# QUALITY ASSURANCE DIVISION

COMPOSTABLE MATERIAL COMPOSITION AUDIT

Document Number: QA20190206

Owner: Rikki Weaver Lewis

Date: February 6, 2019

## TABLE OF CONTENTS

# 1 EXECUTIVE SUMMARY

Austin Resource Recovery (ARR) Collection Services is responsible for collecting yard trimmings and other compostable materials from Austin residents within ARR's service area. Currently, ARR collects curbside compost from approximately 93,075 customers. As part of the City of Austin's Zero Waste goal, the curbside composting collection program piloted in January 2013 and February 2014, to include 14,322 customers. The program was further expanded in October 2017 and again in June 2018, adding 40,091 and 38,740 customers, respectively. Contamination of the compost stream, in the form of trash and recyclable items, negatively affects processing, and reduces ARR's diversion rate. In order to increase the diversion rate and promote a cleaner material stream, ARR's Quality Assurance Division (QAD) conducts composition audits of collected compostable material. This audit, conducted August 6–29, 2018, revealed an overall contamination rate of 2.5%, to include trash/other (2.3%) and recyclables (0.2%). Compostable material (97.5%) consisted of yard trimmings (77.4%), food waste (15.2%), and soiled paper (4.9%). (See the table on page 5 for more details.) Data collected suggests, 1) there may be a positive relationship between compostable bag use and food waste diversion, 2) education and outreach efforts have improved customer knowledge and use of compost carts, and 3) trash, treated wood, and plastic bags continue to contaminate the compost stream. QAD recommends further investigation into the promotion and issuance of compostable bags; increased data collection; continued research, analysis, and communication of tagging procedures; continued education for customers, ARR employees, and Austin 311 customer service staff; and continued improvement and simplification of instructions on customer carts. Field audits of the curbside composting collection program should be performed regularly.

# 2 PURPOSE

The purpose of this report is to provide the results from the compostable material composition audit for ARR's curbside composting collection services. QAD staff conducted the audit in partnership with ARR Operations.

# 3 BACKGROUND

Residential curbside collection services are provided to approximately 201,539 customers, and include trash, recyclables, clothing and housewares, bulk items, and compostable material. In January 2013, a pilot curbside composting collection program expanded the yard trimmings program to include food waste. The pilot initially included 7,902 customers and added 6,402 customers in February 2014. In October 2017, Phase I added 40,091 customers to the program, and in June 2018, Phase II added 38,740 customers. In order to determine contamination rates and customer use of the compost carts, QAD facilitates material composition audits of the curbside composting collections.

# 4 ROLES & RESPONSIBILITIES

The sections listed below detail roles and responsibilities related to the compostable material composition audit.

## 4.1 AUSTIN RESOURCE RECOVERY QUALITY ASSURANCE

ARR QAD is responsible for conducting the compostable material composition audit, documenting findings, and making recommendations to improve customer participation and increase diversion percentages.

## 4.2 AUSTIN RESOURCE RECOVERY LITTER ABATEMENT-YARD TRIMMINGS COLLECTION SERVICES

ARR's Litter Abatement Division (LAD) provided expertise and assistance to the sort. Operations collected, delivered, and removed the samples daily. Additionally, LAD supervisors and crew leaders assisted QAD with sorting and returning the compostable materials to a collection vehicle each day.

# 5 METHODOLOGY

The methodology used in this composition audit is based on international waste analysis standards derived from ASTM Standard D 5231- 92 (Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste). The audit was conducted August 6–29, on corresponding collection days. In order to sample 54 of the 67 compost routes, operations collected the materials from 60 carts at various locations throughout randomly selected routes each day. Drivers delivered the samples to a sorting facility located at 7211 IH 35. The collected material was sorted into various subcategories pertaining to trash, recyclables, or compostables. The weight of each material type was recorded, along with counts of plastic bags (a contaminant) and compostable bags.

# 6 FINDINGS

QAD's Quality Improvement Specialist reviewed the data acquired from the composition audit and documented the findings. The analysis revealed an overall contamination rate of 2.5%, to include trash/other (2.3%) and recyclables (0.2%). Compostable material (97.5%) consisted of yard trimmings (77.4%), food waste (15.2%), and soiled paper (4.9%). The following table summarizes the overall composition of the material audit.

