



Recycling and Waste Reduction Opportunity Assessment SPRINGFIELD [IL] PUBLIC SCHOOLS DISTRICT 186

March 2016



A report by the Illinois Sustainable Technology Center
istc.illinois.edu/zerowaste

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INTRODUCTION

In 2015, through funds made available by US Environmental Protection Agency (EPA) Region 5, the Illinois Sustainable Technology Center (ISTC) launched the Green Lunchroom Challenge. The Green Lunchroom Challenge is a voluntary pledge program for schools to improve the sustainability of their food service operations, with a focus on food waste prevention and reduction. The Challenge involves activities that range in complexity and commitment, to allow participants to best suit their situation, budget and available community resources. Participants earn points for every activity they complete and are recognized for reaching different levels of achievement. More information on the program is available at www.greenlunchroom.org.

In addition to resources available to complete each activity in the challenge, ISTC partnered with the [Springfield Public Schools \(SPS\)](#) to assess opportunities of food waste reduction and diversion. This hands on assessment gave ISTC insight to the barriers and opportunities in implementing the activities included in the Green Lunchroom Challenge.

ISTC, along with its partner [Beyond Green Partners Inc.](#), conducted a three-day assessment at three elementary schools identified by SPS to accomplish the following:

- Conduct assessments of kitchen prep (back of the house) as well as student dining area (front of the house) to establish a baseline of current food service practices surrounding food waste.
- Identify top opportunities for reducing and recycling waste throughout the District, with an emphasis on reducing food waste.
- Assist the District in reducing and recycling waste at one school, with an emphasis on reducing food waste.

This report presents findings from project tasks conducted from January to March of 2016.

- ➔ **Baseline waste characterization** of three different middle schools within the Springfield Public Schools District
- ➔ **Research on:**
 - Current participation of staff with regards to recycling and waste reduction
 - Current waste reduction practices on campus
- ➔ **Recommended steps for improving:**
 - Avoiding waste from being generated
 - Increasing diversion rates
 - Active outreach and education campaign

Questions about this report and project may be directed to:

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WASTE CHARACTERIZATION STUDY

In January of 2016, ISTC conducted a characterization of landfill-bound materials collected from 3 different Springfield Public School cafeterias. Waste samples were collected from the following schools:

- Enos Elementary School (Enos)
- Lindsay Elementary School (Lindsay)
- Ridgely Elementary School (Ridgely)

A total of **498** pounds of waste was sorted into 13 material categories over a 3 day sampling period.

Table 1. University of Illinois Sampling schedule and totals

School	Dates	Back of the house	Front of the house	Total
Enos	Jan 12	16	137	153
Lindsay	Jan 13	25	136	161
Ridgely	Jan 14	23	161	184
			Grand Total	498 lbs.

Sampling Procedure

ISTC worked with SPS food service staff, who in turn coordinated with the three schools participating in the study. The three schools represented the complete demographic variance of the SPS district. These schools were chosen in part because the waste generated by them was likely to be similar to other schools in the district.

Garbage, recycling, and organic materials generated from food service operations at the three schools were collected throughout the lunch period. Each school was sampled on a distinct day. Collected waste was then sorted into 11 material categories. This allowed analysis of total waste generation and composition, as well as contamination of recycling, and capture rates for recycling programs at all of the schools.



All samples were hand sorted on the waste sorting table in ISTC's trailer (left). Each item was categorized and sorted into 11 distinct material types and weighed (right).

