SCS ENGINEERS







Waste Composition Study
Summary of Results

Presented to:

Mecklenburg County, North Carolina
Solid Waste Land Use & Environmental Services
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1 INTRODUCTION AND BACKGROUND

Mecklenburg County (County), North Carolina is considered a leader in waste reduction and recycling, having spearheaded innovative programs that have received national attention. Coupled with this is the County's desire to develop solutions to waste reduction far beyond the 2020 goal of 20 percent. To this end, the County contracted with SCS Engineers (SCS) to conduct a waste composition analysis of waste generated by Charlotte – Mecklenburg Schools (CMS), County government buildings such as the Department of Social Services and Medical Facilities (County Facilities) and the Central Piedmont Community College (CPCC). The primary objectives of the study are as follows:

- To estimate types and quantities of recyclable waste components in the waste streams of different building types; and

- To identify opportunities for greater waste stream diversion.

To meet the County's objectives, SCS developed a detailed approach to provide the qualitative and quantitative data needed by the County to take its recycling program to the next level. SCS used a systematic mix of hands-on waste sorting and information gathering activity (facility surveys and employee interviews) to collect the information needed to make recommendations to the County for increased waste diversion. It is SCS' experience that doing physical waste sorts, in conjunction with other information gathering efforts, is the best method for identifying appropriate programmatic changes.

Based on the County's objectives, the work plan consisted of the following tasks which are presented in the corresponding sections of this report:

- **Section 2: Waste Stream Analysis -** The objective of this task was to conduct qualitative and quantitative sampling of the waste stream from designated types of facilities to estimate quantities of recyclable materials that could be targeted to enhance the County's existing recycling program and/or practices. There were 30 waste samples acquired from CMS from elementary, middle, and high schools as well as CMS support facilities; 10 waste samples from CPCC from administrative, academic, and support buildings; and 10 waste samples from County Facilities, mainly from the Department of Social Services and Medical Facilities.

- **Section 3: Potential Waste Diversion Capability -** The objective of this task was to assess the extent of materials that could be diverted through increased recycling and composting.

- **Section 4: Comparable Recycling Programs** – The objective of this task was to select and survey successful recycling and composting programs with aspects that could be implemented in the County. Information was gained mainly through available public information on websites and promotional materials.

Section 5: Program Implementation and Recommendations - The objectives of this task were to meet with representatives from selected facilities to conduct interviews and site observations in order to evaluate the current recycling strategy. Based on the existing waste composition, potential waste diversion capability, and successful programs at comparable facilities, SCS identified practical programmatic changes and strategies that will assist in achieving the County's recycling and waste reduction goals.

2 WASTE STREAM ANALYSIS

This section summarizes methods used to characterize the waste stream generated by CMS, CPCC, and County Facilities. Sorting activities for the study took place from December 5th through December 9th 2011. Waste characterization activities were performed by manually sorting samples from municipal solid waste (MSW) into distinct waste categories.

WASTE SAMPLING AND SORTING METHODS

Waste Sampling

Waste sorting was performed at the Fort Mill Transfer Station during the operating hours of the facility. Given the limited size of the data set, it was important that unrepresentative data were avoided. Each day vehicles carrying waste from targeted buildings were directed to dump their waste loads on the transfer station floor A representative of SCS manually gathered samples from a random portion of each target load (approximately two hundred pounds) for classification (sorting). Two important procedural factors were considered:

- The target vehicle selected for sampling contained MSW that was representative of the type of waste typically generated in that sector; and
- The process of acquiring the waste sample did not, in itself, alter the apparent MSW composition.

After being filled with solid waste, the trash cans were weighed and set aside until at least two hundred pounds from the discharged load had been selected for characterization. This process was repeated until samples had been collected from all of the targeted loads.

Number of Samples

A total of 50 samples were collected during the week: 30 from CMS; 10 from CPCC; and 10 from County facilities (Department of Social Services and other general County buildings).

Waste Sorting

The sorting and weighing program for samples entailed the use of one sorting crew and an SCS Crew Supervisor. During each day of fieldwork, samples were collected from waste loads that were discharged at the Fort Mill Transfer Station. The basic procedures and objectives for sorting (as described below) were identical for each sample, each day. Sorting was performed as follows:

1. The sort crew transferred the refuse sample onto the sorting table until it was full and began sort activities. Large or heavy waste items, such as bags of yard waste, were torn open, examined and then placed directly into the appropriate waste container for subsequent weighing.

2. Plastic bags of refuse were opened and sort crew members manually segregated each item of waste, according to categories defined in **Exhibit 1** and placed it in the appropriate waste container. These steps were repeated until the entire sample was sorted.

3. At the completion of sorting, the waste containers were moved to the scale where a representative of SCS weighed each category and recorded the net weight on the Sort Data Sheet. Measurements were made to the nearest 0.1 pounds.

4. After each waste category had been recorded, the waste was piled near the sorting area and transferred back to the transfer station floor by a front-end loader.

5. This four-step process was repeated until all of the day's samples taken at the site were characterized. Waste samples were maintained in as-disposed condition or as close to this as possible until the actual sorting began. Proper site layout and close supervision of sampling was maintained to avoid the need to repeatedly handle sampled wastes.

Members of the sorting crew were fully equipped with high visibility vests, puncture/cut resistant gloves, safety glasses, and tyvek suits. The Health and Safety Plan is presented in **Appendix A**.

Consistent with good practice in such sampling programs, efforts were made to minimize sampling bias or other impacts on the integrity of the database. To this end, field sampling had been coordinated to avoid holidays and other out of ordinary events.

Due to the County's expressed objective for this study to evaluate recycling programs, waste sorting activities targeted recyclable materials. **Exhibit 1** details the categories for the waste sorting activities.

Data Reduction

50 samples were manually sorted during the December 2011 field activities. Data presented include mean percentages by weight, standard deviations, and statistical confidence intervals (95 percent confidence interval) for each group of data. Derivation of this data is as follows:

$$Mean\left(\overline{X}\right) = \sum_{i=1}^{n} x_i * \frac{1}{n};$$

$$Standard\ Deviation\ (s) = \sqrt{\frac{\left(n\sum x^2\right) - \left(\sum x\right)^2}{n(n-1)}}\ ;\ \text{and}$$

$$Upper/Lower\ Confidence\ Interval\ Limits = \overline{X} \pm \left[1.96 * \left(\frac{\sigma}{\sqrt{n}}\right)\right]$$

Where: n = number of samples; and
x = sample percentage.

Exhibit 1. Waste Categories

Major Waste Types	Waste Component Categories	Examples
Paper	Newspaper/Print	Daily, weekly newspapers
	Glossy/Magazines	TV Guide, Periodicals, Journals
	Recyclable Corrugated Cardboard	Packing/shipping boxes
	Non-Recyclable Cardboard	Wax or plastic coated, pizza boxes
	Kraft Paper	Brown shopping bags
	Paperboard	Cereal/Soda Boxes
	Phone Books	Phone number listings
	Other Books	Hard and soft-cover books
	White Office Paper	High grade white copy paper or letterhead
	Gable Top/Aseptic Cartons	Milk/Juice Cartons/Boxes
	Paper Plates/Cups	Paper plates/cups/bowls – used for food
	File Folders	Manila or colored file folders
	Paper Packaging	Crumpled paper used for package padding
	Shredded Paper	Lengthwise and crosscut shredded paper
	Other Recyclable Paper	Junk mail, notebook paper, colored copy paper
	Compostable Paper	Napkins, Tissues, food stained paper
	Non-Recyclable Paper	Paper coated with plastic or foil
Plastics	PET (#1) Bottles	Water, Soda
	HDPE (#2) Bottles	Milk, Detergent
	Other (#3-#7) Bottles	Prescriptions
	Plastic Film	Garbage, chip, candy bags, bubble wrap
	Plastic Cups and Tubs	Recyclable margarine tubs, yogurt tubs
	Polystyrene (#6)	Clamshell containers
	Rigid Plastics	Plastic toys, items without a number
	Grocery Bags	Shopping bags from Harris Teeter, Kroger, etc.
	Flower Pots	Recyclable flower pots
	DVD/CD Cases	Self explanatory
	Other Plastic	Not defined above
Glass	Clear Glass Bottles/Jars	Clear containers used for food/beverages
	Green Glass Bottles/Jars	Green containers used for food/beverages
	Brown Glass Bottles/Jars	Brown containers used for food/beverages
	Ceramic Glass	Ceramic/porcelain containers
	Other Glass	Plate or window glass, pint glasses

Exhibit 1. Waste Categories (continued)

Major Waste Types	Waste Component Categories	Examples
Metal	Bi-Metal/Steel Cans	Ferrous cans generally used to contain food
	Aluminum Cans	Soda, beer cans
	Aluminum Tins/Foil	Aluminum tins and foils
	Aerosol Cans	Self explanatory
	Other Ferrous	Ferrous metals not otherwise classified
	Other Non-Ferrous	Non-ferrous metals not otherwise classified
Organic	Food Waste	Meat, vegetables, food and byproducts
	Treated Wood	Pressure treated or painted wood
	Untreated Wood	Lumber, 2x4's, unpainted/untreated
	Furniture	Chairs, couches, tables, shelves
	Mattresses	Mattresses, box springs
	Pallets	Broken or unbroken wooden pallets
	Yard Waste	Sticks, grass, leaves, yard trimmings
	Rubber	Gloves, boots, inner tubes
	Stumps	Self explanatory
	Other Organics	Organics not otherwise classified
Textiles	Textiles	Clothes, blankets
	Other Textiles	Carpet
	Leather	Clothes
Electronics	Computers	Monitors, CPUs
	Televisions	Cathode ray tubes
	Cell Phones	Self explanatory
	Printers	Self explanatory
	DVDs/CDs	Self explanatory
	Printer Ink Cartridges	Self explanatory
	VCRs	Self explanatory
	MP3 Players	Self explanatory
	Other Electronic Waste	Electronics not categorized above
HHW	Household Hazardous Waste (HHW)	Cleaners, oil based paints, pesticides
	Oil Filters	Used oil filters for automobiles or machinery
	Dry Cell Batteries	Alkaline, Zinc-carbon, household batteries
	Lead-Acid Batteries	Automotive batteries

Exhibit 1. Waste Categories (continued)

Major Waste Types	Waste Component Categories	Examples
Other	Infectious Waste	Biohazardous materials
	Diapers	Adult and infant diapers
	Brick	Red brick
	Concrete	Crushed or broken up concrete slabs
	Roofing Materials	Asphalt Shingles, tar paper
	Drywall (Gypsum)	Self Explanatory
	Vinyl Siding	Vinyl siding boards
	Fines	Materials less than ¼ inch by ¼ inch
	Other	Materials not categorized above

Waste samples are acquired to estimate the true waste composition (i.e., the proportion of each waste component present in the waste stream of the various sets of targeted buildings). The mean is the arithmetic average of all data and the standard deviation is a measure of the dispersion in the data. Together, the mean and standard deviation determine the confidence interval. A 95 percent confidence interval is said to contain the true proportion of a waste component with 95 percent confidence (i.e., similar studies will produce the same results 95 percent of the time).

SUMMARY OF RESULTS

Charlotte – Mecklenburg Schools

Exhibit 2 presents a compilation of the thirty waste samples collected and sorted in December 2011. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, of the school waste stream are Food Waste (28.0 percent), Compostable Paper (9.4 percent) and Plastic Films (7.5 percent). During the field activities it was noted that a significant portion of the food waste was composed of full milk and juice containers. Compostable paper was composed of napkins and tissues from cafeterias and bathrooms. The plastic films category was mostly composed of bags used to contain trash.

