

GT Environmental

Current collection staff is at 13 service workers. Under a semi-automated trash and recycling collection, total staff would be 10 workers.

QUESTION 12: FOR EACH OF THE OPTIONS PRESENTED IN THE DRAFT REPORT, WHAT PORTION OF THE COSTS DOES THE RECYCLING PROGRAM REPRESENT?

For each of the options presented in the draft report, what portion of the costs does the recycling program represent?

GT Environmental

From current total collection cost, recycling is estimated at 7% of the budget compared to trash, yard waste, and bulk collections. If you removed the recycling program, there would be one less recycle staff for the current program.

Type of Collection Service	2018	2018 Employees for Recycling	2021	2021 Employee for Recycling
Current Operations Trash & Recycling	13%	1	14%	1
Rear Load - Existing Trucks	54%	2	16%	2
Semi-Automated Trash & Recycling	26%	2	26%	2
Automated Trash & Recycling	30%	1	27%	1
Backyard Trash/Manual Bin Recycle	13%	1	13%	1
Backyard Trash/ Semi-Automated Recycling	26%	1	32%	1
Backyard Trash/ Automated Recycling	13%	1	12%	1
*Automated Trash & Recycling Private Hauler	0%	0	2%	0
*Automated Trash & Recycling Private Hauler Municipal YW	0%	0	0%	0

QUESTION 13: WHAT DO YOU ANTICIPATE THE COST-PER-TON BEING WHEN OUR CONTRACT COMES UP FOR RENEWAL IN JUNE 2020?

Given what you know about changes regional municipalities have seen when their recycling contracts came up for renewal, what do you anticipate the cost-per-ton being when our contract comes up for renewal in June 2020?

GT Environmental

Contract costs per ton range from \$50 to \$150 per ton for recycling. In the report, GT estimates recycle processing going from \$0 to \$50 per ton in 2020 for the City.

QUESTION 14: HOW MANY MORE TONS OF RECYCLING PER YEAR OVER CURRENT NUMBERS DO YOU ANTICIPATE WILL BE GENERATED BY EACH OF THE OPTIONS IN THE DRAFT REPORT?

We believe that ease-of-recycling may increase the number of tons of recyclables collected, how many more tons of recycling per year over current numbers do you anticipate will be generated by each of the options in the draft report?

GT Environmental

In 2018, the City collected 335 tons. Recycling tonnage may increase based on capacity of the container system utilized by the City. A recycle bin is projected to increase annual tonnage by 10% - 20% resulting in an additional of 67 tons. A 64-gallon cart is projected to increase annual tonnage by 20% - 50% resulting in an additional tonnage of 501 tons. Finally, if recyclables increase, then logically trash should decrease. This is evident in the following Lakewood analysis:

Lakewood	2008	2018	Difference
Operation Costs	\$4,411,000	\$3,978,000	-10%
Rubbish Tons	19,990	16,907	-15%
Recycling Tons	3,786	4,738	25%
Number of Households Serviced	14,000	14,000	0%
Operation Costs/Household/Month	\$26.26	\$23.68	-10%

In the table above, recycling tons went up by 25% when Lakewood went from bags to carts on recycling. Landfill tons went down by 15%.

The following table summarizes the projected tonnages by collection option:

Collection Container	Est. Increase	2018 Tons	2023 Low	2023 High
Recycle Bins	10% - 20%	334 Tons	367 Tons	401 Tons
Recycle Carts	20% - 50%	334 Tons	401 Tons	501 Tons

QUESTION 15: WHAT WOULD THE COST BE FOR BLUE RECYCLING BOXES CARRIED TO THE CURB BY CITIZENS AND MANUALLY EMPTIED BY SERVICE WORKERS?

What would the cost be for blue recycling boxes carried to the curb by citizens and manually emptied by service workers?

GT Environmental

A recycling box or bin is estimated to cost \$7-\$8 per bin. In the study, it is estimated \$20 per household to account for supplying 2 bins plus freight. With 4,272 households and estimated extra 5% for replacements puts the cost at \$89,712 for supplying bins to the residents. A recycling 64-gallon cart are about \$52 would cost about \$233,251. Carts are recommended to avoid material debris due to wind and an open top bin. The table below summarizes this option.



Curbside Program Option	Operator	Calculated Cost/HH/ Month	City HH	Total Costs (based on 2018)	2023	2028	Potential Annual Savings (based on 2018)
Backyard Trash/ Manual Bin Recycle	City	\$25.57	4,272	\$1,310,788	\$1,487,457	\$1,653,744	(\$93,574)