Waste Characterization

The sorting of the waste was conducted at each school being sampled in the ISTC sorting trailer. All samples were sorted into 11 categories, described in Appendix A,. Material was separated into labeled containers with known weights and net material weights were recorded for each sample. All sorted material was collected from each school, meaning that the materials were destined to be recycled or landfilled. Individual school data are detailed in Appendix A (pages 12 through 14)

Figure 3. Sampled Composition Recoverability by Weight from Cafeteria

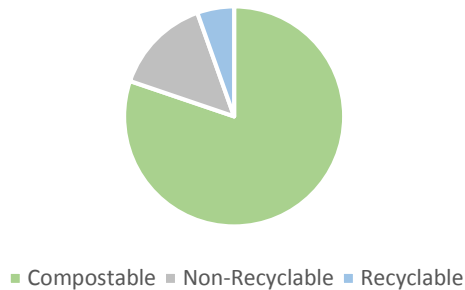


Figure 3. Sampled Composition Recoverability by Weight from Kitchen

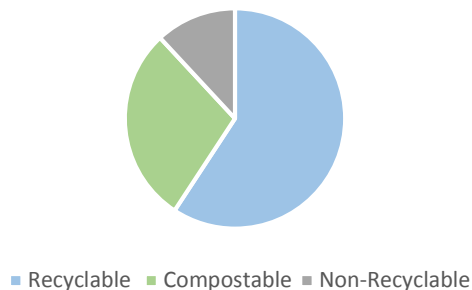


Table 2. Sampled Composition by weight of landfill material

Material Class	Material Composition	Cafeteria	Kitchen
Recyclable	Recyclable Plastic	5.43%	1.25%
	Cardboard	0.00%	13.48%
	Can	0.00%	44.51%
Compostable	Food Service Paper and napkin	4.56%	23.20%
	Food Scraps	51.63%	5.64%
	Liquids	24.02%	0.00%
Landfill (Non-Recoverable)	Milk Cartons and Juice Boxes	6.44%	0.00%
	Non- Recyclable Plastic	3.91%	11.60%
	Bags	2.53%	0.00%
	Flatware	1.24%	0.00%
	EPS	0.23%	0.31%

Key findings and observations about SPS’s landfill-bound waste stream throughout the sample include the following:

- Approximately **88%** of SPS kitchen prep waste stream is **recyclable or compostable**.
- Recyclables represent **59%** of the waste stream from the kitchen. “**Recyclables**” includes glass, plastic and aluminum beverage containers, tinned food cans, non-foodservice paper, corrugated cardboard, and other plastic containers.
- **Food service cans** represents **45%** of the waste stream, followed by **Corrugated Cardboard** at **13%** and **Recyclable Plastics** at **1%** as the recyclables in the waste stream.
- **Compostables** represent almost **29%** of the waste stream. “**Compostables**” includes food scraps, paper towels, food-soiled paper, other paper foodservice ware, paper cups, and liquids.
- The remaining **12%** of the waste diverted to the landfill is material that cannot be recycled or composted. This includes film plastic, trash bags, and composite materials. “Composite” materials are

those made of multiple material types which are difficult to separate for recycling. For example, a coffee pouch or chip bag is made of layers of material which, put together, make it difficult to recycle.

- Approximately **85%** of the SPS cafeteria waste stream is **recyclable or compostable**.
- Recyclables represent **5%** of the waste stream from the cafeteria. “**Recyclables**” includes glass, plastic and aluminum beverage containers, tinned food cans, non-foodservice paper, corrugated cardboard, and other plastic containers.
- **Compostables** represent almost **80%** of the waste stream cafeteria. “**Compostables**” includes food scraps, paper towels, food-soiled paper, other paper foodservice ware, paper cups, and liquids.
- **Food scraps** represent almost **48%** of the waste stream from the cafeteria, followed by **liquids** at **24%**
- The remaining **14%** of the waste diverted to the landfill is material that cannot be recycled or composted.

ISSUES & CONCERNS IDENTIFIED

Through the assessment on site and various meetings with SPS staff, ISTC gathered observations about current issues, concerns and opportunities regarding the overall food service system.

USDA National School Lunch Program (NSLP): The USDA mandates put place in 2012 require, among other things, that students take more fruits and vegetables. This has been attributed by staff as a hurdle to implement changes. A detailed review of how the NSLP system could help schools reduce food waste and provide better nutrition nationwide would benefit school districts.

