

Oregon Wasted Food Study: Institutional and
Commercial Sector Case Studies

Case 7

**Sorts and tracking: Two pictures of wasted food in a corporate
cafeteria**

This report was prepared for
Oregon Department of Environmental Quality, Ashley Zanolli, Project Lead

Submitted
November 20, 2018

By

Reed Brodersen, MURP
Graduate Research Assistant

Christa McDermott, PhD
Director

Jennifer Stefanick
Research Assistant

Community Environmental Services

Portland State University
P.O. Box 751
Portland, OR 97207-0751

1600 SW 4th Avenue, Suite 128
Portland, OR 97201
503-725-5949
christa@pdx.edu

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Introduction

This is a report on the methods and results of one of 15 food service business case studies, as part of the institutional and commercial (IC) sector portion of the Oregon Wasted Food Study. This study is funded by the Oregon Department of Environmental Quality and conducted by Community Environmental Services (CES) at Portland State University.

The research objectives for the IC portion of this study are to:

- Understand components of wasted food in IC sector
- Highlight causes of commercial wasted food and key opportunities for waste prevention
- Test wasted food reduction best practices and quantify their effectiveness
- Promote wasted food reduction best practices for application at commercial food service institutions

Focus of study

This study is focused on causes of wasted food, barriers to prevention and potential opportunities to more fully utilize food in corporate cafeteria settings. In this case, the business participant was a contracted food service operator of the corporate cafeteria. This case study used a system of waste tracking to inform the business and its client on levels and causes of wasted food.

Business context

The business participant in this case study is a cafeteria on a corporate campus in the Portland, Oregon metropolitan area. The cafeteria is one of many food service venues operated by a food service company on this corporate campus. The cafeteria serves about 700 to 1,000 meals daily, five days a week.

Methods

Study design

The study was conducted over a seven-month period from November 2017 into June 2018. It involved a range of data collection and analytic components including: employee interviews, on-site observations, waste sorts and a wasted food tracking practice. The intent of these analyses was to (1) identify types of wasted food and key causes of waste, and (2) document the effectiveness of wasted food tracking as a practice to support waste prevention.

Interviews

A total of five employees were interviewed for this study. These included the executive chef, the district manager, a barista, a deli lead and a line cook. Employees were asked by researchers to voluntarily participate in brief interviews. Individual interviews were conducted with employees on-site but in a private location. Interviews were recorded and took between 10 and 20 minutes each. The interviews were semi-structured: standard interview questions were asked with additional questions asked that either responded to employee answers or pertained to their specific role.

Waste sorts

Researchers sorted the business' entire back-of-house food scrap waste only, generated during a regular 24-hour business period in November 2017. Food scrap waste was retrieved from six compost roll carts, and included all types of back-of-house food waste including buffet and production waste, and spoiled ingredients. A follow-up sort was conducted for this case study in May 2018 and was identical to the initial sort with 100 percent of a 24-hour accumulation of back-of-house food waste sorted and weighed.

Recommended practice

The business perceived strong barriers to preventing waste as it felt it that could affect its client relationship. Accordingly, it **agreed to test waste tracking practices with the idea that better data could bolster its case in future discussions with the client about expectations of abundance and availability that were primary causes of wasted edible food.** Other practices that were discussed for implementation, but turned down because of these perceived barriers, were smaller batch firing, cooking to order towards the end of meal service, allowing pans to get close to or completely empty at the end of meal service, and allowing more flexibility in menu offerings to support additional repurposing.

The business conducted kitchen-wide food waste tracking over a period of 20 business days from May 7 to June 1, 2018. This included all kitchen waste including preparation waste and buffet waste, but did not include front-of-house plate waste. While the practice had been in place historically, its implementation had lapsed. The tracking was initiated with new infrastructure (four quart clear plastic containers), staff-wide training and new managerial expectations for compliance. Waste was sorted into the containers throughout the day, and sorted into **three categories: proteins, vegetables and overproduction, which included both unserved food and served food that went uneaten on the buffet.** The business **also tracked wasted fruit from the free fruit station as a separate category.** These results were compared to researcher-conducted waste sorts. Post-practice staff interviews were also conducted to assess the effectiveness of the practice.