Exhibit 2. CMS Waste Composition

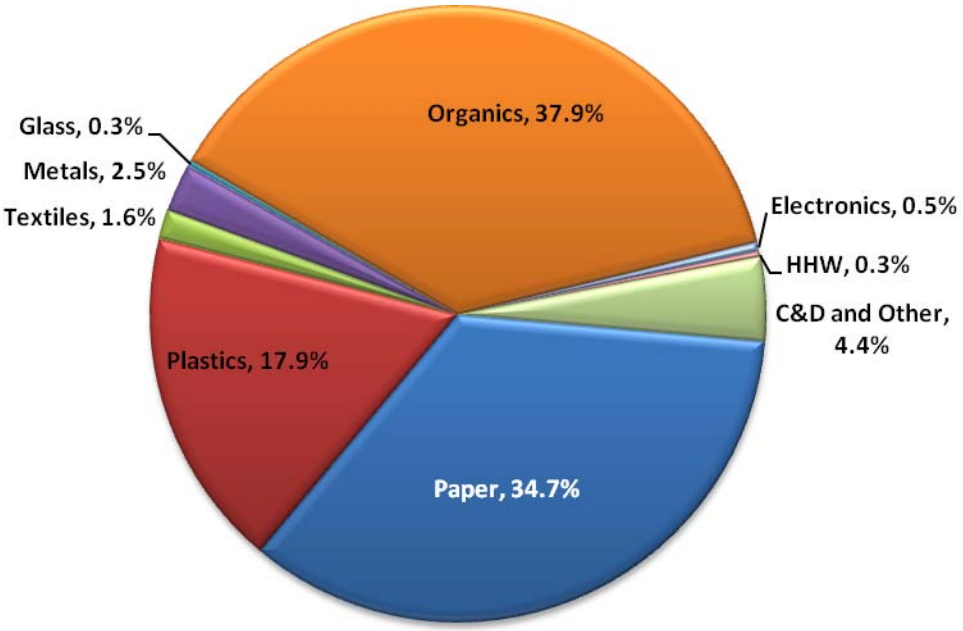
Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Newspaper/Print	0.4%	0.6%	0.2%	0.6%
2 Glossy Magazines	<0.1%	0.2%	<0.1%	0.1%
3 Recyclable Cardboard	3.3%	4.1%	1.8%	4.8%
4 Kraft Paper	0.7%	1.1%	0.3%	1.1%
5 Paperboard (Chipboard)	1.2%	1.1%	0.8%	1.6%
6 Other Recyclable Paper	2.7%	2.1%	1.9%	3.4%
7 White Office Paper	3.9%	2.6%	3.0%	4.8%
8 Gable Top/Aseptic	5.6%	3.6%	4.4%	6.9%
9 Paper Plates/Cups	5.4%	4.4%	3.9%	7.0%
10 File Folders	0.4%	0.6%	0.1%	0.6%
11 Paper Packaging	0.1%	0.4%	<0.1%	0.3%
12 Phone Books	<0.1%	<0.1%	<0.1%	<0.1%
13 Other Books	0.4%	1.0%	<0.1%	0.8%
14 Shredded Paper	0.2%	0.6%	<0.1%	0.4%
15 Non-Recycl Cardboard	<0.1%	0.2%	<0.1%	0.1%
16 Compostable Paper	9.4%	4.0%	8.0%	10.9%
17 Non-Recyclable Paper	0.8%	1.0%	0.5%	1.2%
Total Paper	**34.6%**			
PLASTIC				
18 PET (#1) Bottles	1.9%	1.4%	1.4%	2.4%
19 HDPE (#2) Bottles)	0.3%	0.3%	0.2%	0.4%
20 Other (#3-#7) Bottles	<0.1%	<0.1%	<0.1%	<0.1%
21 Plastic Films	7.5%	2.2%	6.6%	8.3%
22 Grocery Bags	0.2%	0.2%	0.1%	0.3%
23 Plastic Cups and Tubs	1.1%	0.9%	0.7%	1.4%
24 Polystrene (#6) Foam	3.7%	2.8%	2.7%	4.7%
25 Disposable Trays	1.8%	1.5%	1.2%	2.3%
26 Rigid Plastics	1.5%	1.7%	0.9%	2.1%
27 Flower Pots	<0.1%	0.2%	<0.1%	<0.1%
28 DVD/CD Cases	<0.1%	<0.1%	<0.1%	<0.1%
Total Plastic	**17.8%**			
GLASS				
29 Clear Glass Bottles/Jars	0.2%	0.3%	<0.1%	0.3%
30 Green Glass Bottles/Jars	<0.1%	<0.1%	<0.1%	<0.1%
31 Brown Glass Bottles/Jars	<0.1%	<0.1%	<0.1%	<0.1%
32 Ceramic Glass	<0.1%	0.2%	<0.1%	0.1%
33 Other Glass	<0.1%	<0.1%	<0.1%	<0.1%
Total Glass	**0.2%**			
METAL				
34 Steel/Bi Metal Food Cans	0.7%	1.0%	0.4%	1.1%
35 Aluminum Cans	0.4%	0.3%	0.3%	0.5%
36 Aluminum Tin/Foil	0.3%	0.4%	0.1%	0.4%
37 Aerosol Cans	<0.1%	0.2%	<0.1%	0.1%
38 Other Ferrous	0.9%	2.5%	<0.1%	1.8%
39 Other Non-Ferrous	0.2%	0.4%	<0.1%	0.3%
Total Metals	**2.5%**			

Exhibit 2. CMS Waste Composition (continued)

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
TEXTILE				
40 Textiles	1.1%	2.1%	0.4%	1.8%
41 Other Textiles	0.4%	2.4%	<0.1%	1.3%
42 Leather	<0.1%	<0.1%	<0.1%	<0.1%
Total Textiles	**1.5%**			
ORGANIC				
43 Food Waste	28.0%	8.8%	24.9%	31.1%
44 Treated Wood	0.5%	1.9%	<0.1%	1.2%
45 Untreated Wood	0.9%	2.7%	<0.1%	1.9%
46 Furniture	<0.1%	<0.1%	<0.1%	<0.1%
47 Mattresses	<0.1%	<0.1%	<0.1%	<0.1%
48 Pallets	0.3%	1.6%	<0.1%	0.9%
49 Yard Waste	0.6%	1.7%	<0.1%	1.2%
50 Rubber	<0.1%	0.3%	<0.1%	0.2%
51 Stumps	<0.1%	<0.1%	<0.1%	<0.1%
52 Condiments	<0.1%	<0.1%	<0.1%	<0.1%
53 Other Organics	7.1%	2.6%	6.1%	8.0%
54 Diapers	0.5%	1.3%	<0.1%	0.9%
Total Organics	**37.8%**			
ELECTRONICS				
55 Computers	<0.1%	<0.1%	<0.1%	<0.1%
56 Televisions	<0.1%	<0.1%	<0.1%	<0.1%
57 Cell Phones	<0.1%	<0.1%	<0.1%	<0.1%
58 Printers	<0.1%	<0.1%	<0.1%	<0.1%
59 DVD's/CD's	<0.1%	<0.1%	<0.1%	<0.1%
60 VCR's	<0.1%	<0.1%	<0.1%	<0.1%
61 MP3 Players	<0.1%	<0.1%	<0.1%	<0.1%
62 Other Electronic Waste	0.5%	1.3%	<0.1%	0.9%
Total Electronics	**0.5%**			
HHW				
63 Hazardous Waste	<0.1%	<0.1%	<0.1%	<0.1%
64 Oil Filters	<0.1%	<0.1%	<0.1%	<0.1%
65 Infectious Waste	<0.1%	<0.1%	<0.1%	<0.1%
66 Printer Ink Cartridges	<0.1%	<0.1%	<0.1%	<0.1%
67 Flourescent Bulbs (# of bulbs)	0.3%	1.6%	<0.1%	0.9%
68 Dry Cell Batteries	<0.1%	<0.1%	<0.1%	<0.1%
69 Lead-Acid Batteries	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Wastes	**0.3%**			
C&D and OTHER WASTES				
70 Brick	<0.1%	<0.1%	<0.1%	<0.1%
71 Concrete	<0.1%	<0.1%	<0.1%	<0.1%
72 Roofing Material	<0.1%	<0.1%	<0.1%	<0.1%
73 Drywall (Gypsum)	<0.1%	<0.1%	<0.1%	<0.1%
74 Vinyle Siding	<0.1%	<0.1%	<0.1%	<0.1%
75 Fines	1.9%	1.6%	1.3%	2.4%
76 Other	2.5%	3.6%	1.2%	3.8%
Total C&D and Other Wastes	**4.4%**			
TOTALS	**100.0%**			

Note: Composition based on 30 samples.

Exhibit 2. CMS Waste Composition (continued)



Central Piedmont Community College

Exhibit 3 presents a compilation of the ten waste samples collected and sorted in December 2011. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, of the college waste stream are Food Waste (14.9 percent), Plastic Films (9.5 percent) and Compostable Paper (9.0 percent). During field activities it was noted that a significant portion of the food waste was generated by restaurants on the CPCC campus.

Exhibit 3. CPCC Waste Composition

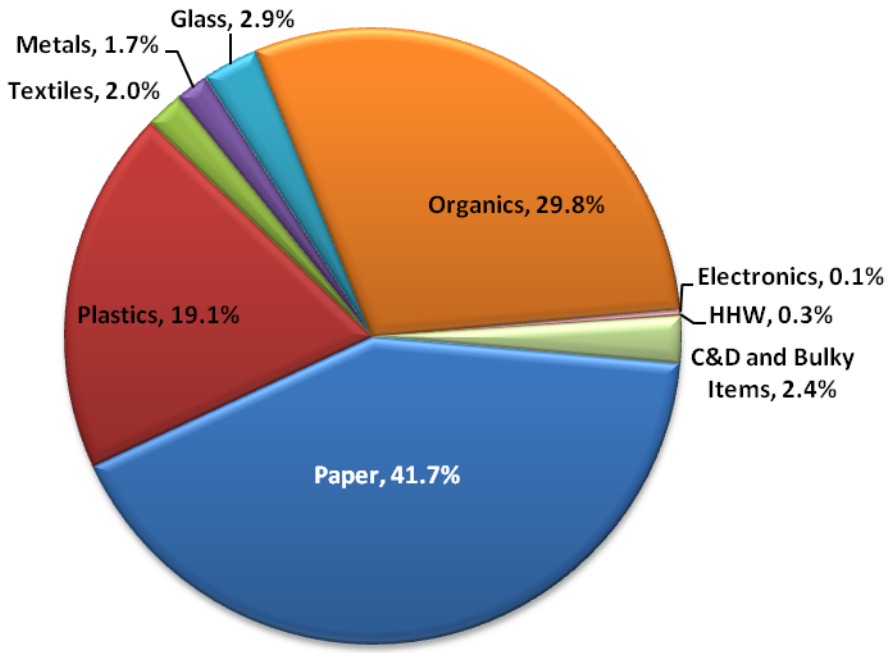
Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Newspaper/Print	1.6%	2.2%	0.2%	3.0%
2 Glossy Magazines	1.0%	1.4%	0.1%	1.9%
3 Recyclable Cardboard	7.9%	9.5%	2.0%	13.9%
4 Kraft Paper	0.5%	0.6%	0.1%	0.8%
5 Paperboard (Chipboard)	1.7%	1.1%	1.0%	2.4%
6 Other Recyclable Paper	3.6%	2.6%	2.0%	5.2%
7 White Office Paper	7.7%	6.7%	3.5%	11.8%
8 Gable Top/Aseptic	<0.1%	0.1%	<0.1%	0.1%
9 Paper Plates/Cups	4.0%	5.1%	0.8%	7.1%
10 File Folders	0.4%	0.6%	<0.1%	0.8%
11 Paper Packaging	<0.1%	<0.1%	<0.1%	<0.1%
12 Phone Books	<0.1%	<0.1%	<0.1%	<0.1%
13 Other Books	1.9%	4.9%	<0.1%	4.9%
14 Shredded Paper	1.4%	2.1%	0.1%	2.7%
15 Non-Recycl Cardboard	<0.1%	<0.1%	<0.1%	<0.1%
16 Compostable Paper	9.0%	3.6%	6.8%	11.3%
17 Non-Recyclable Paper	0.9%	0.9%	0.4%	1.5%
Total Paper	**41.6%**			
PLASTIC				
18 PET (#1) Bottles	2.7%	1.3%	1.9%	3.5%
19 HDPE (#2) Bottles)	0.6%	0.4%	0.3%	0.8%
20 Other (#3-#7) Bottles	<0.1%	<0.1%	<0.1%	<0.1%
21 Plastic Films	9.5%	5.8%	5.9%	13.1%
22 Grocery Bags	0.3%	0.3%	0.1%	0.5%
23 Plastic Cups and Tubs	1.1%	1.0%	0.4%	1.7%
24 Polystrene (#6) Foam	2.1%	1.3%	1.2%	2.9%
25 Disposable Trays	1.2%	1.5%	0.3%	2.2%
26 Rigid Plastics	1.6%	1.5%	0.7%	2.6%
27 Flower Pots	<0.1%	<0.1%	<0.1%	<0.1%
28 DVD/CD Cases	<0.1%	<0.1%	<0.1%	<0.1%
Total Plastic	**19.1%**			
GLASS				
29 Clear Glass Bottles/Jars	0.9%	1.0%	0.3%	1.6%
30 Green Glass Bottles/Jars	0.5%	0.6%	<0.1%	0.9%
31 Brown Glass Bottles/Jars	0.1%	0.2%	<0.1%	0.3%
32 Ceramic Glass	1.3%	2.5%	<0.1%	2.9%
33 Other Glass	<0.1%	0.3%	<0.1%	0.3%
Total Glass	**2.8%**			
METAL				
34 Steel/Bi Metal Food Cans	0.3%	0.3%	0.1%	0.5%
35 Aluminum Cans	0.8%	0.5%	0.5%	1.1%
36 Aluminum Tin/Foil	0.3%	0.3%	0.1%	0.5%
37 Aerosol Cans	<0.1%	<0.1%	<0.1%	<0.1%
38 Other Ferrous	<0.1%	0.2%	<0.1%	0.2%
39 Other Non-Ferrous	0.1%	0.4%	<0.1%	0.4%
Total Metals	**1.6%**			