Production control: Although the current system of food prepared and served keeps adequate records and helps with inventory, creating waste logs by menu item and working with school administration to make production adjustments based on daily attendance will help reduce overproduction. Ideally no overproduction is preferred, however realistically a 4% overproduction rate can be achieved. Currently some schools in the assessment are at a 17% overproduction.

Meal service time: During the assessment, average seated times were noted for students after they had received lunch. The average seated time at the schools sampled was fifteen minutes. USDA and ISBE recommend ten minutes after receiving breakfast and twenty minutes after receiving lunch as sufficient time to eat. [Research by Juliana Cohen et al.](#) indicates that 25 minutes of seated time is a good minimum to increase consumption and reduce food waste.

Unopened milk and uneaten fruit: Unopened milk cartons were a consistent appearance in all the trash bags in the cafeterias sampled. On average through the assessment 30 unopened milk cartons per day entered the waste stream. Unopened/unpeeled fruit shared a similar fate; during lunch service at Enos the assessment found 54 whole unpeeled bananas in the waste stream.

OPPORTUNITY ASSESSMENT

Beyond the waste characterization study, ISTC gathered information and observations about SPS operations, for the purposes of proposing initiatives to improve the overall efficiency of the food service operation.

Opportunities are categorized by three main areas of focus:

- **Reduction Improvement:** will focus on approaches to avoid waste from being generated
- **Engagement Improvement:** will focus on approaches to engage the school district staff and students in waste reduction
- **Collection Reduction:** will focus on approaches to divert waste from landfill.

Reduction Improvement

Current Practices

All of the schools sampled in this study had kitchens on the premises. Most of the food served at the schools had a low scratch cooking component and thus translated into a low prep waste portion. As a high portion of the incoming food is in cans and boxes, very little of the food is wasted through preparation activities.

Food is also presented in a highly packaged way, with food service staff providing labor to place portions into disposable paper boats, plastic cups, foam bowls, etc. In some instances, whole fruit placed on salad bars was also packaged in plastic. While moving through the lunch line, students place packaged items on reusable trays



Collection Improvement Recommendations

Recommendations (Table 3) are divided into Phase 1 and Phase 2 categories. Phase 1 recommendations are easier to implement and may be precursor steps to Phase 2 recommendations. Recommendations are further classified as Planning (additional data gathering, cost research, etc.) or Implementation (program launch, signage, staff training, etc.).

Table 3. Reduction Improvement Recommendations, by Implementation Phase

Reduction Improvement/ Phase I	
<p>Move back to washable foodservice ware. The avoided cost in purchasing single use flatware, along with the reduction in solid waste charges could be used to implement some of the other recommendations. Disposable items in the lunchroom also help create an atmosphere where materials, including the food served, are perceived by students as having less value. In such an atmosphere, waste seems more acceptable. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/reusablePlates.cfm.</p>	<p>Implementation</p>