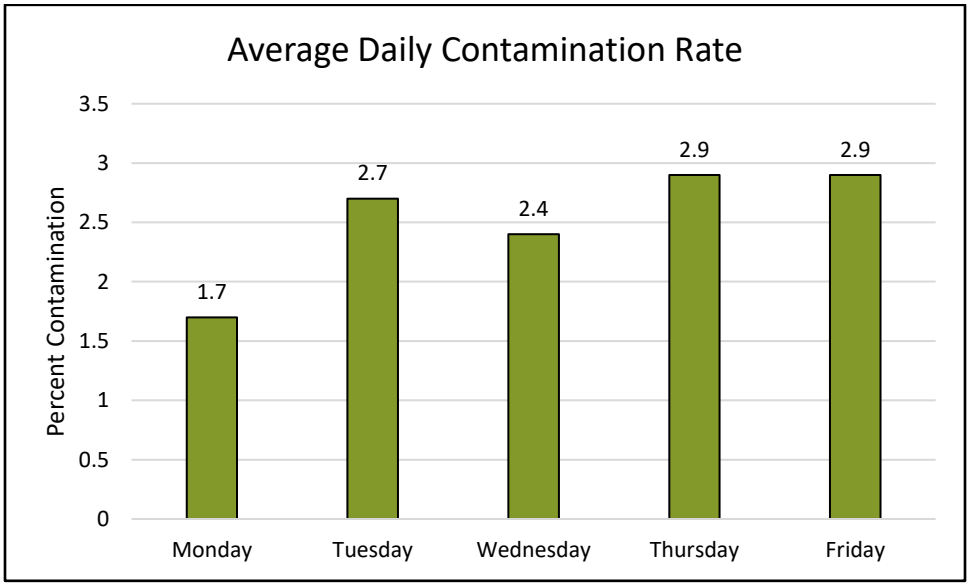
## Total Overall Material Composition

| | MATERIAL | Total | Percent of Total |
|---|---|---|---|
| | | | |
| **COMPOSTABLES** | Yard Trimmings | 46957 | 77.4 |
| | Food Waste | 9249.2 | 15.2 |
| | Soiled Paper/Cardboard | 2952.4 | 4.9 |
| | **Total** | **59158.6** | **97.5** |
| **RECYCLABLES** | Plastics | 65 | 0.1 |
| | Glass | 34.7 | <0.1 |
| | Tin/Aluminum | 17.1 | <0.1 |
| | **Total** | **116.8** | **0.2** |
| **OTHER** | Trash | 922.2 | 1.5 |
| | Treated Wood | 315.9 | 0.5 |
| | Odd Items | 67 | 0.1 |
| | Clothes/Textiles | 65 | 0.1 |
| | Styrofoam | 9.1 | <0.1 |
| | **Total** | **1379.2** | **2.3** |
| **Total Contaminants** | | **1496** | **2.5** |
| **Total Material** | | **60654.6** | **100.0** |
| | | | |
| **BAG COUNTS** | Plastic | 691 | |
| | Compostable | 2277 | |