Results

Waste assessments

Waste was assessed both with sorts and tracking. The initial sort of the back-of-house found that 77.5% of wasted food was edible (402.67 pounds). **Fruit and vegetables, dry foods, and baked goods presented the most waste.** A breakdown of all sort categories can be found in Table 1 in the Appendix and Figure 1, below. Fruit and vegetables were 29.6% of total edible wasted food (119.19 pounds), and the dry goods category was almost identical. Researchers found peeled and cored whole melons, whole pears, bananas, celery and leek stalks among the items in the fruit and vegetables category and a large quantity of pinto beans, cooked rice and blocks of tofu in the dry goods category. Baked goods (18.5% of total edible wasted food or 74.48 pounds) appeared to be mostly all sliced artisan breads and some whole bagels. **None of these categories of food showed signs of spoilage.**

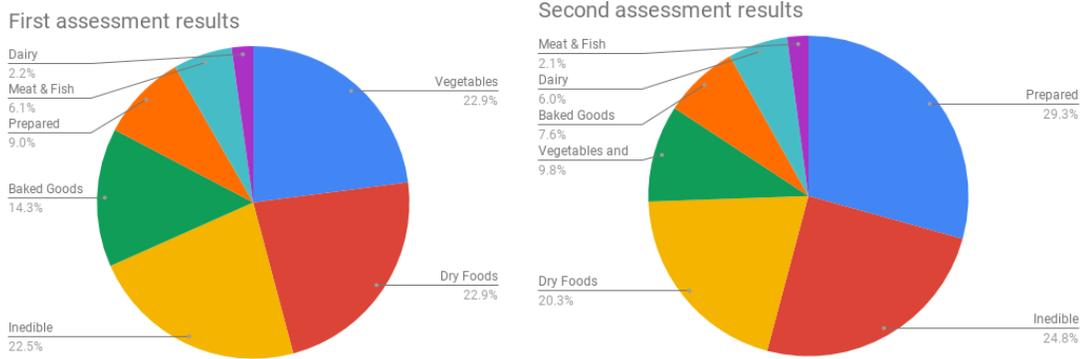


Figure 1: Results from the first and second sort, with categories reported as percentages of the total food scrap weight.

In the follow-up sort of back-of-house waste fruit and vegetable wasted food dropped to 13% of total edible foods (36.06 pounds) with bananas accounting for 46% of the waste, plus tomatoes, greens, asparagus, green beans, whole lemons and oranges. Prepared foods were a higher portion of wasted food, making up 39% of total edible wasted food (107.93 pounds) and was made up of a variety of rice, salad and pasta dishes. Dry foods were 27% of total edible wasted food (74.7 pounds) and were mainly comprised of oatmeal, cream of wheat, plain pasta, rice, couscous and quinoa.

Wasted food (in lb) by category

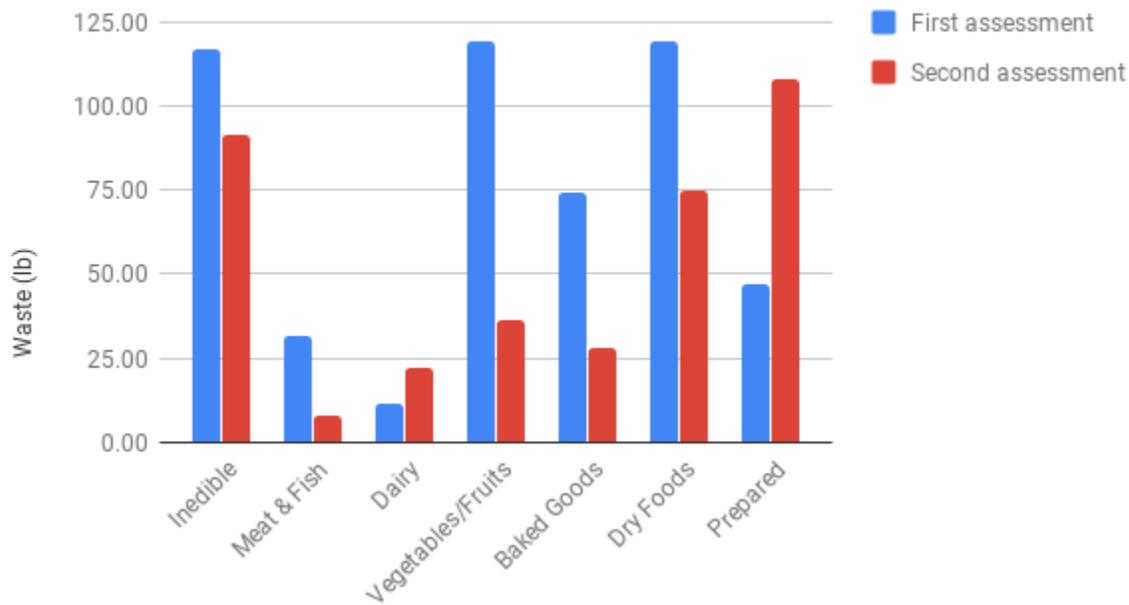


Figure 2: Wasted food by category for both the first and second waste sorts.