Reduction Improvement/ Phase I	
Consider trayless food service through reusable 9” plates. Different reusable plate sizes and trayless options may also be explored through pilot tests to determine optimal conditions..	Planning & Implementation.
In conjunction with the above, use portion-sized serving utensils for portion control instead of basing portions on the size of disposable paper boats, plastic cups, etc. Refer to Appendix page 78 in the USDS Food and Nutrition Service document " Tricks of the Trade " for information on serving utensils. For additional information, refer to USDA’S The Food Buying Guide for Child Nutrition Programs, Revised 2000 , pp. I-43 to I-45. See also http://mrs.mde.k12.ms.us/printables/mrs_cooks_tools_portion_control.pdf .	Planning & Implementation.
Cut fruit into discrete servings , instead of plastic wrapping each orange, for example. Studies have shown that slicing or cutting fruit reduce wastage, in one study fruit consumption went up 71% compared to the control. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/cutProduce.cfm .	Implementation
Use creative names to encourage interest in trying new foods, choosing vegetables, etc. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/creativeNames.cfm .	Implementation
Implement a waste tracking system for food service operations , to allow for adjustment and reduction of overproduction	Planning & Implementation
Reduction Improvement/ Phase II	
Establish a policy to donate unused edible food to a local food bank, shelter, or charity. Although a small portion of waste coming out of the kitchen is overproduction, this could help engage the community with the school district. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/foodDonationPolicy.cfm .	Planning
Create a menu that allows multiple uses of key ingredients. This will reduce the need for discarding unused food as well as increase purchasing efficiencies. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/multipleUseIngredients.cfm .	Planning
Solicit feedback from students and/or observe selection of menu options over time to identify items for elimination or adjustment. A student focused approach will help garner collective ownership in the food waste reduction process. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/solicitFeedback.cfm .	Planning & Implementation
Increase the lunch period. Giving students adequate time to eat their lunch will reduce the amount of food wasted. Research shows improved results at 25 mins. of seated time. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/longerLunch.cfm .	Planning & Implementation

Reduction Improvement/ Phase II	
<p>Move to over 80% scratch cooking. Scratch cooking reduces the overall ecological footprint through the entire food system as well as increase the nutritional content of the food served.</p>	<p>Planning & Implementation</p>

Engagement Improvement

Current Practices

The USDA principles of [“Offer versus serve”](#) are employed district wide. The district also qualifies under the Community Eligible Provision (CEP) of the Healthy, Hunger-Free Kids Act of 2010, so free lunches are provided to all students in the district. Food service staff noted that some confusion exists among teachers and students regarding the exact requirements for food components which need to be taken in order for meals to be reimbursable. In particular, food service staff have observed other adults insisting that children take a carton of milk, for example, even though that is not necessarily required, and it is their belief that this contributes to the number of full or partially full beverages in the waste stream. Indeed, such confusion could make operations more closely resemble “serving” rather than “offering” in practice.



ISTC staff also observed that students at SPS schools received facts and lessons about some produce offerings, as part of SPS participation in the [ISBE Fresh Fruit and Vegetable Grant program](#). Thus, SPS students are accustomed to receiving nutrition education in some form as the result of this program. It may perhaps be a simple extension of existing procedures to bring discussions of food waste issues into lessons.

Food service staff have noted that some schools within the district have school gardens, and that produce from those gardens is used in home economics classes with older students. Educators already involved with garden-related education may provide inspiration and best practices for others interested in integrating gardening into curricula for a wider range of student ages.

Finally, food service administration have expressed that food service staff, as well as parents, have observed the magnitude of waste generation in district schools and expressed dismay and a desire for action. This indicates that various stakeholders are already motivated to participate in measures the District may implement to reduce waste.

Engagement Improvement Recommendations

Recommendations (Table 4) are divided into Phase 1 and Phase 2 categories. Phase 1 recommendations are easier to implement and may be precursor steps to Phase 2 recommendations. Recommendations are further classified as Planning (additional data gathering, cost research, etc.) or Implementation (program launch, signage, staff training, etc.).

Table 4. Engagement Improvement Recommendations, by Implementation Phase

Engagement Improvement/ Phase I	
<p>Improve communication of Offer vs. Serve guidelines to non-food-service school staff and to students through training and/or signage. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/offerVsServe.cfm.</p>	Implementation
<p>Engage teaching staff to create lesson plans on various food waste issues. This will help students realize the complete effect of food wastage. See the “Raise Awareness and Share Successes” category at https://www.greenlunchroom.org/activities.cfm for several relevant Green Lunchroom Challenge activities. Lessons on nutrition being provided via the Fresh Fruit and Vegetable Program (see pg. 20 of http://www.fns.usda.gov/sites/default/files/handbook.pdf) might also be modified to include considerations of food waste.</p>	Planning
<p>Establish a zero-waste lunchroom policy that goes district wide and gets all schools engaged at their individual ability. Staff, students, and parents who have already expressed interest in waste reduction can feel unified for action by the establishment of such a policy, and be guided in monitoring progress toward waste reduction goals. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/zwPolicy.cfm.</p>	Planning
<p>Establish an onsite garden for students and staff to grow basic produce. This will help build a connection between students and the food they eat. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/establishGarden.cfm.</p>	Implementation
<p>Have a “zero waste” or “waste-free” lunch day. Plan a day district-wide that will activate the program! Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/wastefreeLunchday.cfm.</p>	Planning