Exhibit 3. CPCC Waste Composition (continued)

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
TEXTILE				
40 Textiles	2.0%	2.0%	0.8%	3.2%
41 Other Textiles	<0.1%	<0.1%	<0.1%	<0.1%
42 Leather	<0.1%	<0.1%	<0.1%	<0.1%
Total Textiles	**2.0%**			
ORGANIC				
43 Food Waste	14.9%	7.9%	10.0%	19.8%
44 Treated Wood	<0.1%	<0.1%	<0.1%	<0.1%
45 Untreated Wood	0.4%	1.2%	<0.1%	1.2%
46 Furniture	1.4%	4.4%	<0.1%	4.1%
47 Mattresses	<0.1%	<0.1%	<0.1%	<0.1%
48 Pallets	<0.1%	<0.1%	<0.1%	<0.1%
49 Yard Waste	7.0%	7.8%	2.2%	11.9%
50 Rubber	<0.1%	<0.1%	<0.1%	<0.1%
51 Stumps	<0.1%	<0.1%	<0.1%	<0.1%
52 Condiments	<0.1%	<0.1%	<0.1%	<0.1%
53 Other Organics	6.0%	1.9%	4.9%	7.2%
54 Diapers	<0.1%	<0.1%	<0.1%	<0.1%
Total Organics	**29.8%**			
ELECTRONICS				
55 Computers	<0.1%	<0.1%	<0.1%	<0.1%
56 Televisions	<0.1%	<0.1%	<0.1%	<0.1%
57 Cell Phones	<0.1%	<0.1%	<0.1%	<0.1%
58 Printers	<0.1%	<0.1%	<0.1%	<0.1%
59 DVD's/CD's	<0.1%	<0.1%	<0.1%	<0.1%
60 VCR's	<0.1%	<0.1%	<0.1%	<0.1%
61 MP3 Players	<0.1%	<0.1%	<0.1%	<0.1%
62 Other Electronic Waste	<0.1%	0.2%	<0.1%	0.2%
Total Electronics	**0.0%**			
HHW				
63 Hazardous Waste	0.3%	0.8%	<0.1%	0.8%
64 Oil Filters	<0.1%	<0.1%	<0.1%	<0.1%
65 Infectious Waste	<0.1%	<0.1%	<0.1%	<0.1%
66 Printer Ink Cartridges	<0.1%	<0.1%	<0.1%	<0.1%
67 Flourescent Bulbs (# of bulbs)	<0.1%	<0.1%	<0.1%	<0.1%
68 Dry Cell Batteries	<0.1%	<0.1%	<0.1%	<0.1%
69 Lead-Acid Batteries	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Wastes	**0.3%**			
C&D and OTHER WASTES				
70 Brick	<0.1%	<0.1%	<0.1%	<0.1%
71 Concrete	<0.1%	<0.1%	<0.1%	<0.1%
72 Roofing Material	<0.1%	<0.1%	<0.1%	<0.1%
73 Drywall (Gypsum)	<0.1%	<0.1%	<0.1%	<0.1%
74 Vinyle Siding	<0.1%	<0.1%	<0.1%	<0.1%
75 Fines	1.5%	1.2%	0.8%	2.2%
76 Other	0.9%	1.1%	0.2%	1.6%
Total C&D and Other Wastes	**2.4%**			
TOTALS	**100.0%**			

Note: Composition based on 10 samples.

Exhibit 3. CPCC Waste Composition (continued)



County Facilities and Department of Social Services

Exhibit 4 presents a compilation of the ten waste samples collected and sorted in December 2011. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, are Textiles (19.7 percent), Compostable Paper (8.8 percent) and Concrete (8.8 percent). During field activities it was noted that the majority of the textiles were used clothing, blankets, and shoes. The concrete consisted of broken pieces that were a few inches thick and did not contain rebar. The compostable paper in these samples consisted of napkins and tissues, mostly from bathrooms.

These samples may not reflect the actual waste from typical County Facilities, as Textiles and Concrete are usually not a significant source of waste in these types of buildings. **Exhibit 5** presents an alternate composition, which omits Textiles and Concrete from the composition.

Exhibit 4. County Facilities Waste Composition

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Newspaper/Print	2.0%	2.1%	0.8%	3.3%
2 Glossy Magazines	0.6%	0.6%	0.2%	1.0%
3 Recyclable Cardboard	1.4%	1.1%	0.8%	2.1%
4 Kraft Paper	0.4%	0.4%	0.2%	0.6%
5 Paperboard (Chipboard)	2.6%	1.7%	1.5%	3.7%
6 Other Recyclable Paper	2.6%	2.9%	0.7%	4.4%
7 White Office Paper	2.9%	2.9%	1.1%	4.7%
8 Gable Top/Aseptic	0.3%	0.4%	<0.1%	0.6%
9 Paper Plates/Cups	0.7%	0.6%	0.3%	1.1%
10 File Folders	0.3%	0.7%	<0.1%	0.7%
11 Paper Packaging	0.4%	0.4%	0.2%	0.7%
12 Phone Books	<0.1%	<0.1%	<0.1%	<0.1%
13 Other Books	2.1%	2.9%	0.3%	3.9%
14 Shredded Paper	0.4%	0.8%	<0.1%	0.9%
15 Non-Recycl Cardboard	<0.1%	<0.1%	<0.1%	<0.1%
16 Compostable Paper	8.8%	3.2%	6.8%	10.8%
17 Non-Recyclable Paper	0.5%	1.0%	<0.1%	1.2%
Total Paper	**26.0%**			
PLASTIC				
18 PET (#1) Bottles	1.7%	1.6%	0.7%	2.7%
19 HDPE (#2) Bottles)	<0.1%	0.1%	<0.1%	0.1%
20 Other (#3-#7) Bottles	<0.1%	<0.1%	<0.1%	<0.1%
21 Plastic Films	6.9%	6.3%	2.9%	10.8%
22 Grocery Bags	0.4%	0.5%	0.1%	0.7%
23 Plastic Cups and Tubs	0.6%	0.5%	0.2%	0.9%
24 Polystrene (#6) Foam	1.7%	1.2%	1.0%	2.4%
25 Disposable Trays	0.3%	0.4%	<0.1%	0.5%
26 Rigid Plastics	6.0%	3.8%	3.7%	8.4%
27 Flower Pots	<0.1%	<0.1%	<0.1%	<0.1%
28 DVD/CD Cases	<0.1%	<0.1%	<0.1%	<0.1%
Total Plastic	**17.6%**			
GLASS				
29 Clear Glass Bottles/Jars	0.2%	0.3%	<0.1%	0.3%
30 Green Glass Bottles/Jars	0.1%	0.4%	<0.1%	0.4%
31 Brown Glass Bottles/Jars	<0.1%	<0.1%	<0.1%	<0.1%
32 Ceramic Glass	<0.1%	<0.1%	<0.1%	<0.1%
33 Other Glass	0.5%	1.0%	<0.1%	1.1%
Total Glass	**0.8%**			
METAL				
34 Steel/Bi Metal Food Cans	0.2%	0.3%	<0.1%	0.4%
35 Aluminum Cans	0.6%	0.6%	0.2%	1.0%
36 Aluminum Tin/Foil	0.3%	0.4%	<0.1%	0.5%
37 Aerosol Cans	0.2%	0.4%	<0.1%	0.4%
38 Other Ferrous	1.0%	1.2%	0.2%	1.7%
39 Other Non-Ferrous	0.3%	0.8%	<0.1%	0.7%
Total Metals	**2.6%**			

Exhibit 4. County Facilities Waste Composition (continued)

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
TEXTILE				
40 Textiles	19.7%	10.3%	13.4%	26.1%
41 Other Textiles	3.8%	5.4%	0.5%	7.1%
42 Leather	<0.1%	<0.1%	<0.1%	<0.1%
Total Textiles	**23.5%**			
ORGANIC				
43 Food Waste	7.2%	5.0%	4.1%	10.4%
44 Treated Wood	1.3%	2.2%	<0.1%	2.7%
45 Untreated Wood	0.4%	1.1%	<0.1%	1.1%
46 Furniture	0.4%	1.4%	<0.1%	1.3%
47 Mattresses	<0.1%	<0.1%	<0.1%	<0.1%
48 Pallets	<0.1%	<0.1%	<0.1%	<0.1%
49 Yard Waste	<0.1%	<0.1%	<0.1%	<0.1%
50 Rubber	<0.1%	<0.1%	<0.1%	<0.1%
51 Stumps	<0.1%	<0.1%	<0.1%	<0.1%
52 Condiments	<0.1%	<0.1%	<0.1%	<0.1%
53 Other Organics	4.8%	2.8%	3.1%	6.5%
54 Diapers	0.3%	0.5%	<0.1%	0.6%
Total Organics	**14.5%**			
ELECTRONICS				
55 Computers	<0.1%	<0.1%	<0.1%	<0.1%
56 Televisions	<0.1%	<0.1%	<0.1%	<0.1%
57 Cell Phones	<0.1%	<0.1%	<0.1%	<0.1%
58 Printers	0.6%	1.8%	<0.1%	1.6%
59 DVD's/CD's	<0.1%	<0.1%	<0.1%	<0.1%
60 VCR's	<0.1%	<0.1%	<0.1%	<0.1%
61 MP3 Players	<0.1%	<0.1%	<0.1%	<0.1%
62 Other Electronic Waste	2.3%	3.7%	<0.1%	4.6%
Total Electronics	**2.9%**			
HHW				
63 Hazardous Waste	<0.1%	<0.1%	<0.1%	<0.1%
64 Oil Filters	<0.1%	<0.1%	<0.1%	<0.1%
65 Infectious Waste	<0.1%	<0.1%	<0.1%	<0.1%
66 Printer Ink Cartridges	<0.1%	<0.1%	<0.1%	<0.1%
67 Flourescent Bulbs (# of bulbs)	<0.1%	<0.1%	<0.1%	<0.1%
68 Dry Cell Batteries	<0.1%	<0.1%	<0.1%	<0.1%
69 Lead-Acid Batteries	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Wastes	**<0.1%**			
C&D and OTHER WASTES				
70 Brick	<0.1%	<0.1%	<0.1%	<0.1%
71 Concrete	8.8%	15.5%	<0.1%	18.3%
72 Roofing Material	<0.1%	<0.1%	<0.1%	<0.1%
73 Drywall (Gypsum)	0.3%	0.9%	<0.1%	0.8%
74 Vinyl Siding	<0.1%	<0.1%	<0.1%	<0.1%
75 Fines	1.7%	1.4%	0.8%	2.6%
76 Other	1.3%	3.1%	<0.1%	3.2%
Total C&D and Other Wastes	**12.1%**			
TOTALS	**100.0%**			

Note: Composition based on 10 samples.