Wasted food tracking

Records

The waste tracking records alone indicated food waste averaged 146.75 pounds per day over the 20-day tracking period (see, Table 1). The Appendix details a full explanation of the results and methods for analysis.

Table 1: Wasted food in pounds, 20-day waste tracking practice

	Protein	Vegetables	Free Fruit	Over-production	Total
Average	6.77	34.53	69.59	35.86	146.75
Min	2.85	27.55	14.25	25.65	89.30
Max	10.45	43.70	190.00	45.60	261.25
Std deviation	2.10	4.62	42.08	6.51	42.77

The comparison between the waste tracking records and the waste sort data, both for the full business day on May 24, 2018 uncovered some stark discrepancies. These two tools measured the same types of waste - specifically, all of the kitchen and buffet waste. While the tools used different categories to define this waste (for example, only the fresh fruit category was directly comparable, and which was found to have over-reporting of almost 70%) the total waste was under-reported by more than half. In other words, **the actual waste reported by the sort was 124% higher than that recorded from waste tracking.**

Table 2: Comparison between waste tracking and the waste sort, both for the same, full business day

	Waste tracking total	Waste sort total	% Difference
Fresh fruit	53.2	16.6	-68.80%
Total	134.9	303.05	124.65%

Interviews

Sources and causes

Overproduction

Staff suggested the overproduction of food was the primary cause of wasted edible food at the business. **“We could do a better job tailoring production to need,”** one employee said. This appeared to be in part due to **client expectations of abundance**, which will be discussed below. However, two staff members also indicated overproduction occurs because of a **lack of communication between management and employees around PARs¹** and **expectations of production**. Staff also said that overproduction often occurred because of **inaccurate estimates of demand** or because of **unanticipated events**. For example, the corporation often hosted large tours, details of which were generally communicated to the executive chef

¹ PARs, or periodic automatic replenishment, are set production amounts that are generally set by management and followed by preparation staff. Some businesses have standard PARs across days or menu items, while others adjust their PARs according to anticipated customer demand.

to support production planning. Sometimes, however, these tours or events would be scheduled or re-schedule with little to no notice.

Client expectations

All of the staff interviewed indicated a clear understanding of client expectations that contributed to a culture of fear of running out. **Staff understood that abundance was always necessary, and that all menu items must be available for the full meal service time.** “We could lose the account if we don’t have food out,” one employee said. It appears that there were especially high expectations because this particular cafe serves the corporate employees and executives. Furthermore, the corporate client even has a staff person dedicated to monitoring quality standards and ensuring offerings are up to par.

These expectations impact staff and perpetuate a fear of running out. One employee expressed what he thought was a common way of thinking: “I’m always thinking at least 30 minutes out, and if I think there’s any risk of running out of any item, I’ll make more of it.” One employee lamented that **“the client has complained both when we have lots of waste and when we don’t have full serving dishes.”**

Additional causes of waste

A few employees suggested that the **fresh fruit program** - a program paid for by the client which requires the cafe to keep two tables fully stocked with free fruit, like apples, oranges, and bananas, for company staff was a significant cause of waste. Demand for fruit was particularly hard to judge because many employees would take more than the one piece of fruit they were supposed to, with some taking bags of fruit home for their family or for weekends. While the bakery does use overly-ripened bananas for baking, there were far too many to be utilized, an employee said. Another source of waste was the **sandwich station**, where abundance expectations meant that bread and bagels were kept fully stocked the entire day, resulting in uneaten breads that had to be composted at the end of service.

A few employees mentioned that **inflexible menus limited options for re-purposing.** The grill is the only station where specials utilize leftover proteins from past meals, they said. This was in part due to client expectation that menus be shared in advance, and also because nutrition information was displayed for each menu item, offering little to no opportunity for variation from established recipes. An employee also indicated that **stringent quality and food safety standards**, imposed by the food service company, that were above and beyond health department standards sometimes contributed to the wasting of edible food.