Collection Reduction

Current Practices

Currently most schools in the district recycle corrugated cardboard; plastic beverage containers and metal cans are not recycled.

Collection Improvement Recommendations

Recommendations (Table 5) are divided into Phase 1 and Phase 2 categories. Phase 1 recommendations are easier to implement and may be precursor steps to Phase 2 recommendations. Recommendations are further classified as Planning (additional data gathering, cost research, etc.) or Implementation (program launch, signage, staff training, etc.).

Table 5. Collection Improvement Recommendations, by Implementation Phase

Collection Improvement/ Phase I	
<p>Establish a recycling program throughout the school district. Getting a clear sense of the cost or savings associated with implementing a recycling program will help reduce waste in the kitchen/prep section. Recycling is also an important part of any zero waste policy. Relevant Green Lunchroom Challenge Activity: https://www.greenlunchroom.org/zwPolicy.cfm.</p>	<p>Planning & Implementation</p>
Collection Improvement/ Phase II	
<p>Survey food scrap composting options. A food scraps composting program will be able to reduce the total volume of waste coming out of the school district by at least 40%. This will also be a great interaction with the local community. Relevant Green Lunchroom Challenge Activities: See the “Composting” category at https://www.greenlunchroom.org/activities.cfm.</p>	<p>Planning</p>
<p>Establish a composting program throughout the school district, after getting a clear sense of the cost associated with implementing an onsite or offsite program will help reduce waste in the kitchen/prep section. Relevant Green Lunchroom Challenge Activities: See the “Composting” category at https://www.greenlunchroom.org/activities.cfm.</p>	<p>Implementation</p>

APPENDIX A. WASTE CHARACTERIZATION DATA FOR INDIVIDUAL BUILDINGS

Enos Elementary School

Student size: 300

Sample period: January 12, 2015

Total Waste sorted: 153 lbs.

Building Summary

Enos School serves approximately 300 pre-kindergarten through fifth grade students. The faculty is united in unrelenting efforts to ensure that all students work toward achieving their full academic potential. Enos School is organized around instruction, community and climate.