Exhibit 4. County Facilities Waste Composition (continued)

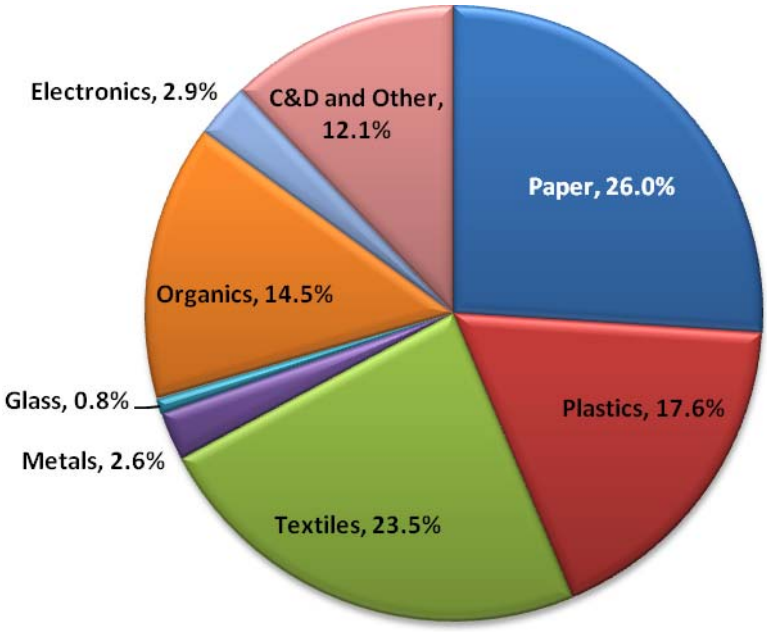


Exhibit 5. County Facilities Waste Alternate Composition

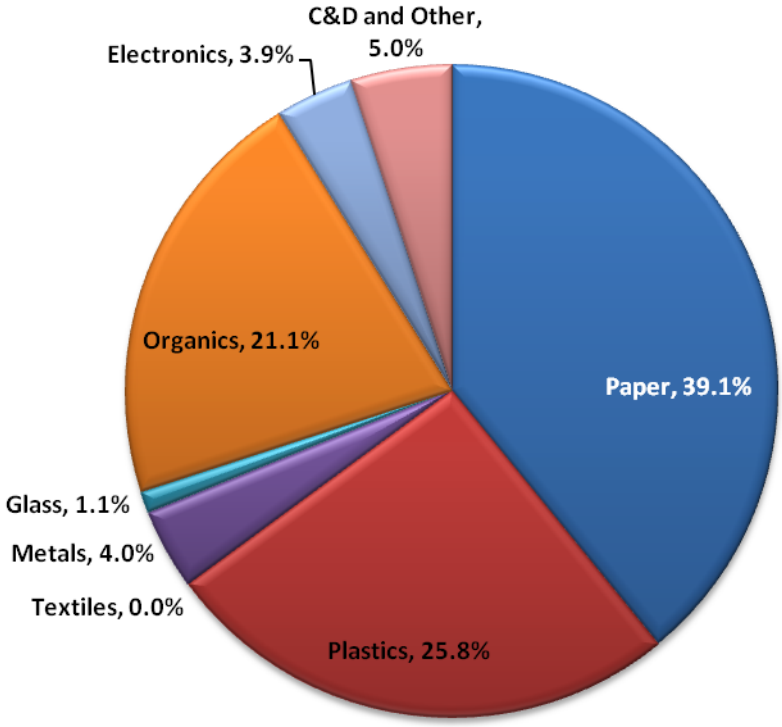
Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Newspaper/Print	3.0%	3.0%	1.1%	4.9%
2 Glossy Magazines	0.8%	0.8%	0.3%	1.3%
3 Recyclable Cardboard	2.2%	1.6%	1.3%	3.2%
4 Kraft Paper	0.6%	0.5%	0.3%	0.9%
5 Paperboard (Chipboard)	3.9%	2.3%	2.5%	5.4%
6 Other Recyclable Paper	3.8%	3.9%	1.4%	6.2%
7 White Office Paper	4.1%	4.2%	1.5%	6.7%
8 Gable Top/Aseptic	0.5%	0.6%	0.1%	0.8%
9 Paper Plates/Cups	1.0%	0.9%	0.5%	1.5%
10 File Folders	0.5%	1.0%	<0.1%	1.1%
11 Paper Packaging	0.7%	0.7%	0.3%	1.1%
12 Phone Books	<0.1%	<0.1%	<0.1%	<0.1%
13 Other Books	3.5%	5.1%	0.3%	6.6%
14 Shredded Paper	0.5%	1.1%	<0.1%	1.2%
15 Non-Recycl Cardboard	<0.1%	<0.1%	<0.1%	<0.1%
16 Compostable Paper	13.4%	4.3%	10.7%	16.1%
17 Non-Recyclable Paper	0.7%	1.1%	<0.1%	1.4%
Total Paper	**39.1%**			
PLASTIC				
18 PET (#1) Bottles	2.3%	1.6%	1.3%	3.4%
19 HDPE (#2) Bottles)	<0.1%	0.1%	<0.1%	0.2%
20 Other (#3-#7) Bottles	<0.1%	<0.1%	<0.1%	<0.1%
21 Plastic Films	9.2%	6.0%	5.5%	12.9%
22 Grocery Bags	0.6%	0.6%	0.2%	1.0%
23 Plastic Cups and Tubs	0.8%	0.7%	0.4%	1.2%
24 Polystrene (#6) Foam	2.4%	1.4%	1.6%	3.3%
25 Disposable Trays	0.3%	0.6%	<0.1%	0.7%
26 Rigid Plastics	10.1%	7.1%	5.6%	14.5%
27 Flower Pots	<0.1%	<0.1%	<0.1%	<0.1%
28 DVD/CD Cases	<0.1%	<0.1%	<0.1%	<0.1%
Total Plastic	**25.7%**			
GLASS				
29 Clear Glass Bottles/Jars	0.3%	0.4%	<0.1%	0.5%
30 Green Glass Bottles/Jars	0.2%	0.6%	<0.1%	0.5%
31 Brown Glass Bottles/Jars	<0.1%	<0.1%	<0.1%	<0.1%
32 Ceramic Glass	<0.1%	<0.1%	<0.1%	<0.1%
33 Other Glass	0.6%	1.4%	<0.1%	1.5%
Total Glass	**1.1%**			
METAL				
34 Steel/Bi Metal Food Cans	0.3%	0.4%	<0.1%	0.5%
35 Aluminum Cans	0.8%	0.7%	0.4%	1.3%
36 Aluminum Tin/Foil	0.5%	0.6%	0.1%	0.9%
37 Aerosol Cans	0.3%	0.5%	<0.1%	0.6%
38 Other Ferrous	1.7%	2.6%	0.1%	3.3%
39 Other Non-Ferrous	0.4%	1.1%	<0.1%	1.1%
Total Metals	**4.0%**			

Exhibit 6. County Facilities Waste Alternate Composition (continued)

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
TEXTILE				
40 Leather	<0.1%	<0.1%	<0.1%	<0.1%
Total Textiles	**0.0%**	(Textiles omitted)		
ORGANIC				
41 Food Waste	9.8%	5.7%	6.2%	13.3%
42 Treated Wood	1.8%	2.9%	<0.1%	3.6%
43 Untreated Wood	1.1%	3.1%	<0.1%	3.0%
44 Furniture	0.7%	2.1%	<0.1%	2.0%
45 Mattresses	<0.1%	<0.1%	<0.1%	<0.1%
46 Pallets	<0.1%	<0.1%	<0.1%	<0.1%
47 Yard Waste	<0.1%	<0.1%	<0.1%	<0.1%
48 Rubber	<0.1%	<0.1%	<0.1%	<0.1%
49 Stumps	<0.1%	<0.1%	<0.1%	<0.1%
50 Condiments	<0.1%	<0.1%	<0.1%	<0.1%
51 Other Organics	7.3%	4.1%	4.7%	9.8%
52 Diapers	0.5%	1.0%	<0.1%	1.1%
Total Organics	**21.1%**			
ELECTRONICS				
53 Computers	<0.1%	<0.1%	<0.1%	<0.1%
54 Televisions	<0.1%	<0.1%	<0.1%	<0.1%
55 Cell Phones	<0.1%	<0.1%	<0.1%	<0.1%
56 Printers	0.8%	2.6%	<0.1%	2.4%
57 DVD's/CD's	<0.1%	<0.1%	<0.1%	<0.1%
58 VCR's	<0.1%	<0.1%	<0.1%	<0.1%
59 MP3 Players	<0.1%	<0.1%	<0.1%	<0.1%
60 Other Electronic Waste	3.1%	4.4%	0.4%	5.8%
Total Electronics	**3.9%**			
HHW				
61 Hazardous Waste	<0.1%	<0.1%	<0.1%	<0.1%
62 Oil Filters	<0.1%	<0.1%	<0.1%	<0.1%
63 Infectious Waste	<0.1%	<0.1%	<0.1%	<0.1%
64 Printer Ink Cartridges	<0.1%	<0.1%	<0.1%	<0.1%
65 Flourescent Bulbs	<0.1%	<0.1%	<0.1%	<0.1%
66 Dry Cell Batteries	<0.1%	<0.1%	<0.1%	<0.1%
67 Lead-Acid Batteries	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Wastes	**<0.1%**			
C&D and OTHER WASTES				
68 Brick	<0.1%	<0.1%	<0.1%	<0.1%
69 Roofing Material	<0.1%	<0.1%	<0.1%	<0.1%
70 Drywall (Gypsum)	0.3%	1.1%	<0.1%	1.0%
71 Vinyl Siding	<0.1%	<0.1%	<0.1%	<0.1%
72 Fines	3.0%	3.0%	1.1%	4.8%
73 Other	1.7%	3.3%	<0.1%	3.7%
Total C&D and Other Wastes	**5.0%**	(Concrete omitted)		
TOTALS	**100.0%**			

Note: Composition based on 10 samples.

Exhibit 5. County Facilities Waste Alternate Composition (continued)



3 POTENTIAL WASTE DIVERSION CAPABILITY

Significant portions of the waste streams generated by CMS, CPCC, and County Facilities are compostable or recyclable. Some materials, such as Treated Wood, Ceramic Glass, and Plastic Film (largely plastic bags used to contain trash materials), are considered trash since they do not have markets for recycling nor composting. **Exhibit 6** details the materials included in the compostable, recyclable, and trash classifications used for this section.

Exhibit 6. Compostable, Recyclable, and Trash Classifications for Waste Materials

Compostable	Recyclable		Trash
Paper Plates/Cups	Newspaper/Print	DVD/CD Cases	Non-Recyclable Cardboard
Compostable Paper	Glossy Magazines	Steel/Bi Metal Food Cans	Non-Recyclable Paper
Food Waste	Recyclable Cardboard	Aluminum Cans	Plastic Films
Untreated Wood	Kraft Paper	Aluminum Tin/Foil	Polystyrene
Yard Waste	Paperboard (Chipboard)	Aerosol Cans	Ceramic Glass
Stumps	Other Recyclable Paper	Other Ferrous	Other Glass
Other Organics	White Office Paper	Other Non-Ferrous	Other Textiles
	Gable Top/Aseptic	Textiles	Leather
	File Folders	Pallets	Treated Wood
	Paper Packaging	Electronics	Furniture
	Phone Books	Oil Filters	Mattresses
	Other Books	Printer Ink Cartridges	Rubber
	Shredded Paper	Fluorescent Bulbs	Condiments
	Glass Bottles/Jars	Dry Cell Batteries	Diapers
	PET (#1) Bottles	Lead-Acid Batteries	Hazardous Waste
	HDPE (#2) Bottles	Brick	Infectious Waste
	Other (#3-#7) Bottles	Concrete	Fines
	Grocery Bags	Roofing Material	Other
	Plastic Cups and Tubs	Drywall (Gypsum)	
	Disposable Trays	Vinyl Siding	
	Rigid Plastics		
	Flower Pots		

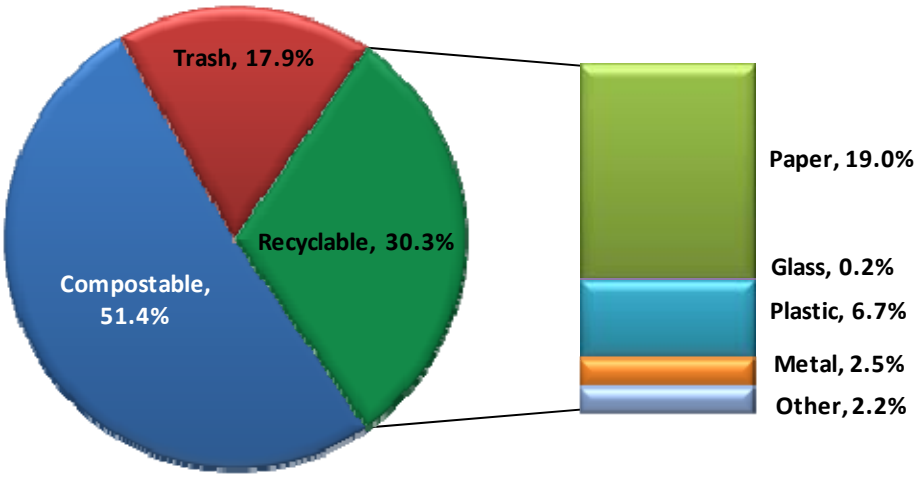
CHARLOTTE-MECKLENBURG SCHOOLS

The largest waste diversion opportunity for CMS is composting of food waste. According to the results of the waste stream analysis, food waste comprised 28 percent of the waste stream. Food waste includes liquids, such as full milk and juice containers which were noted to be prevalent in the waste stream. Other significant sources of compostable materials included Compostable Paper (9.4 percent), Other Organic (7.1 percent), and Paper Plates/Cups (5.4 percent).