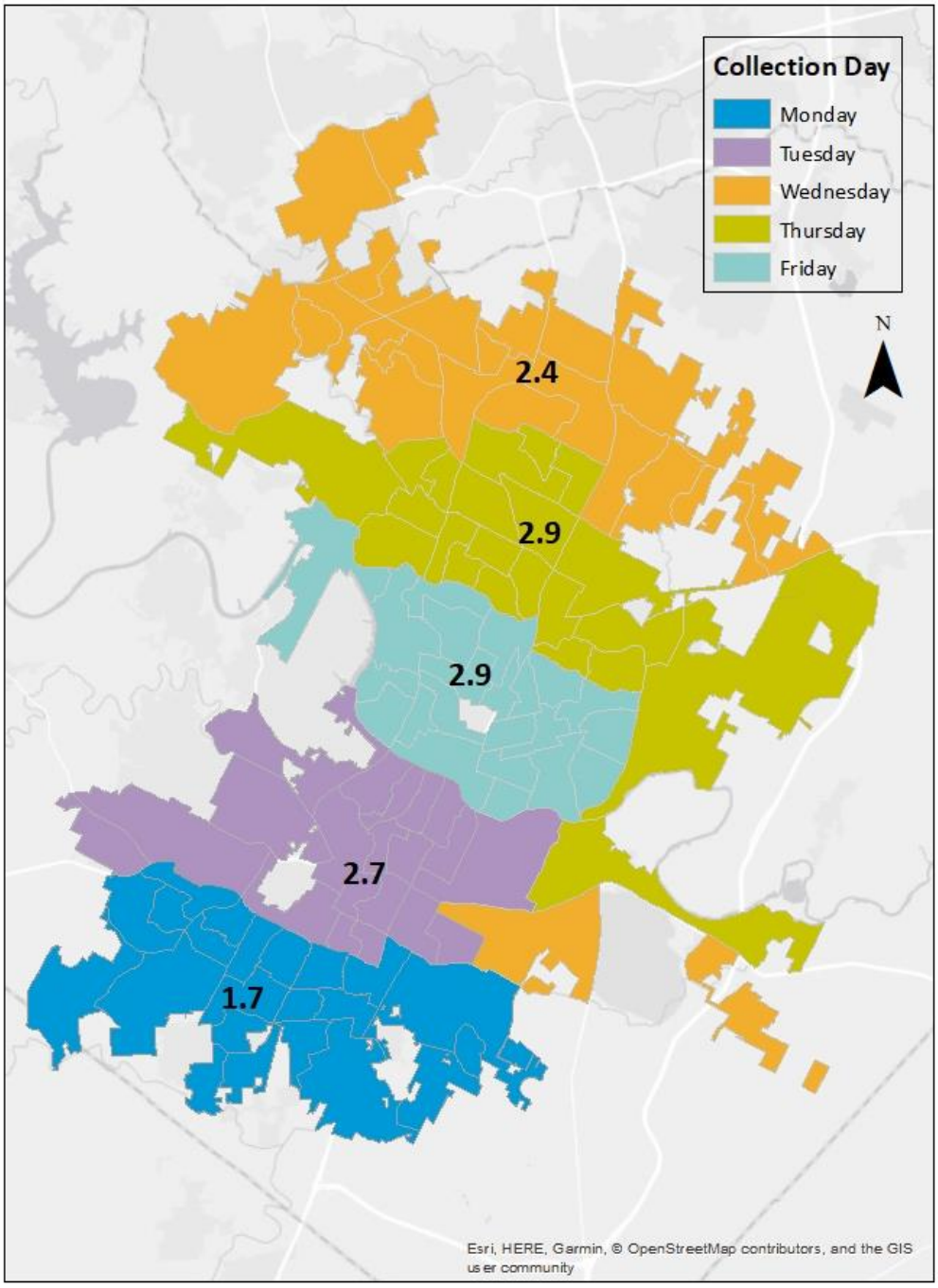
*Weights recorded in pounds.

**See the appendix for more detailed information.

A comparison of daily contamination rates is highlighted in the following chart and map.