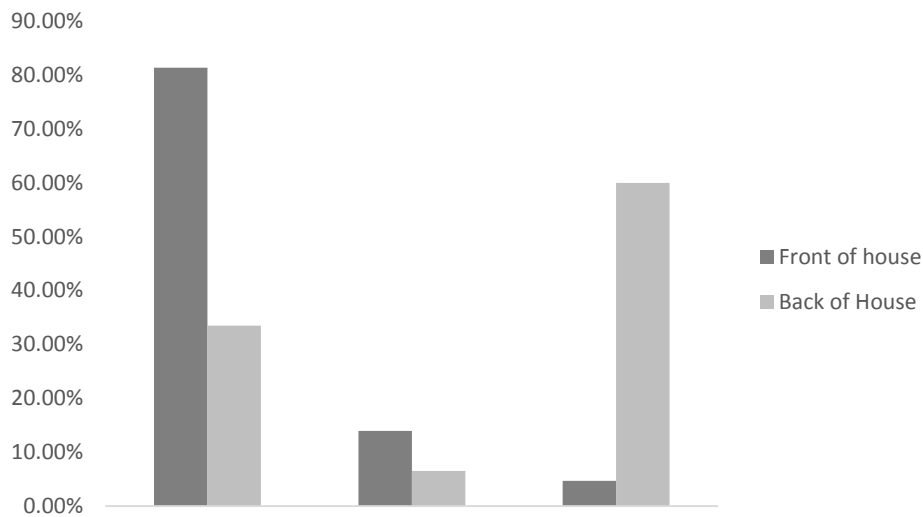


Table A-1 Detailed Composition of Material destined for Landfill, Enos

Material	Cafeteria	Percent
Compostable	80%	33%
Food Scraps	52%	4%
Liquids	25%	0%
Food Service Paper and napkin	4%	30%
Recyclable	4%	44%
Recyclable Plastic	4%	2%
Can	0%	42%
Cardboard	0%	0%
Non-Recyclable	16%	22%
Milk Cartons and Juice Boxes	7%	0%
Bags	2%	0%
Flatware	1%	0%
EPS	1%	1%
Non- Recyclable Plastic	5%	21%

Ridgeley Elementary School

Student size: 430

Sample period: January 14, 2015

Total Waste sorted: 184 lbs.

Building Summary

Ridgeley School is a preschool through grade five public school, which underwent major construction in 2005 that currently houses 430 students and 17 instructional staff members.

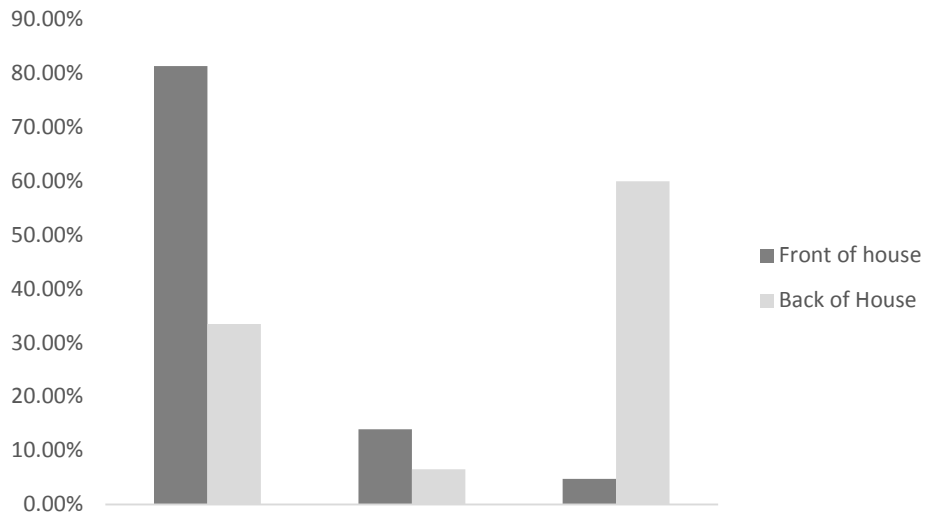


Table A-2 Detailed Composition of Material destined for Landfill, Ridgeley

Material	Cafeteria	Percent
Compostable	79%	21%
Food Scraps	53%	9%
Liquids	21%	0%
Food Service Paper and napkin	5%	12%
Recyclable	8%	69%
Recyclable Plastic	8%	1%
Can	0%	30%
Cardboard	0%	37%
Non-Recyclable	13%	10%
Milk Cartons and Juice Boxes	6%	0%
Bags	3%	0%
Flatware	1%	0%
EPS	0%	0%
Non- Recyclable Plastic	3%	10%

Lindsay Elementary School

Student size: 515

Sample period: January 13, 2015

Total Waste sorted: 161 lbs.

Building Summary

Lindsay houses grades K-5, educating approximately 515 students. In 2010, Lindsay was named as a Blue Ribbon school. Lindsay regularly performs among the top of schools with similar demographics.