Recyclable paper comprised the largest segment of the recyclable portion of the waste stream at about 19 percent. The largest subcomponents of the Recyclable paper category were Gable

Top/Aseptic Containers (5.6 percent), White Office Paper (3.9 percent), and Recyclable Cardboard (3.3 percent). **Exhibit 7** portrays the waste composition by recyclable, compostable, and trash materials. At CMS, approximately 82 percent of the waste stream is considered recyclable or compostable.

Exhibit 7. Diversion Opportunities for CMS

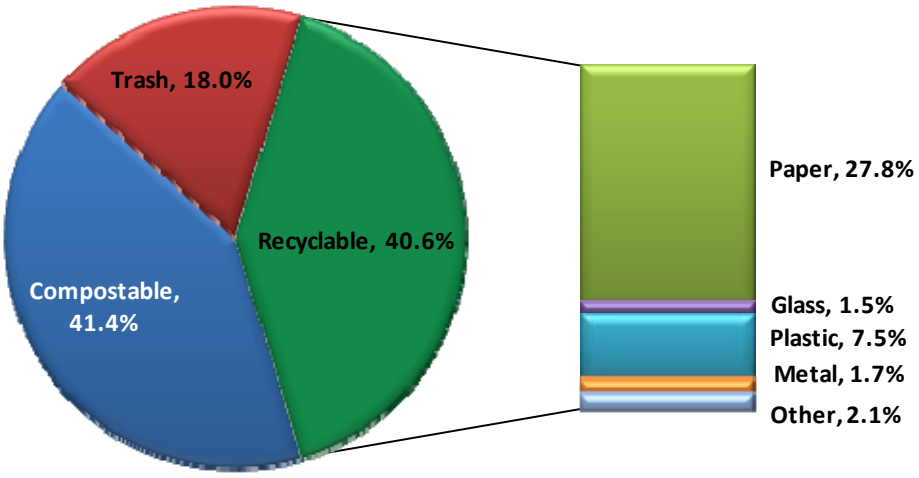


CENTRAL PIEDMONT COMMUNITY COLLEGE

The largest waste diversion opportunities for the CPCC are composting of Food Waste and Compostable Paper. According to the results of the waste stream analysis, Food Waste comprised 14.9 percent of the waste stream and Compostable Paper comprised 9.0 percent. Materials such as napkins and tissues were noted to be prevalent in the waste stream.

Recyclable paper comprised 27.8 percent of the waste stream. The largest subcomponents in this category were Cardboard (7.9 percent) and White Office Paper (7.7 percent). **Exhibit 8** portrays the waste composition by recyclable, compostable, and trash materials. At CPCC, about 82 percent of the waste stream is considered recyclable or compostable.

Exhibit 8. Diversion Opportunities for CPCC

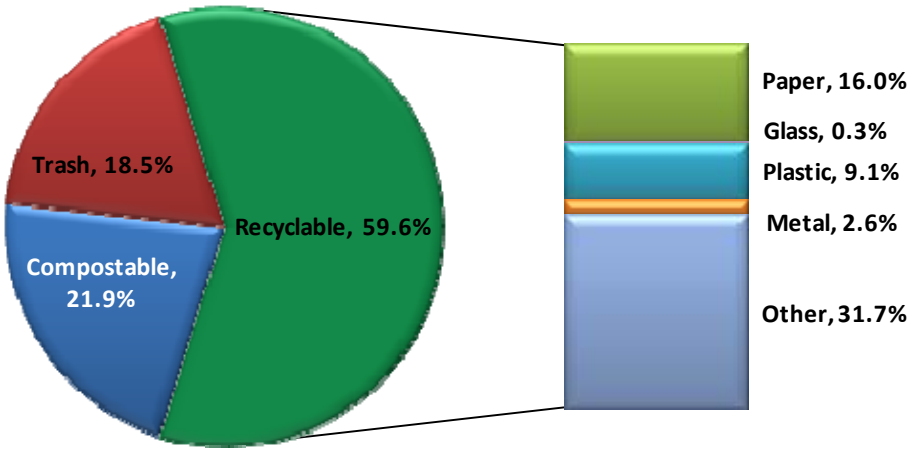


COUNTY FACILITIES

The largest waste diversion opportunity for County Facilities is recycling of textiles. According to the results of the waste stream analysis conducted in December 2011, Textiles comprised 19.7 percent of the waste stream. Food Waste (7.3 percent) and Compostable Paper (8.8 percent) also comprised a significant portion of the waste stream.

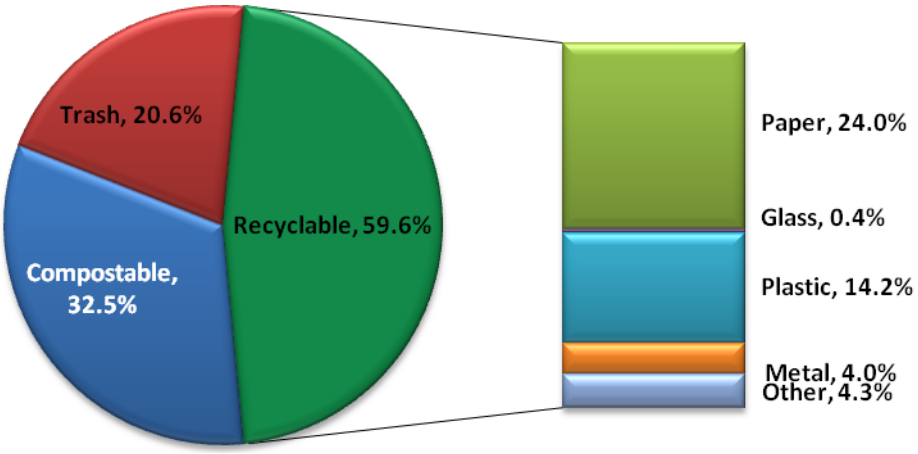
Recyclable paper comprised about 16 percent of the waste stream. The largest subcomponents in this category were White Office Paper (2.9 percent) and Paperboard (2.6 percent). The samples collected in December also had a large amount of concrete, which comprised 8.7 percent of the waste stream. Although this may not be typical of the year round waste stream, concrete is considered recyclable. **Exhibit 9** portrays the waste composition by recyclable, compostable, and trash materials. **Exhibit 9** is generated from the actual data collected, while **Exhibit 10** presents the alternate waste composition (omitting Textiles, Other Textiles, and Concrete). At the County Facilities, about 82 percent of the waste stream is considered recyclable or compostable.

Exhibit 9. Diversion Opportunities for County Facilities



In the alternate composition, Recyclable paper comprised about 24 percent of the waste stream. The largest subcomponents in this category were White Office Paper (4.1 percent) and Paperboard (3.9 percent). Recyclable Plastics comprised about 14.2 percent of the waste stream. The largest subcomponents in this category were Rigid Plastics (10.1 percent) and PET #1 Bottles (2.3 percent)

Exhibit 10. Diversion Opportunities for County Facilities – Alternate Composition



4 COMPARABLE RECYCLING PROGRAMS

SCHOOL SYSTEMS

Montgomery County Maryland Public Schools

Establishment and Participation in Recycling Team

Montgomery County Public Schools has created the School Energy and Recycling Team (SERT) to encourage and monitor recycling programs in public schools. Participation in SERT is mandatory and requires schools to submit a SERT Action Plan each year. The Montgomery County Government requires all public facilities to recycle 50 percent of all solid waste material generated. SERT facilitators are available to help engage school staff and students in an active recycling program.

Principals' support of the SERT team is strongly encouraged to establish school wide awareness and participation, to promote environmental stewardship and to ensure proper use of awards. SERT developed a Principal's Handbook to provide the energy conservation and recycling guidelines that should be followed for efficient building management. All schools are assigned a SERT facilitator based on their maintenance depot.

Benchmarking, Events, and Contests

SERT manages recycling data from all schools and monitors progress toward the 40 percent recycling goal. Monthly progress reports for each school and for the entire school system are posted to their website (www.montgomeryschoolsmd.org/departments/facilities/greenschoolsfocus/sert.shtm). **Exhibit 10** presents example recycling benchmarking reports.

SERT sponsors or facilitates many recycling events throughout the year including:

- **Drive for Supplies Program –** This program encourages students to donate used, but usable school supplies (pens, pencils, crayons, note paper, glue, rulers, notebooks, etc.) at the end of the school year when they clean out their lockers, bookbags, and desks. Materials collected are donated to disadvantaged children. Local businesses are can also participate: for example, SAIC donated 33 boxes of binders last school year. This program saves Montgomery County Public Schools (MCPS) money by reducing disposal costs while also reducing waste in community landfills.

- **Waste Free Lunch –** This program encourages students to make their lunch more earth friendly by adopting a few waste free ideas while packing your lunch such as using reusable containers for meals and drinks, eliminating use of plastic utensils which are not recyclable, and using cloth napkins. This program is promoted through flyers and the SERT website.

- **Cafeteria Tray Reduction –** This program encourages cafeterias to establish tray-free days or eliminate trays entirely. To promote this program the school broadcasts a video made by students on tray reduction to remind students that food will not be served on trays that particular day. All other times, the trays are placed away from the main serving

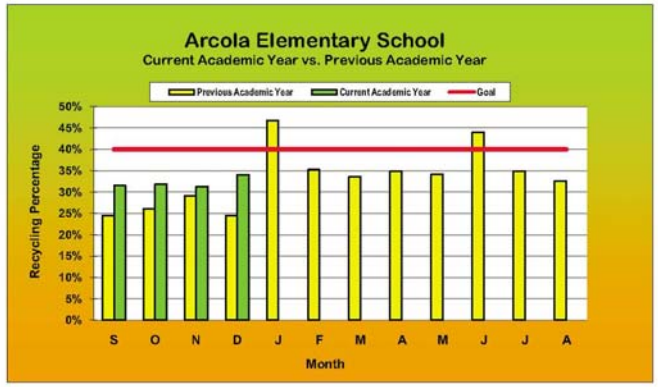
area. A student standing in the serving area will have to make a conscious effort in order to obtain a tray.

- **Field Trips Focused on Recycling and Waste Reduction –** This program encourages both elementary and secondary students to visit the County's Recycling Center, Solid Waste Transfer Station, Waste-To-Energy Facility, and Composting Facility.

Exhibit 11. Benchmarking School Recycling

Arcola Elementary School
Recycling Chart
2010-11 VS. 2011-12

Month	Previous Academic Year Monthly Recycling Rates	Current Academic Year Monthly Recycling Rates	% Change 2010-11 vs. 2011-12
September (S)	24.5%	31.5%	28.2%
October (O)	26.1%	31.8%	22.0%
November (N)	29.1%	31.2%	7.3%
December (D)	24.5%	34.1%	38.9%
January (J)	46.7%	0.0%	
February (F)	35.2%	0.0%	
March (M)	33.5%	0.0%	
April (A)	34.9%	0.0%	
May (M)	34.1%	0.0%	
June (J)	44.0%	0.0%	
July (J)	34.8%	0.0%	
August(A)	32.6%	0.0%	
YTD %	35.3%	32.1%	24.1%



It's your world... choose to conserve.

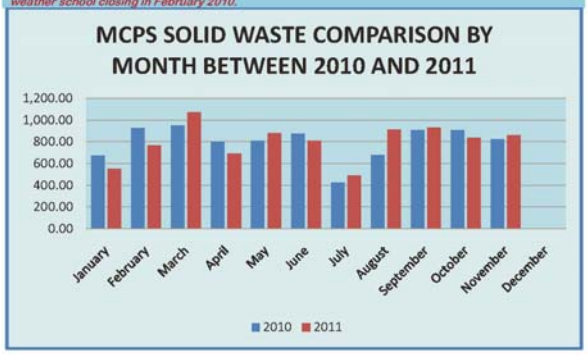
As of: 1/23/2012

MCPS SOLID WASTE REPORT YEAR-TO-DATE 2011

	2010 (TONS)	2011 (TONS)	Diff. (TONS)	YTD Inc./Dec. %
January	675.70	549.64	-126.06	-18.66
February	*926.20	766.22	-159.98	-17.27
March	949.60	1,074.93	125.33	13.20
April	799.70	691.97	-107.73	-13.47
May	808.80	879.20	70.40	8.70
June	875.90	810.55	-65.35	-7.46
July	427.10	488.39	61.29	14.35
August	678.00	914.67	236.67	34.91
September	906.30	931.56	25.26	2.79
October	906.60	836.22	-70.38	-7.76
November	824.59	861.59	37.00	4.49
December				
YTD TOTAL	8,778.49	8,804.94	26.45	0.30

YTD % of solid waste(trash) increase/decrease : 0.30 % (Increase)

**Note: For comparative purpose Feb 2009 weight is used instead of Feb 2010 due to emergency weather school closing in February 2010.*



SERT also holds various recycling contests among individual schools including:

- **Recycling Spirit Contest** - SERT requests all high schools to demonstrate their recycling spirit by promoting recycling at all MCPS high school extracurricular activities. SERT encourages schools to increase awareness through delivering announcements at all MCPS sporting venues to promote responsible recycling. Schools can apply for a recycling award when they demonstrate their recycling spirit (cheers, chants, songs, skits, announcements, mascot, ushers, etc.). Awards are made in January for the previous Fall.