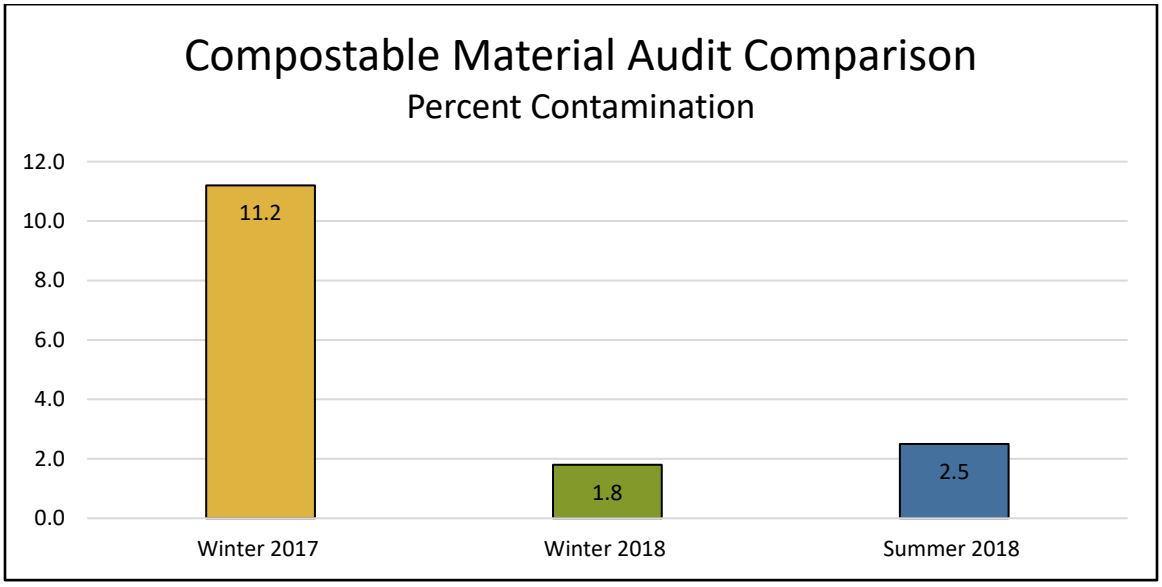


## Average Contamination Rate

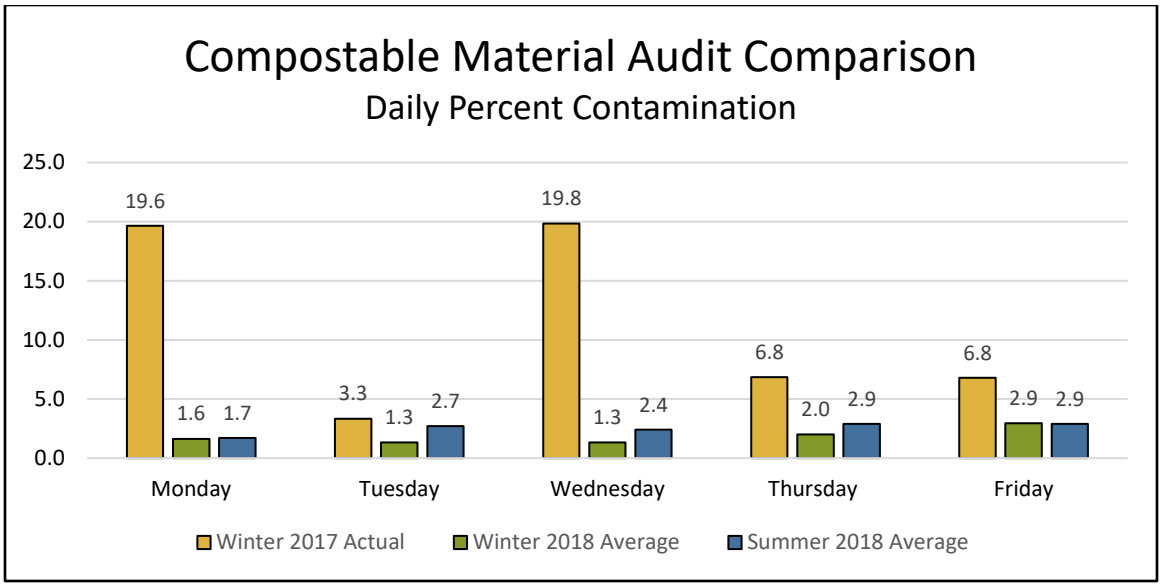



Map Created by:
Thomas Montgomery, IT Applications Senior Analyst
Rikki Weaver Lewis, Quality Improvement Specialist