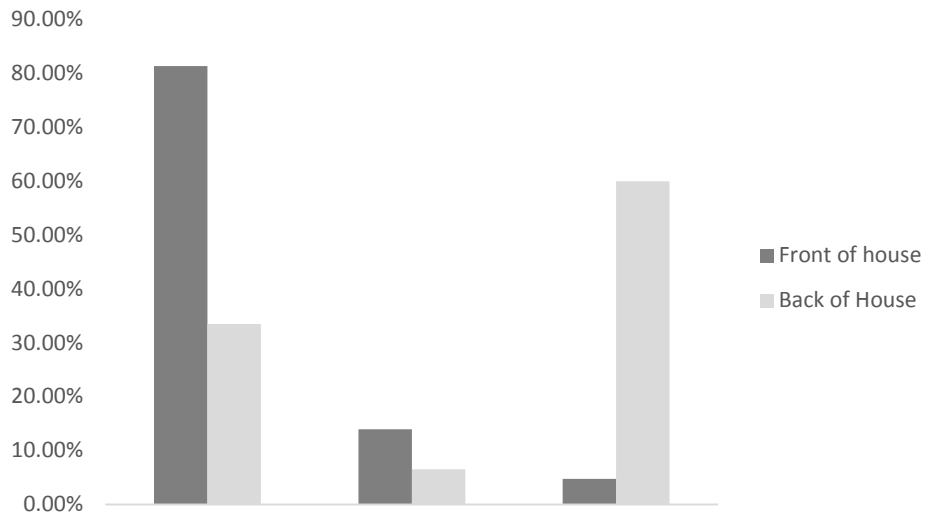


Table A-3 Detailed Composition of Material destined for Landfill, Lindsay

Material	Cafeteria	Percent
Compostable	81%	33%
Food Scraps	50%	4%
Liquids	27%	0%
Food Service Paper and napkin	5%	29%
Recyclable	5%	60%
Recyclable Plastic	5%	0%
Can	0%	60%
Cardboard	0%	0%
Non-Recyclable	14%	7%
Milk Cartons and Juice Boxes	6%	0%
Bags	2%	0%
Flatware	1%	0%
EPS	0%	0%
Non- Recyclable Plastic	4%	7%

Material definitions used for Waste Characterization sorting

Material Category	Description
Compostable	
Fines	Remnants left after sorting is complete. Typically consists of dirt, sawdust, small food scraps, etc.
Food scraps	Food preparation wastes, uneaten food portions, spoiled food
Green waste	Debris such as grass clippings, leaves, garden waste, brush, and trees.
Other paper food-service ware	Paper kitchen products except paper cups
Paper cups	Cups made from paper with or without waxy coating
Paper towels and food-soiled paper	Bathroom towels, food-soiled paper
Recyclable	
Aluminum and tinned food cans	Aluminum beverage cans, and tin cans used for food
Corrugated cardboard	Non-food-soiled corrugated cardboard
Electronic waste	All items that either contain a battery or power cord
Glass bottles and jars	All glass food and beverage containers
Non-food service paper	Newsprint, magazines, office paper
Other plastic containers	Plastic containers not used as packaging for beverages.
Plastic beverage containers	Plastic containers used for containing liquid beverages
Non-Recoverable	
Expanded Polystyrene (EPS or “Styrofoam”) food-service ware	EPS plates, cups and containers
Other bulky items	Large materials such as couches and tires
Other plastic food-service ware	Plastic one-time-use plates, bowls, forks and knives
Regulated materials	Materials regulated under federal or state solid waste management laws
Remainder/composite glass	Items that contain glass as the predominant constituent and another material
Remainder/composite metal	Items that contain metal as the predominant constituent and another material
Remainder/composite organics	Items that contain organics as the predominant constituent and another material
Remainder/composite paper	Items that contain paper as the predominant constituent and another material
Remainder/composite plastic	Items that contain plastic as the predominant constituent and another material
Trash bags	Bags used to contain waste materials