Existing prevention strategies

Staff said that recently they had switched to using **smaller serving dishes for the buffets and salad bar** and that this practice had helped reduce the amount of buffet waste. Another prevention strategy one employee mentioned was efforts to **share ingredients across stations.** “We communicate regularly about extra prep or leftover items,” they said, “it is the expectation of the kitchen.”

Post-practice interview

An employee in a managerial position overseeing the waste tracking practice was interviewed via email after the practice. They said that they thought the practice was well implemented, with “about a **95% participation in actively tracking**” wasted food and a “fairly accurate recording” of waste data. The employee did say that they noticed their staff would “begin to slip and be a little more loose with their tracking as the week went on.” To assist in motivating staff, the **manager appointed a “waste champion” who encouraged colleagues to properly track and record waste.** The manager was also asked how the

waste tracking practice impacted employees. They said it **“didn’t take a whole lot of extra time out of anyone’s day... maybe an extra seven minutes.”**

When asked how, if at all, the waste tracking practice was operationalized to prevent waste, the employee said it helped **“bring to light where specific waste was coming from and why.”** They said it was used as a way to prompt one-on-one conversations with employees about specific actions that caused the wasting of food and work with them to reduce waste.

The manager said that overall **the waste tracking was helpful for his team to pinpoint “when and where” the wasting of food was occurring. They said they “would (and do) continue to use waste tracking to assist in proper utilization of foods.”** They said, however, that it did not work to overcome significant causes and barriers of waste, namely, the **client expectations of abundance and impeccable quality standards.** When asked if they thought this data (which demonstrated significant waste production) could be used to convince the client to alter their expectations of abundance they said they **“don’t see much changing their mind in the way of lessening waste.”**

Analysis and Conclusion

Key causes and barriers to full food utilization

Client expectations

This case study suggests that the **corporate cafeteria’s client expectation of abundance** was the primary cause of wasted food. The inflexible expectation that serving dishes should be kept full until the end of service appeared to create significant buffet waste, and a pervasive fear of running out leads employees to overproduce at substantial levels. In the two waste sorts, 401 and 278 pounds of edible wasted food was found to have been produced, respectively, in a single business day in a cafeteria serving 700 to 1000 guests a day. This means that **between 0.28 and 0.57 pounds of edible (pre-consumer) food waste was generated per guest due to overproduction, serving, and other back-of-house practices.**

Inaccurate waste tracking

Inaccurate waste tracking meant that staff had incorrect understandings of the amount of food being wasted. This limited their own motivation to reduce waste and weakened their position in conversations with their client around problematic expectations of abundance. **A more realistic idea of waste production, through more accurate waste tracking, could better motivate both the business and the client to invest in waste prevention practices and policies.**

Fresh fruit program

The interviews, waste sort and waste tracking results all suggested that the fresh fruit program was a major cause of wasted edible fruit. **Over-ordering and over-stocking** the fruit table are both causes of waste and likely stem from similar **concerns about running out and failing to meet client expectations.**

Conclusion

This case study suggests that **at this corporate cafeteria client expectations created a culture of fear around running out, effectively creating incentives to waste edible food.** This led to significant waste, totaling a **quarter to a half of a pound of edible wasted food per person served.**

Waste tracking was tested to observe its accuracy, burden on employees and potential use to inform source reduction. **Waste tracking was not found to be a burden, and was said to be a helpful exercise for employees to observe where and when food waste was occurring.** However, the waste tracking results appeared to be highly inaccurate and significantly underestimated the amount of wasted food. The post-practice interview with a manager suggests that employee perceptions of waste, and of waste tracking accuracy, may be very different than reality, which is likely to impact the business' approach to source reduction.

While, this study suggests waste tracking could be a powerful tool to understand and target wasted food, **inaccurate tracking practices (namely, resulting from low compliance, inadequate training or failures of oversight) risk under-recording wasted food and undermining efforts for reduction.**

Additional opportunities

The most potentially effective approach to reducing wasted food at this institution would be to negotiate with the client to revise expectations of abundance. For example, **allowing food to run out during the last 15 to 30 minutes of service would reduce buffet waste and lessen the fear of running out,** a primary cause of overproduction waste. To help convince the client, the business could **estimate the food costs and environmental costs to their wasted food.** Since this business' particular contract includes food cost sharing agreements, the client has a fiscal motivation to promote waste prevention. The business could **also appeal to the client's internal and external environmental sustainability goals.** Finally, both the business and the client could consider deploying **waste prevention practices as a tool to enhance employee engagement.**

Employees also mentioned that inadequate communication around production planning, or PARs, existed, which further supported overproduction. Staff could benefit from **more direction from management around PARs,** as well as complementary practices for source reduction like **small-batch firing and re-purposing.**

Limitations

The volume to weight estimates could account for some of the discrepancy in weights between the sort and the waste tracking records. Also, a single point-in-time waste sort was used to check the accuracy of the waste tracking records. Future research would benefit from more frequent sorts.