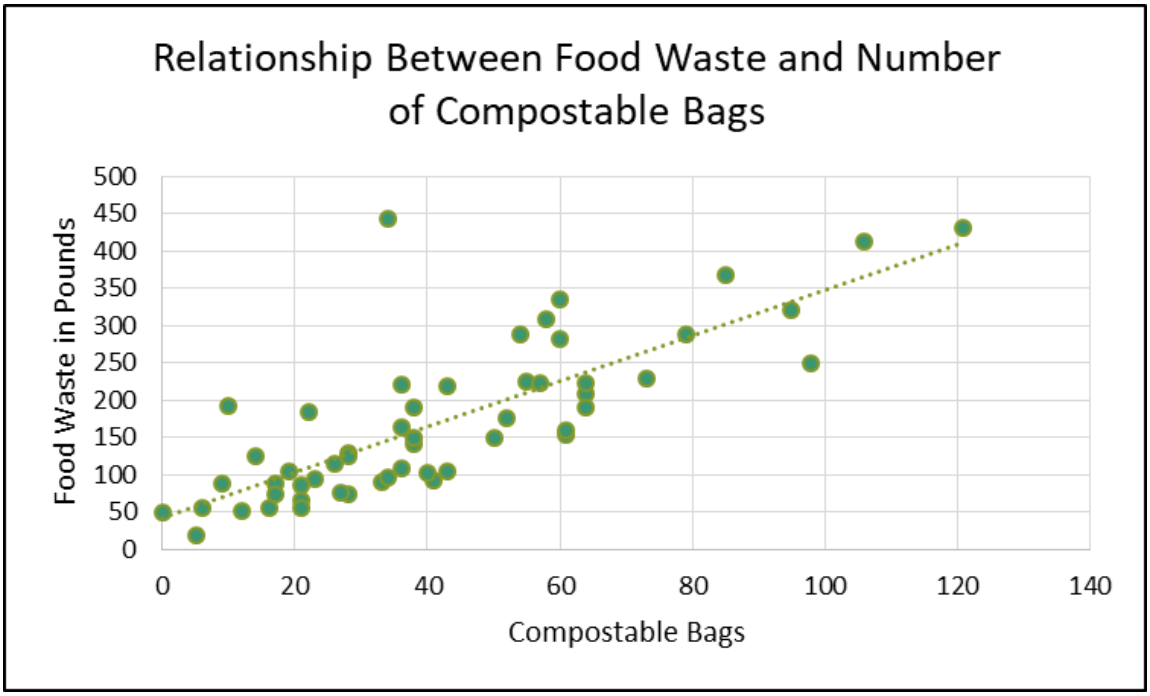
ARR QAD conducted the first of three compostable material composition audits March 6–10, 2017, three years after the Pilot Phase was initiated, and at which time there were approximately 14,322 curbside composting collection customers. The second audit was conducted February 22–March 7, 2018, four months after the addition of Phase I, at which time there were approximately 54,413 composting customers. At the time of the third audit, conducted August 6–29, 2018, two months after the addition of Phase 2, approximately 93,075 customers were participating in the program. Though the number of participants, the amount of material collected, and the number of samples varied among the three audits, it is still worthwhile to examine the trend regarding contamination. The following chart displays a comparison of the overall contamination rate of each audit.




Further, a comparison of contamination rates can be observed when comparing the average daily contamination rates of the two most recent audits to the contamination rate of the first audit which spanned 5 days.



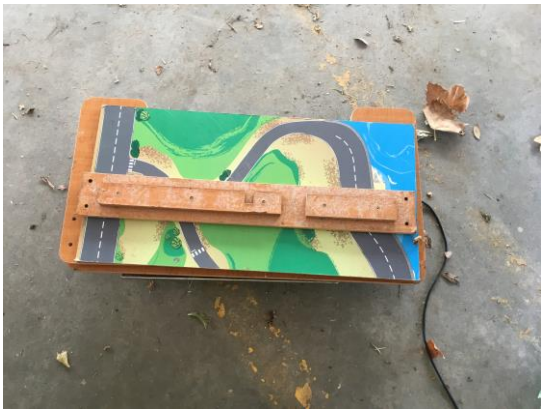

This is the first audit in which compostable bags were quantified. The positive relationship between the number of compostable bags and food waste (per sample) is illustrated below. This data suggests that as the pounds of food waste per sample increased, so did the number of compostable bags.