- **Lead by Example** – SERT requests all MCPS high schools to participate in the Lead by Example contest where proven projects/initiatives will be highlighted in the SERT manual "SERT Best Management Practices". This on-line resource provides schools with proven conservation strategies and expectations with regard to efficient building use and operations. Entries can include behavioral strategies, energy efficiency projects, and awareness campaigns. SERT awards will be granted to the top three high schools along with certificates of participation for all participating students. Submissions should demonstrate the effectiveness of each project by creating a plan and measuring results.

Educational Resources

SERT's website provides recycling resources such as signs, flyers, and posters for schools to download and print. Flyers cover topics such as 'Tap and Stack Lunch Recycling' which enforces the method for recycling food trays in cafeterias and announcements/reminders to participate in various recycling initiatives.

Chicago Public Schools (CPS)

Rewards Program

Each semester CPS awards top recyclers with gift cards ranging up to $500 (up to $1,000 per year) for meeting or exceeding their recycling targets. Recycling targets are specific to each school and are based on the size and number of students. Purchasing products with recycled content (paper, toner, folders, etc) through the CPS office supply vendor, Office Depot, will also fund a gift card to the school

The program is monitored by the recycling truck drivers, who record the volume of recyclables in the dumpsters each week. That volume is compared to the recycling target set for each school. Weekly reports are presented on their website (www.cps.edu/GoGreen/Pages/WasteandRecycling.aspx).

Composting Program

Chicago Public Schools have also incorporated back yard composting in some schools. Informational documents posted on their website make it easier for schools to implement this program. A comprehensive document details the steps required to begin a composting program. The document explains how to delegate responsibilities, obtain the necessary equipment, develop the collection process, and communicate the composting program. The document also contains troubleshooting information and tips on including composting in the science curriculum.

Appendix B presents "Composting in Chicago Public Schools" which is prepared by the Environmental Impact Initiative. This resource is a comprehensive guide to establishing and operating a successful composting program.

COLLEGE PROGRAMS

Penn State

Food Waste and Napkin Composting

Penn State has an Organic Materials Processing and Education Center where compost is manufactured by blending food residuals, leaves, manure, crop residue, and wood chips. Food waste is captured at cafeterias throughout the campus. The compost is used for campus landscaping projects, athletic field maintenance, and agricultural research and demonstration projects. Food waste composting has also reduced water usage, as less food is disposed via garbage disposal units. Each table in the dining halls has an information tent that often contains information about the recycling program or upcoming recycling events.

Recycling at Special Events

A notable strength in Penn State's recycling program is recycling at special events. In 1995, the Beaver Stadium Recycling Effort and the Bryce Jordan Recycling Effort were implemented. These events use Boy Scout volunteers to collect recyclables generated at football and basketball games. The proceeds from the sale of the collected material are donated to the United Way of Centre County.

Education and Outreach

Penn State also has a strong educational program to promote recycling around campus. The recycling program manager writes numerous letters and gives presentations to faculty, staff, and students, both individuals and organizations. Educational materials and initiatives include:

- Promotion of the Recycling Hotline;
- The RA recycling packet;
- Posters, banners, and pamphlets;
- Recycling fact sheet distributed to every employee and student on campus;
- Public Service Announcement videos;
- Beaver Stadium pictorial ad and video boards;
- Giveaways (mugs, shirts, hats, buttons, mouse pads, pencils, cozies, safety knives);
- Recycling promotions on trash collection vehicles; and
- Special Events.

University of Maryland (UM)

University of Maryland achieved a recycling rate of 63 percent in 2010, up from 17 percent in 2003.

Special Events

Recycling and Composting at special events such as football and basketball games has been very successful; over the course of seven home games, 59 tons of waste were diverted from landfills. The program includes 'valet recycling' at tailgating events. Composting and recycling bins are strategically located throughout the stands and high traffic areas.

Composting

The composting program at UM focuses on pre and post-consumer food waste and packaging in order to divert compostable waste. The Dining Services have eliminated the use of polystyrene and replaced those containers with a compostable product made from sugarcane.

Recycling Contests

Recyclemania is an eight-week-long contest sponsored by the Environmental Protection Agency. In 2011, 630 universities and colleges throughout the nation participated. Annual participation in the nationwide contest allows UM to benchmark their diversion rates and compare the success of their recycling program to other colleges throughout the country.

LOCAL GOVERNMENT FACILITIES

City of Bellevue, Washington

The City of Bellevue has been listed from 2007 to 2011 as one of King County's (Washington) Best Workplaces for Recycling and Waste Reduction. To qualify as a Best Workplace for Recycling, organizations had to meet at least 10 criteria out of a list of 33 good recycling practices. The City has increased waste diversion by expanding the types of items that can be recycled to include:

- All plastic containers (including hot and cold cups)
- Compostable service ware in their food service operations
- Block Styrofoam
- Compact fluorescent light bulbs
- Plastic lids

The City uses shadow boxes to educate employees on how to sort their recyclables.

In late 2010, the City conducted a waste sort to monitor progress toward their recycling goals and discovered that it had reduced the overall amount of waste generated. The City continues to promote zero-waste events, and all nine fire stations continue to recycle food waste after a successful pilot program. Other government facilities have had success by instituting green procurement programs, which can promote the use of recycled materials and cut down on packaging waste.

Pierce County, Washington

Sustainability Goals

Pierce County is striving to purchase 50 percent of office products containing recycled paper, reduce purchase and consumption of paper by 15 percent, increase recycling by 50 percent, and reduce landfill waste by 30 percent, by 2015. Pierce County is striving to reach a recycling rate of 25 percent in 2011.

Green Procurement

Pierce County monitors purchases of all products for recycled content. From 2008 to 2009 they increased the percentages of purchases with recycled content from 22 percent to 26 percent. The goal is to reach 50 percent by 2015.

Sustainability Manager

Pierce County received a grant from the Department of Energy to fund a Sustainability Manager position. The Sustainability Manager works with each department on environmental initiatives, including green purchasing and recycling.

Reporting

Each County Department reports their activities that lead towards a more sustainable workplace.

Activities include:

- Public works recycled 75 tons of tires for use in chip-sealing projects, and recycled obsolete aluminum road signs.
- Community Services houses a CFL recycling station in the lobby and recycles toner cartridges.
- Parks and Recreation expanded their recycling program from just paper to include more materials, attempted to eliminate plastic water bottles from special events, and provides/promotes recycling bins at special events.

5 PROGRAM IMPLEMENTATION AND RECOMMENDATIONS

CURRENT PRACTICES

CMS), County Facilities, and CPCC each have an Interlocal Agreement with Mecklenburg County for garbage collection services. The agreement authorizes the County to administer garbage collection services to these programs. This partnership has allowed for greater economies of scale by combining collection services for CMS, CPCC, and Mecklenburg County office buildings and facilities.

Mecklenburg County serves as the central point of contact for the dissemination of information pertaining to the internal recycling program for CPCC, CMS, and County Facilities. The County provides services including the following: waste collection from containers at CMS, City/County Facilities, and CPCC; educational posters and fliers; a contract administrator through the waste hauler; and a program manager.

Local governing laws require each CMS, CPCC, and Mecklenburg County facility to recycle paper and cardboard under Mecklenburg County's Source Separation Ordinance. New single stream recycling capabilities for CMS, CPCC and Mecklenburg County, allow all recyclable materials to be placed in the same dumpster and provide a greater range of potentially recyclable materials.

Charlotte- Mecklenburg Schools

The County currently provides trash and recycling services to 180 CMS locations. Each school location has a Recycling Coordinator to implement and facilitate the recycling program. According to interviews with custodial services, in most cases, the dumpsters are collected when close to full, but not overflowing. During some events such as the end of the school year, extra pickups are necessary. CMS could save money by increasing their diversion rate and therefore requiring fewer trash dumpster pickups. CMS estimated their recycling rate to be between 15 and 18 percent during the 2010-11 school year.

SCS conducted site visits at Barringer Elementary School, Mountain Island Elementary School, Carmel Middle School, David W Butler High School, and the Transportation Building at 3901 Craig Avenue. During the site visits, recycling operations were observed in order to provide recommendations on improving the recycling program.

At the schools visited, recycling bins were located in all of the classrooms and most of the faculty offices. Larger 35-gallon toters were located in the hallways and in common areas such as copy and break rooms. Some schools had recycling teams that were responsible for emptying classroom bins into the larger toters. Custodial services are responsible for emptying the toters into recyclable single stream dumpsters which are collected by Republic and delivered to the County's Materials Recovery Facility. All of the four schools visited were participating in milk carton recycling and had a dedicated container for milk cartons in the cafeteria.

The Bus Maintenance building at 3901 Craig Avenue was also visited. Most of the recycling activities at this location were related to auto maintenance (tires, antifreeze, oil, oil filters, and scrap metal). Employees here were under the impression that their dumpster was cardboard only. While the dumpster is labeled 'cardboard only' it can be used for single stream recycling. The dumpster is serviced by Republic Services Inc.

Central Piedmont Community College

The County provides service to 19 trash dumpsters on CPCC campuses throughout Mecklenburg County. According to interviews with custodial services, the dumpsters are collected when close to full, but not overflowing. During some events such as the end of the school year, extra pickups are necessary. CPCC could save money by increasing their diversion rate and therefore requiring fewer trash dumpster pickups.

SCS conducted site visits at Levine Information Technology Building, the Overcash Center, and the Sommers Administrative buildings. During the site visits, recycling operations were observed in order to provide recommendations on improving the recycling program.

At the buildings visited, recycling bins were noted in some classrooms and offices, but not all. Recycling bins were absent in most common areas such as hallways and food courts. Recycling bins were emptied into larger toters located in break rooms and copy rooms in each building. These toters are transferred by custodial staff to one of the three recyclables dumpsters located on campus. The recyclable dumpsters are single stream and serviced by Republic Services Inc.

County Facilities

The County provides service to 93 trash dumpsters for Mecklenburg County/City of Charlotte Facilities.

SCS conducted site visits at the Valerie C. Woodward Center at 3205 Freedom Drive and the Wallace H. Kuralt DSS building at 301 Billingsley Road. During the site visits, recycling operations were observed in order to provide recommendations on improving the recycling program.

At the buildings visited, recycling bins were located in almost all offices and workspaces. Recycling bins were observed in most copy and break rooms, but were usually not present in meeting and conference rooms. Employees are responsible for emptying their bins into larger toters located in hallways and break rooms. Custodial staff transfers the contents of the toters twice a week into single stream recyclable dumpsters which are serviced by Republic Services Inc.

PROGRAM WIDE INITIATIVES

Recycling

A County-wide committee could be established to develop standards and guidelines to enhance recycling between schools and offices. Periodic meetings of the committee could be used to

share challenges and successes. If appropriate, students could be allowed participate in the committee so that students play an active role in identifying and solving problems.

Such a committee could be charged with:

- Developing a consistent recycling logo throughout County Facilities, CMS, and CPCC. Consistent labeling on containers and in public education materials will allow greater recognition of the program by students, staff, faculty, and the public.
- Developing a more structured and reliable process for departments and offices to report annual recycling data/accomplishments.
- Identifying and applying for grant opportunities for new recycling program initiatives.

Procurement and Waste Reduction

Reuse Products and Supplies

Using durable, reusable products rather than single-use materials is one of the more effective waste prevention strategies. Examples include using ceramic mugs rather than disposable cups, reusing envelopes for interoffice mail, and reusing file folders and report binders. Posting notices in common areas and using email and electronic bulletin boards are means of communication with virtually no waste generated.

Electronic Documents

Prepare final versions of large documents in Portable Document File (PDF) format on CD as an alternative to the hard paper copy version. Minimize the number of documents that are printed – use electronic versions when practical. While writing letters or other documents, review the first proof on the computer screen rather than printing a draft.

Packaging

Use minimal or reusable packaging. Work with suppliers to minimize the amount of packaging used and to return shipping materials such as crates, cartons, and pallets for reuse; alternatively, save the packaging and reuse it for outgoing shipments. Promote the purchase of items in bulk to reduce packaging.

Reuse Construction Materials

Encourage acceptance of reused materials on construction contracts where the material will serve the intended purpose; e.g., using crushed concrete or asphalt as road base or chipped wood as mulch.