Appendix

Waste assessments

Waste tracking analysis

Results from the 20-day waste tracking practice were analyzed to determine the average, median, minimum, maximum and standard deviation of wasted food produced per day (see Table 1 in report body).

Waste tracking records were compared to waste sort data to evaluate the practice's accuracy. First, waste tracking data (recorded in quarts) had to be converted into pounds. A conversion factor of 0.95 pounds per quart was used. Waste sort data for wasted food produced on Thursday May 24 was compared to employee-tracked wasted food records for the same day. Coffee grounds were removed from the waste sort data in the comparison because coffee grounds were not tracked as part of the waste tracking practice.

Waste collection and sorting process

One folding table was set up with two flat black bins placed on table and two CES staff conducting the sort. Bags from a 24-hour sample of mixed waste were dumped into black bins to facilitate sorting through contents. Numerous five-gallon buckets were placed around and under the tables and labeled with each specific food category for sorters to toss each item. Foods were sorted according to back-of-house or front-of-house, if applicable. Once all foods were sorted and categorized, photos were taken of the contents of each bucket. All buckets were weighed with amounts recorded with a tare weight of each bucket, once empty, also weighed and recorded. Non-food materials for landfill and recycling were also separated during the sorting process, weighed and recorded.

Table A1: Waste sort categories and definitions

Categories		Definitions	Examples
1	Inedible	Items not intended for human consumption (small amounts of edible material associated with the inedible material are permitted to be included)	Egg shells, banana peels, pits/seeds, bones
2	Meat & Fish	Uncooked or cooked meat (with mostly edible components) unmixed with other types of food	Chicken drumstick, salmon fillet
3	Dairy	Solid dairy products unmixed with other food types or in original form	Cheese, yogurt
4	Eggs	Egg products unmixed with other food types or in original form	Fried egg, whole eggs, liquid egg whites
5	Fruits & Vegetables	Solid uncooked or cooked vegetables and fruits (with mostly edible components) unmixed with other types of food	Potatoes, spinach, berries, salad with only vegetables
6	Baked Goods	Baked goods and bread-like products unmixed with other food types or in original form, including pastries	Bread, tortillas, pastries
7	Dry Foods	Cooked or uncooked grains, pastas, legumes, nuts, or cereals unmixed with other food types or in original form	Rice, cereal, pasta
8	Snacks, Condiments, Sauces	Includes confections, processed snacks, condiments, and other miscellaneous items	Condiments, candy, granola bars, sauces, jellies
9	Liquids, Oils, Grease	Items that are liquid, including beverages	Sodas, milk, oil, juice
10	Cooked or Prepared Food	Items that have many food types mixed together as part of cooking or preparation	Lasagna, sandwiches, burritos
11	Unidentifiable	Used only if necessary	

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Waste sort results

Table A3: Results from the first and the second waste sorts

	First sort	Second sort
Inedible	116.82	91.44
Meat & Fish	31.70	7.88
Dairy	11.49	22.17
Vegetables & Fruits	119.19	36.06
Baked Goods	74.48	27.99
Dry Foods (Grains, Pasta, Cereals)	119.04	74.70
Snacks, Condiments, Sauces	<.01	<.01
Liquids, Oils, Grease	<.01	<.01
Cooked, Prepared, Leftovers	46.77	107.93
Unidentifiable	<.01	<.01
Edible wasted food (pounds)	402.67	276.73
Edible wasted food (% of total food)	77.51%	75.16%
Total food scrap waste (pounds)	519.49	368.17

Sort photographs



Figure A1: A bag of fresh fruit from the Fresh Fruit Program, as well as some vegetable trim, before being separated and sorted.



Figure A2: A bag of cooked beans, before being separated and sorted.



Figure A3: A bag of cut potatoes, prepared for french fries but never cooked, before being separated and sorted.

Conformance to Food Loss and Waste Reporting Standard

[The Food Loss & Waste Protocol](#)² is a multi-stakeholder partnership, which has developed the global Food Loss and Waste Accounting and Reporting Standard – also known simply as the FLW Standard. Launched in 2013, the Food Loss & Waste Protocol’s mission is to ensure wide adoption of the FLW Standard so companies, governments, cities and others are better informed about food loss and waste and motivated to curb this inefficiency.”