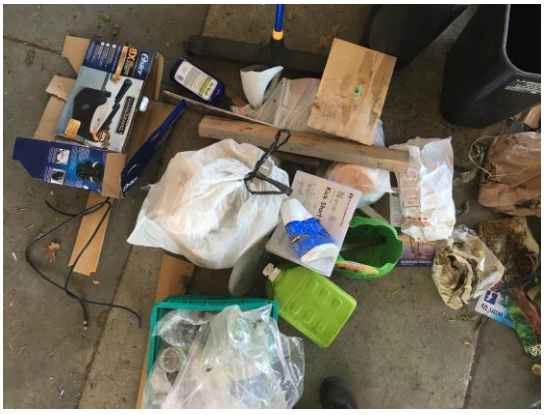


**Items of Note:**

- The analysis revealed an overall contamination rate of 2.5% with a daily range of 0.7% to 5.7%.
- To account for the presence of items which did not register on the scale, a weight of 0.1 lbs. was recorded, e.g., lightweight recyclable materials, polystyrene/polyethylene foam (commonly known as Styrofoam), and clothing/textiles. The light weight of these items should be considered when discerning contamination rates.
- All samples had some amount of contamination.
- Treated wood contaminated 57% of samples.
- Some customers deposit food waste in plastic bags and place them in their compost cart (plastic bags observed include produce bags, bun and bread bags, and resealable bags). Along the same lines, unopened frozen food in plastic bags, e.g., peas, were also observed.
- Many samples included one to a few dog waste bags, however, it is possible these were thrown in by passersby. Soiled kitty litter was also observed.
- Odd items weighed include: insulation, a large terra cotta flower pot, 21 lbs. of canned food and unopened baby cereal boxes (in one sample), a bag of cement, personal floatation devices, a power steering pump, and rocks.
- Other items of note include: filters, foil (Mylar) balloons, a drill battery, soiled diapers (2), a shower curtain, a full vacuum bag, a punch set and silverware, and a child's wooden playset.
- Finally, several compostable bags were observed with non-compostable items inside (see following photos).

**Images of Items Found in the Compost Stream:**





# 7 CONCLUSION AND RECOMMENDATIONS

Data collected during this material composition study suggest 1) there may be a positive relationship between compostable bag use and food waste diversion, 2) education and outreach efforts have improved customer knowledge and use of compost carts, and 3) trash, treated wood, and plastic bags continue to contaminate the compost stream.

Efforts to increase diversion and decrease contamination should focus on these findings. In addition to current and previous endeavors—which include door-to-door distribution of collateral, direct mail, and community outreach efforts—consider the following:

## 7.1 COMPOSTABLE BAG USE AND INCREASED DIVERSION

A positive relationship may exist between customer use of compostable bags and food waste diversion. Consider options for increasing promotion and issuance of compostable bags to customers. Currently, ARR issues a small amount of compostable bags to new customers and to those who attend outreach events (while supplies last). Some comparable cities initially offer customers a six month to one year supply. At least one city reviewed funds issuance of compostable bags with single-use bag fees. Funding options should be further investigated.

Address the "ick" factor

- Increase promotion and issuance of compostable bags.
- Ensure Customer Service and 311 offer mission supported responses to customers.

In addition to promoting the use of compostable bags, Customer Service and Austin 311 should continue to educate and support customers by offering advice to keep down the perceived "ick" factor (as seen in the PSA), especially to customers who are calling in to complain or opt-out. Opportunities for communication include collateral, incoming 311 calls, and incoming calls to Customer Service.

## 7.2 CUSTOMER SERVICE, DATA COLLECTION, AND EDUCATIONAL OUTREACH

Opportunities exist to collect data and provide education with both new customers and existing customers. Instituting a quarterly report derived from billing and shared with Strategic Initiatives (SI), outlining new customers, would allow SI to direct mail new customers the same educational materials distributed during a roll out. Following up with new customers one to three months after a roll out or quarterly mailing, either with a mail piece or door-to-door contracted outreach, may further engage and educate customers. Another alternative is a biannual newsletter sent to all customers. In addition to promoting the mission, customer service has an opportunity to collect data when a customer requests an opt-out in two ways. 1) Asking

Collect data, engage customers

- Institute a quarterly new customer report.
- Collect data on customers who opt-out:
  - Why?
  - Where?

customers why they are choosing to opt-out, and recording their responses, will provide data that can be analyzed quarterly or biannually to help us better serve our customers. 2) Likewise, recording the location of opt-outs, and sharing this information with SI, will allow focused outreach in areas with concentrated opt-outs.

### 7.3 EDUCATION AND BEHAVIOR CHANGE: TAGGING

Both customers and employees can benefit from education that leads to behavior change. Studies suggest tagging carts can positively influence customers' behaviors. In some cities, tags are left to correct contamination ("oops" tags) and to offer reward for behavior correction ("thank you" tags). Currently, ARR issues only "oops" tags. Continued research of other tagging programs, and analysis of current tagging practices may improve our procedures. Implementing a system to track tagged carts could also be useful.

Research and analyze tagging procedures
- Incorporate "Thank you" tags.
- Track tagged carts.
- Increase communication with operators.
- Incentivize tagging.
- Conduct a work-time study.

Increasing communication with operators, to stress the importance of their role, and the effectiveness of the program and procedures, could increase tagging efforts. Additionally, offering incentives or including tagging specifically in SSPRs may positively affect operators' tagging behavior. A work-time study to determine the feasibility of adding "thank you" tags to current practices, as well as to understand collections' perspective and workload may be beneficial.