CHARLOTTE-MECKLENBURG SCHOOLS

The CMS system supports more than 141,000 students from kindergarten to 12th grade in 159 schools throughout the County. The school system employs about 18,000 teachers, support staff, and administrators. Serving almost 100,000 lunches daily, the cafeterias offer one of the greatest

diversion opportunities. Although milk carton recycling programs are in place in many cafeterias, the waste audit showed that a large amount of milk cartons from students' lunches are still in the waste stream. SCS toured several school buildings in order to make recommendations to improve the recycling program.

Program Success:

- Recycling containers in every classroom
- Carton recycling in cafeterias
- Student involvement in collection

Recommendations:

Recycling Bins in Offices

Some faculty offices were lacking recycling bins. The best management practice is to have a recycling bin everywhere there is a trash can so that it is never more convenient to throw recyclables in the trash.

Milk Carton Capture Rate

According to interviews with faculty, student participation in the carton recycling program was poor at times. According to the waste characterization activities, Gable Top and Aseptic containers comprised 5.6 percent of the waste stream at CMS. Reward programs and events should be considered to encourage student participation in the milk carton recycling program. Cafeterias could also make use of student monitors to remind other students to recycle their cartons when they clear their tables and conduct student training and demonstrations as Chicago Public Schools does.

Schools that have successful recycling programs typically follow best practices guidelines which includes consistent program monitoring and routine training and education for students, teachers and administrators. Schools with the best recycling programs assign these duties to someone who makes the recycling program a priority.

Signage and Education

Generally, insufficient posters, signage, and recycling education materials were observed during site visits. Posters and educational materials should be placed in the central collection areas to demonstrate that recycling is a priority. Maintaining a recycling program requires on-going effort. After each break or at the beginning of new school years, recycling education should be reinforced. Volunteer school programs or environmental clubs can be used to play a key role in educational activities.

A well-run public education campaign can increase the recycling rate of target materials up to 20 percent.

Student Participation

Students should be encouraged to actively participate in the recycling program. Students should form groups that create and present educational materials on the recycling program and the

importance of recycling. Field trips to material recovery facilities and waste processing facilities can provide students with hands-on experience and may spark interest in recycling programs.

Recycling at Events

During interviews with faculty, it was indicated that recycling at events, such as football games, was an area for improvement. Initiatives should be made to place recycling containers near trash cans during special events, especially those that generate large quantities of waste. Signage is of vital importance for special event recycling to ensure that trash is not placed into recycling bins.

Recycling at Transportation and Support Buildings

Recycling at a maintenance building that was visited was very limited. Although automotive fluids and parts were all recycled, the office staff was not aware that their dumpster was single stream, and that they could recycle mixed paper and comingled materials in it. The employees at this location were under the impression that their dumpster was cardboard only.

Recycling Events and Competitions

Students love classroom competitions and schools can take advantage of this by establishing a recycling contest in concert with other Earth Day activities. Classroom recyclables could be weighed for a period of time and the winning classroom rewarded appropriately. Students could also be encouraged to bring recyclables, such as paper, from home to increase participation. Local businesses could be approached to provide awards for the winners.

Backyard Composting Programs

Many schools have the resources and could use compost for science and horticulture classes. A pamphlet on backyard composting should be assembled that details the equipment required and the composting process. Composting can be included in science curriculums. A composting demonstration area could be established and compost used directly on school landscaping projects. According to the waste characterization, 51.4 percent of the waste stream is compostable.

Polystyrene Usage in Cafeterias

Replacing polystyrene with recyclable materials (PET, HDPE, or compostable trays and cups) will allow more dining materials to be diverted and recycled. According to the waste characterization, 3.7 percent of the waste stream is composed of polystyrene.

Recycling Bins in Kitchens

Steel/tin cans were noted during the waste characterization study. Recycling bins should be installed in kitchens near trash collection containers, and kitchen staff should be educated on recyclable materials.

Benchmark Recycling per School

The County could work with the waste collection company to record recyclables collected in each building. Track results and offer rewards for improvements and high diversion rates. Rates achieved can be highlighted in school newsletters.

CENTRAL PIEDMONT COMMUNITY COLLEGE

There are six CPCC campuses throughout Mecklenburg County, serving more than 70,000 students and employing more than 2,500 faculty and staff. CPCC has the basic infrastructure for a recycling program, including recycling dumpsters and bins in many classrooms. The waste composition study showed that there is substantial room for improvement in diverting recyclables from CPCC buildings. SCS toured several CPCC buildings in order to make recommendations to improve the recycling program.

Recommendations:

Accompany Trash Cans with Recycling Bins

During site visits, many rooms were noted to have only trash cans without recycling bins. All offices and classrooms should have a recycling bin. Placing bins in each of these spaces is the first step to a higher diversion rate. Trash cans in hallways, lobbies and other common areas should be accompanied by single stream recycling bins.

Signage and Education

Recycling bins, especially in high traffic areas, should be accompanied by posters and educational materials. New students and faculty should be briefed on the recycling program.

Recycling Events and Competitions

Individual buildings and campuses should participate in recycling events and competitions. Rewards for competitions would encourage student and faculty participation. The data generated from participating in competitions would allow CPCC to benchmark their recycling program and monitor future successes. Events such as ***Recyclemania*** are free to enter and provide free promotional materials.

Placement of Recycling Dumpsters

Under the current contract, recycling dumpsters are relatively inexpensive compared to trash removal dumpsters. The CPCC central campus currently has three dumpsters for about 28 buildings. Some buildings on the east side of the campus are relatively far from a recycling dumpster. More efficient dumpster placement would allow for higher diversion rates and less labor for custodial staff.

Outdoor Recycling Collection Containers

During site visits, trash collection containers were noted outside on sidewalks and in common areas. No accompanying recycling containers were noted. Recycling containers should be placed near trash collection containers in heavily traveled areas.

Contractor Participation

Contractors leasing space from the college, such as restaurants, should be required to participate in the recycling program. Recycling containers should be placed near trash cans in these areas.

Develop a Recycling Committee

Develop a more structured and reliable process for departments and offices to report annual recycling data/accomplishments, pursue grants, and monitor the budget. Appoint personnel to administrate and work on improving the recycling program.

Benchmark Recycling per Building

Work with the waste collection company to record recyclables collected in each building. Track results and offer rewards for improvements and high diversion rates. Rates achieved should also be highlighted in employee newsletters.

COUNTY FACILITIES

SCS visited the Valerie C. Woodward Center at 3205 Freedom Drive and the Wallace H. Kuralt Building at 301 Billingsley Road. These buildings primarily serve as offices for County employees. During site visits, single stream recycling bins were observed in practically every employee workspace. Employees are responsible for emptying their bins into toters placed in common areas. Confidential documents are collected by a private contractor, shredded, and recycled.

Program Success:

- Recycling containers in almost all offices and break rooms.
- Good employee participation.
- Confidential documents are shredded and recycled.

Recommendations:

Recycling Containers in Meeting and Conference Rooms

During site visits, it was noted that many meeting and conference rooms had trash bins, but no recycling bin. It is considered a best management practice to accompany all trash bins with recycling bins.

Signage and Education

Recycling bins, especially in high traffic areas, should be accompanied by posters and educational materials. New employees should be briefed on the recycling program, and existing employees should be refreshed often during staff meetings or through routine publications.

Recycling Events and Competitions

Employees should be encouraged to participate in recycling events and competitions. Competitions help to benchmark the recycling diversion rate and monitor the program's future successes. Many communities, in association with America Recycles Day, hold "Clean Out Your Files" days. Such events can easily be turned into friendly competitions to see which department can recycle the most material. Shredding services can be provided at events to ensure that confidential materials are properly managed.

Education on Single Stream Recycling

In some cases, employees do not realize they can recycle bottles/cans in the same collection containers as office/mixed paper. Many bins are labeled 'paper only'. While replacing all of these bins is cost prohibitive, stickers could be applied that would designate the bins as single stream and remind employees of potential recyclable materials. Simple signage could also be placed on walls near recycling bins.

Benchmark Recycling per Building

Work with the waste collection company to record recyclables collected in each building. Track results and offer rewards for improvements and high diversion rates. Rates achieved should also be highlighted in employee newsletters.

FURTHER STUDY

To continue to divert waste materials into a recycling or composting program, Mecklenburg County should supplement their existing studies and knowledge with the following actions:

1. **Assess Recycling Capture Rates:** The capture rate indicates the proportion of each material being "captured" by the recycling program. Information generated by the waste composition study can be used to estimate the quantity of each material disposed of in the waste stream. The quantity of recyclable materials in the waste stream should be compared to the quantity of materials diverted from the waste stream to assess how successful the recycling program is.

2. **Recycling Assessment:** Similar to the field activity performed for this study, a separate study should be conducted to assess the types, quantities, and condition of materials that are diverted to the recycling program. Sampling and hand-sorting waste materials diverted to the recycling program can educate participants about contamination issues and help the County negotiate costs/revenue with the hauler that collects recyclables.

Appendix A
SCS Health and Safety Plan

HEALTH AND SAFETY PLAN

FOR THE

Mecklenburg County
2011 WASTE CHARACTERIZATION STUDY

EMERGENCY PHONE NUMBERS

Fire, First Aid, Ambulance, Police
911

Carolinas Medical Center **(704)-355-2000**

Mecklenburg County Sheriff's Office (**704)-336-8100**

Field Responsibility:

Stacey Demers, Project Director
Josh DeGayner, Site Manager & Crew Chief

SCS ENGINEERS
11260 Roger Bacon Drive
Suite 300
Reston, VA 20190
(703) 471-6150

A Copy Of This Safety Plan And Its Attachments Must Be Kept At The Site During All Field Activities.

December, 2011

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SECTION 1

INTRODUCTION

The health and safety of site workers is a primary concern and goal. Thus, a comprehensive, carefully managed, and thoroughly documented Health and Safety Plan is crucial for successful project completion.

1.1 PURPOSE

The purpose of this document is to inform persons of potential safety and health hazards and mitigating measures recommended for action when performing the project field work at transfer stations, on landfill sites, and associated areas where municipal solid waste is being handled. These recommendations are intended for work on sites containing biodegradable and solid waste materials, not for sites containing hazardous or toxic wastes regulated under federal or North Carolina state laws. This document has been prepared for use on the 2011 Mecklenburg County Waste Composition Study to be performed by SCS Engineers.

1.2 DISCUSSION

Waste characterization involves collecting field samples and sorting the solid waste into designated categories. The data that is generated from the field activities will be compiled and presented to the Mecklenburg Land Use and Environmental Service Agency/Solid Waste Department.

There have been no reported serious or fatal incidents attributed specifically to the performance of waste characterization studies. However, accidents may occur due to the potential hazards associated with the presence of heavy equipment at the site, the components of the waste itself (potentially sharp objects, broken glass), climatic conditions, and carelessness. At transfer stations, combustion of the waste materials on the tipping floor or in "Hot Loads" from refuse vehicles can present potential hazards.

The presence of heavy equipment in operation at the site (end loaders, graders, transfer station compactors, garbage trucks, etc.) presents potential hazards which can be avoided with the use of general common sense. The equipment operators generally are involved in performing their tasks and may be unaware of the presence of other individuals within the immediate area. Personnel will be trained to be aware of the movement and location of equipment at all times. Also, highly visible clothing, including safety vests and hard hats, is required.

The components of solid waste present potential physical hazards. These include, but are not limited to, cuts from broken glass and sharp metal objects; splinters from pieces of wood; punctures from nails and other potential objects and scrapes and abrasions from the general handling of the solid waste. There also exists the potential for exposure to household products, such as bleach, cleansers, and other toxic chemicals.

To alleviate the possibility of injury, caution should be employed at all times when physically

handling the solid waste. Protective clothing, including gloves and safety glasses, should be worn at all times. If there is any question about the handling of a component of solid waste, the Site Manager or Crew Chief should be notified.

The waste characterization will be preformed indoors, but not in a climate controlled area. Caution should be taken to avoid the possibility of heat stress due to protective clothing or weather, or frostbite in areas of extreme cold. Depending on temperature, portable heaters may be used to warm sorting personnel.

Landfill gas (LFG) is produced by the anaerobic decomposition of organic waste materials placed in a landfill. LFG is typically composed of 50 to 60 percent methane, 40 to 50 percent carbon dioxide, and trace amounts of various other gases, including odorous and possible toxic compounds. At the Fort Mill Transfer Station, the generation of LFG is not expected to be a concern.

Refuse discharged at the Fort Mill Transfer Station can pose a potential fire hazard. Fires can be started through carelessness, sparks, or from "Hot Loads" discharged from refuse facilities. If fire or smoke is observed, Fort Mill Transfer Station personnel should be notified immediately, all SCS personnel and subcontractors should leave the immediate area at once, and the local, emergency fire department should be notified.