The graphic below describes the scope of Case Study 7 of the institutional and commercial sector assessment of the Oregon Wasted Food Study using the FLW Standard.

Food loss + waste protocol

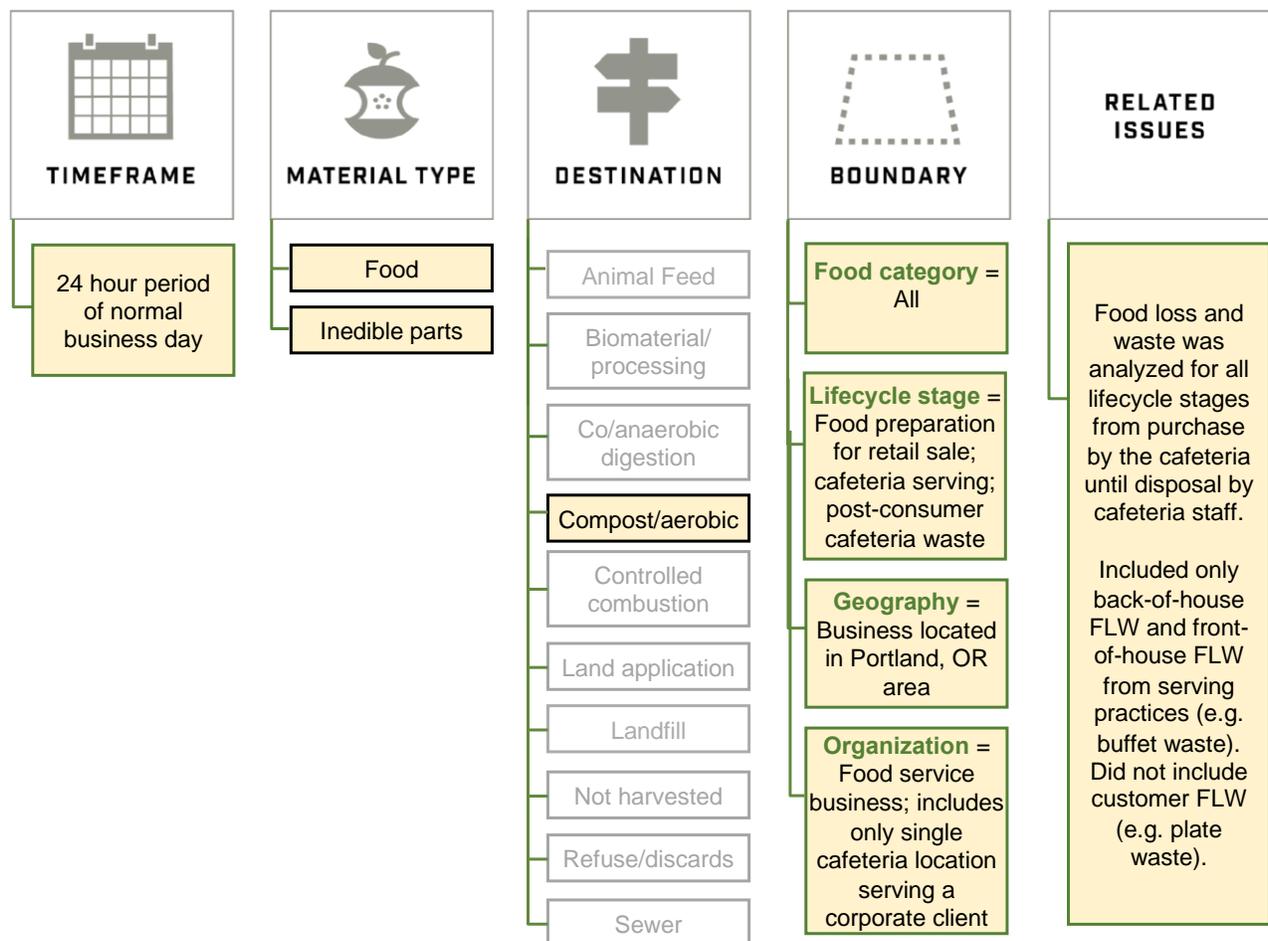


Figure A4: Scope of Case Study 7 as it relates to the Food Loss and Waste Reporting Standard

² See, <http://flwprotocol.org>