### 7.4 PEOPLE SUPPORT WHAT THEY HELP CREATE

Increased communication and continued education may engage ARR and Austin 311 employees to better promote the Zero Waste mission to customers. Sharing new and updated collateral across ARR divisions and with Austin 311 ensures all are up to date on program guidelines. Creating an annual or semiannual presentation to share with employees (and Austin 311), to include the benefits of composting, industry standards (set-out and participation measurements), performance measures and benchmarks, contamination issues, and process improvements, e.g., why tagging works, may help keep employees engaged and up-to-date. The presentation could include an interactive quiz as well as a survey to gather employee input on improvements to the program. Engaged employees are more likely to participate in promotion of the mission.

Engage and educate employees
- Share collateral across divisions.
- Create a presentation for employees:
  - Include a quiz
  - Include a survey

### 7.5 EDUCATION AT THE CART

Though contamination has decreased since the first audit, there still exists room for improvement. To promote a cleaner compost stream, continue to improve and simplify instructions on the customer carts. These efforts could include additional signage for those items which continue to contaminate the stream in large numbers. Identify a priority contaminant, i.e., trash, treated wood, glass, or plastic bags, and place a sticker(s) on top and/or on sides of cart. Space for additional signage is limited on current 32-gallon carts. Consider availability and placement of flat surfaces, especially on lids, in future cart purchases.

Improve and simplify cart instructions

- Identify a priority contaminant for additional signage.

# APPENDIX

## Detailed Material Composition

| | MATERIAL | Monday 8/6/2018 | Tuesday 8/7/2018 | Wednesday 8/8/2018 | Thursday 8/9/2018 | Friday 8/10/2018 | Monday 8/13/2018 | Tuesday 8/14/2018 | Wednesday 8/15/2018 | Thursday 8/16/2018 | Friday 8/17/2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COMPOSTABLES | Yard Trimmings | 4163.6 | 1445 | 3545.2 | 3750 | 1695.2 | 2251.8 | 2841 | 3578 | 2846.2 | 2090.6 |
| | Food Waste | 344 | 450.2 | 248.6 | 305.2 | 328.6 | 273.2 | 517.8 | 515.6 | 664.8 | 264 |
| | Soiled Paper/ Cardboard | 200.8 | 130.8 | 194.4 | 127.2 | 105.2 | 169.4 | 158 | 227 | 257.8 | 66.4 |
| | **Daily Total** | **4708.4** | **2026** | **3988.2** | **4182.4** | **2129** | **2694.4** | **3516.8** | **4320.6** | **3768.8** | **2421** |
| RECYCLABLES | Plastics | 4.6 | 4.2 | 8.5 | 0.3 | 6.5 | 7.7 | 0.7 | 1.4 | 2.6 | 3.2 |
| | Glass | 0.6 | 1.2 | 0.2 | 5.7 | 4.8 | 5 | 0.1 | 0 | 4 | 4.2 |
| | Tin/Aluminum | 1.2 | 1.7 | 0.2 | 5.4 | 0.3 | 1.6 | 0.1 | 0.2 | 2.3 | 1 |
| | **Daily Total** | **6.4** | **7.1** | **8.9** | **11.4** | **11.6** | **14.3** | **0.9** | **1.6** | **8.9** | **8.4** |
| OTHER | Clothes/Textiles | 2.5 | 9.2 | 11.6 | 33.2 | 0.1 | 2.8 | 0 | 5 | 0.2 | 0.1 |
| | Styrofoam | 0.3 | 0.1 | 0.3 | 0.1 | 0.1 | 0.8 | 0.2 | 0.2 | 0.2 | 2 |
| | Treated Wood | 0 | 36 | 51.6 | 9.4 | 4.9 | 65 | 5.8 | 36.6 | 0.1 | 11.2 |
| | Trash | 49.6 | 69.3 | 79.6 | 94.8 | 84.4 | 39 | 16.4 | 25.9 | 21.2 | 57.6 |
| | Odd Items | 0 | 0 | 17.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Daily Total** | **52.4** | **114.6** | **160.5** | **137.5** | **89.5** | **107.6** | **22.4** | **67.7** | **21.7** | **70.9** |
| **Total Contaminants** | | **58.8** | **121.7** | **169.4** | **148.9** | **101.1** | **121.9** | **23.3** | **69.3** | **30.6** | **79.3** |
| **Total Material** | | **4767.2** | **2147.7** | **4157.6** | **4331.3** | **2230.1** | **2816.3** | **3540.1** | **4389.9** | **3799.4** | **2500.3** |
| **Percent Contamination** | | **1.2** | **5.7** | **4.1** | **3.4** | **4.5** | **4.3** | **0.7** | **1.6** | **0.8** | **3.2** |
| BAG COUNTS | Plastic | 45 | 44 | 49 | 42 | 83 | 49 | 21 | 43 | 31 | 25 |
| | Compostable | 83 | 93 | 56 | 38 | 47 | 66 | 167 | 183 | 170 | 76 |

| | MATERIAL | Monday 8/20/2018 | Tuesday 8/21/2018 | Wednesday 8/22/2018 | Thursday 8/23/2018 | Friday 8/24/2018 | Monday 8/27/2018 | Tuesday 8/28/2018 | Wednesday 8/29/2018 | Total | Percent of Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| COMPOSTABLES | Yard Trimmings | 1883.6 | 3263.4 | 2829.4 | 2167.6 | 2217.8 | 2541.2 | 1676.6 | 2170.8 | 46957 | 77.4 |
| | Food Waste | 520.2 | 303 | 831.2 | 1134 | 723.4 | 854.4 | 456.4 | 514.6 | 9249.2 | 15.2 |
| | Soiled Paper/ Cardboard | 137.6 | 190 | 130 | 217 | 162.6 | 128 | 247 | 103.2 | 2952.4 | 4.9 |
| | **Daily Total** | **2541.4** | **3756.4** | **3790.6** | **3518.6** | **3103.8** | **3523.6** | **2380** | **2788.6** | **59158.6** | **97.5** |
| RECYCLABLES | Plastics | 0.2 | 8.8 | 0.3 | 5.8 | 4.5 | 0.3 | 2 | 3.4 | 65 | 0.1 |
| | Glass | 0.8 | 2.2 | 0.1 | 1.2 | 4.4 | 0 | 0.1 | 0.1 | 34.7 | <0.1 |
| | Tin/Aluminum | 0.1 | 0.2 | 0.1 | 1.6 | 0.2 | 0.1 | 0.6 | 0.2 | 17.1 | <0.1 |
| | **Daily Total** | **1.1** | **11.2** | **0.5** | **8.6** | **9.1** | **0.4** | **2.7** | **3.7** | **116.8** | **0.2** |
| OTHER | Clothes/Textiles | 0 | 0.2 | 0 | 0 | 0 | 0 | 0.1 | 0 | 65 | 0.1 |
| | Styrofoam | 0 | 0.2 | 0.1 | 1.9 | 0 | 0.7 | 1.6 | 0.3 | 9.1 | <0.1 |
| | Treated Wood | 0 | 12.3 | 5 | 9.6 | 16 | 7.1 | 24.8 | 20.5 | 315.9 | 0.5 |
| | Trash | 16.5 | 55.8 | 35.1 | 149 | 14.6 | 31.4 | 56 | 26 | 922.2 | 1.5 |
| | Odd Items | 0 | 7.8 | 0 | 0 | 4.8 | 0 | 4.4 | 32.6 | 67 | 0.1 |
| | **Daily Total** | **16.5** | **76.3** | **40.2** | **160.5** | **35.4** | **39.2** | **86.9** | **79.4** | **1379.2** | **2.3** |
| **Total Contaminants** | | **17.6** | **87.5** | **40.7** | **169.1** | **44.5** | **39.6** | **89.6** | **83.1** | **1496** | **2.5** |
| **Total Material** | | **2559** | **3843.9** | **3831.3** | **3687.7** | **3148.3** | **3563.2** | **2469.6** | **2871.7** | **60654.6** | **100.0** |
| **Percent Contamination** | | **0.7** | **2.3** | **1.1** | **4.6** | **1.4** | **1.1** | **3.6** | **2.9** | **2.5** | |
| BAG COUNTS | Plastic | 11 | 25 | 22 | 69 | 17 | 40 | 47 | 28 | **691** | |
| | Compostable | 140 | 93 | 168 | 266 | 175 | 213 | 119 | 124 | **2277** | |

*Weights recorded in pounds.