1.3 RESPONSIBLE INDIVIDUALS

Safety during the field work will be the responsibility of the Site Manager. The Site Manager may temporarily suspend work if there appears to be a threat to health or safety. The Site Manager and other SCS personnel will be on site during all field activities. Other safety-related responsibilities are described below.

The SCS Site Manager, or appointed representative, will have responsibility for overall safety policy, planning, and execution. He will be responsible for making project level decisions regarding safety rules and operations.

The Site Manager will have primary responsibility for:

- Assuring that appropriate personnel protective equipment is available and properly utilized by all SCS and sampling personnel;

- Assuring that sampling personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and in planned procedures for dealing with emergencies;

- Assuring that sampling personnel are aware of the potential hazards associated with site operations;

- Supervising the monitoring of safety performance by all personnel to ensure that required work practices are employed; and

- Correcting work practices or conditions that may result in injury to personnel or exposure to hazardous substances.

1.4 SCOPE AND APPLICABILITY

A copy of this safety plan and its attachments must be kept at the site during all field activities.

The provisions of this plan are mandatory for all SCS project personnel and personnel under contract to SCS while field work is being conducted at the site.

Prior to conducting any field work, those individuals who will be performing field work must read this Safety Plan and all attachments. If any of the information presented in these materials is unclear, the reader will contact the Site Manager for clarification. Once the information has been read and understood, the individual will sign a copy of the acknowledgment shown in ***Exhibit 1*** on the following page.

After field personnel have read the Safety Plan and attachments, but before beginning field activities, a training session will be conducted to familiarize personnel with health and safety requirements relevant to the project.

EXHIBIT 1

ACKNOWLEDGMENT OF RECEIPT, HEALTH AND SAFETY PLAN

CONFIRMATION OF NOTIFICATION

HEALTH AND SAFETY PLAN FOR WAKE COUNTY 2011 WASTE COMPOSITION STUDY

I have been provided, read, and understand the Health and Safety Plan for the Mecklenburg County 2011 Waste Composition Study. I confirm that I will provide and use appropriate footwear and clothing.

I also understand that SCS Engineers will provide:

- Hard Hats
- Safety Glasses
- Gloves
- Safety Vest
- Tyvek Suit

These must be used during sorting activities. I understand that all safety regulations must be observed. **Violations of safety rules or use of safety equipment is grounds for dismissal.**

_____ _____

Signature Date

SECTION 2

EMERGENCY INFORMATION AND PROCEDURES

2.1 EMERGENCY INFORMATION

Emergency telephone numbers for reporting an emergency are listed on the cover of this Plan.

2.2 ACCIDENTS/INJURIES

Depending on the severity of the injury, treatment may be given at the site by trained personnel, additional assistance may be required at the site (emergency medical technicians), or the victim may have to be transported to a hospital. The address of the nearest hospital is as follows:

1000 Blythe Blvd
Charlotte, NC 28203
(704)-355-2000

2.3 FIRE

The potential for fire exists on this project. No smoking will be allowed by project participants.

2.4 EVACUATION

Stages of Evacuation

The Site Manager is responsible for judging if circumstances exist which require evacuation. Specific evacuation procedures will be covered in the health and safety training session prior to beginning field work.

Three stages of evacuation will be used:

- Withdraw from immediate work area.
- Withdraw from building.
- Withdraw from facility property.

These three stages are discussed below:

Withdrawal from Work Area

Withdrawal to a safe location will be required if any of the following occur:

- Occurrence of a minor accident,. field operations will resume after first aid and/or decontamination procedures have been administered.

- Equipment, protective clothing, or respirator malfunctions.

Withdrawal from Building

SCS project personnel will be evacuated from the building in the following cases:

- Explosive or toxic levels of gases or volatile organics are suspected.
- A major accident or injury occurs.
- Fire and/or explosion occurs.

Withdrawal from the Facility Property

The Site Manager is responsible for judging if circumstances exist for evacuation of the facility property. Prior to evacuating the property, all field staff will meet at the rendezvous site, which will be designated by Waste Industries. Fire and police departments must be contacted.

2.5 INCIDENT REPORTING

Incident reporting procedures are listed below and should be performed in the order indicated.

1. Call the appropriate emergency number (911) (e.g., ambulance, fire, etc.). Give information in format provided under subsequent section titled "Oral Accident/Incident Report Format".

2. Call project points of contact. Give information in format provided under "Oral Accident/Incident Report Format".

3. Call SCS points of contact to report an accident or incident.

Oral Accident/Incident Report Format

Accident/Incident reports should contain the following information:

- Name, location, and title of the person(s) reporting.

- Location of accident/incident, (i.e., building number, facility name.)

- Casualties (fatalities, disabling injuries).

- Suspected/known chemical substances involved, if any.

- Details of any existing chemical hazard or contamination.

- Summary of accident/incident, giving pertinent details including type of operation at

time of accident, etc.

- Suspected/known cause of accident incident.

Information will not be released under any circumstances to parties other than those listed in ***Section 2-5***.

Distribution of Written Accident/Incident Report

The accident/incident report form will be distributed by the Site Manager to the following individuals as appropriate and in the following order of priority:

Name	Address
Stacey Demers	SCS Engineers 11260 Roger Bacon Drive Reston, Virginia 22090 703/471-6150
Bart Keller	Republic Services 3358 Highway 51 N Fort Mill, SC 843/514-5550
Trey Miller	Mecklenburg County 704/336-4314

SECTION 3

GENERAL FIELD SAFETY PROCEDURES

Safety is the responsibility of every individual involved in field efforts. Properly followed procedures are essential to assure personal safety and minimize lost time due to injuries or accidents. Anticipated hazards while working at the sites include, but are not limited to:

- Exposure to toxic or hazardous chemicals;
- Physical hazards from use of heavy equipment end-loaders, graders, transfer station compactors, etc;
- Fire or explosion caused by ignition of methane gas or other chemicals;
- Site physical hazards including debris, uneven terrain, poor footing, and water hazards; and
- Heat stress from personal protective equipment and weather.

This section presents procedures and requirements designed to reduce these hazards and minimize their impact on personnel safety and completion of the task.

3.1 SAFETY EQUIPTMENT

The level of protection required will depend on the specific activity and the location. The Site Manager will define appropriate protection. The minimum personal protective equipment that will be worn at all times by field personnel is EPA Protocol Level D (hard hat, safety glasses, stout work boots, and heavy work clothes).

SCS field personnel (including subcontractors) will be informed in the use of safety equipment and will be required to wear protective clothing appropriate for the tasks in which they will be involved.

Extra equipment will be located on-site. This equipment will include the following items:

- Dust Masks
- Gloves (surgical and heavy rubber)
- Safety Vests
- Eye Protection
- Ear Protection
- Hard Hats
- First Aid Kit

Sufficient water for personal use will be brought on-site daily.

3.2 SITE STANDARD OPERATING PROCEDURES

SCS team members will conduct themselves in a professional manner at all times. The following restrictions will also be observed by all SCS personnel and subcontractors to SCS.

- Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited;
- Smoking anywhere on site is prohibited;
- Loose clothing will not be worn on-site. Long hair will be worn up inside hard hat;
- Eating, drinking, chewing gum, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited on-site;
- No personnel will be admitted to the site without the proper safety equipment, clearance or other approval;
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the Site Manager, will be immediately dismissed from the site;
- No unapproved work clothes or equipment will be allowed on-site;
- Prescription drugs should not be taken by personnel where the potential for contact with toxic substances exist. Use must be specifically approved by a qualified physician;
- Work areas for various operational activities will be established;
- Work areas will be established based on prevailing site conditions and are subject to change. Personnel should check with the Site Manager for current and appropriate procedures regularly;
- Contact with contaminated or potentially contaminated material should be avoided. Whenever possible, do not walk through puddles, mud, or any discolored ground surface. Do not kneel on the ground. Do not lean, sit or place equipment on drums, containers, or vehicles;
- No exchange of personal protective equipment will be allowed except in emergency situations involving a threat to health or safety;
- Lunch eaten at the site will be eaten only at the designated areas located away from the immediate area of the site;

- Due caution will be observed when proceeding on-foot through open areas, Aerotek personnel will not cross the line of cones that will separate the sorting area from the area where heavy equipment will be operating; and

- Any medical emergency supersedes routine safety requirements.

A safety meeting will be conducted by the Site Manger prior to beginning field work. The meeting will cover, but is not limited to, a review of site information and a question-and-answer period. The site information review will include:

Expected hazards:

- Special conditions.
- Sampling procedures.
- Location of telephones.
- Emergency medical information.
- Level of personal protection required.

Before entering the site, the following checklist should be reviewed:

- Check location of lavatory, water supply and telephones.
- Layout and check alternative safety gear.

    - First aid kit
    - Fire extinguishers
    - Extra clothing

- Put on required safety gear.
- Check gear for rips and malfunctions.
- Identify and be familiar with the responsibilities for each of the crewmembers prior to proceeding.
- Use caution.

The following regulations will be observed during sampling:

- No eating/drinking/smoking while sampling;

- Use standard sampling techniques;

- Use maximum care in handling samples. If the sampling site is not accessible using your gear (i.e., water too high, slippery ground, steeply sloped terrain, holes, etc.), do not sample. Confer with the Crew Chief about alternate sampling site;

- Wipe off spills, dirt, and residue immediately;

- If any gear or equipment damage develops, immediately repair or replace;

- If any personal protective equipment fails, proceed immediately to a designated area; and

- If you experience any physical discomfort, abnormalities, fatigue, or lightheadedness, immediately stop work, tell the Crew Chief, and leave the area with escort.

3.3 INSPECTIONS

The Site Manager will inspect all safety equipment daily for the following:

- Proper working order.
- Nicks, cuts, tears, etc., in boots and gloves.
- Persistent stains.

Any piece of safety equipment that is not in order will be repaired or disposed of properly.

3.4 WEATHER

Decreased body ventilation caused by protective clothing and equipment can result in increased potential for heat stress. Workers should carefully observe each other for signs of heat stress, particularly on hot days. If appropriate, extra equipment will be assembled during periods of inclement weather, such as rain, wind, heat, and cold. Examples might include tents, coveralls, heaters, etc.

3.5 HOUSEKEEPING

Work areas will be kept clean and orderly at all times.

3.6 DECONTAMINATION

The risks of illness due to ingestion of diseased or decomposing materials from the work site are significant. To minimize these risks, all personnel should remove and store the outer layer of their protective clothing (i.e., coveralls, gloves, hat, etc.) on-site. Hands, face and nails should be thoroughly washed, or scrubbed, with soap and water prior to engaging in any activity likely to transmit materials encountered on-site into the mouth.

SECTION 4

PERSONNEL PROTECTION LEVEL DETERMINATION

The Site Manager is responsible for insuring the health, safety, and efficiency of the team at the work site. The level of personal protection necessary for the health and safety of the team will be determined by the Site Manager. These factors include surface air and wind characteristics, the location of the site relative to human traffic, and overt signs of hazards to life and health. Under no circumstances will the team members downgrade the level of personal protection selected. The constituents of the typical level of required personal protection are listed below:

LEVEL D PERSONAL PROTECTION

Level D is the basic work uniform of the team.

Equipment

1. Boots/shoes: Leather or chemical-resistant, steel toes.
2. Safety glasses.
3. Hard hat.
4. Dust mask. (Optional)
5. Work gloves (surgical and heavy rubber).
6. Safety vests.
7. Tyvek Suits (Sorting Crewmembers Only)

When to Use:

1. Site set-up and operations in working zones, including Waste Sorting Area.

Used By:

1. Team members working in the area, including:

    - Site Manager
    - Crew Chief
    - Sorting Crewmembers
    - Others, such as visitors, in the work zones.

Additional gear may be required, at the discretion of the Site Manager, as site conditions demand.

Appendix B
Chicago Public Schools Composting Handbook

CHICAGO PUBLIC SCHOOLS | CPS

Composting in Chicago Public Schools

A Go-Green Guide

Prepared for Chicago Public Schools by environmental impact initiative

Composting in CPS

Dear CPS Green Leader,

Welcome to the Chicago Public Schools Composting initiative. As part of our ongoing Environmental Action Plan, we encourage schools to begin composting to reduce their impact on the planet and teach students to be environmental stewards. We put together this guide to steer you through the process of starting a composting program at your school.

Composting may seem like an intimidating task, but it's actually very manageable with the right help. On a daily basis it can take as little as ten minutes. Many Chicago Public Schools have been doing it successfully for years. We've drawn on all their experience here to start you on the path to a thriving and rewarding program. The environmental benefits of composting are substantial—an average school can prevent 3,000 pounds of food waste from going to landfill each year. More importantly, we will instill an empowering message in our students—that they can make a positive difference in their community and the world—while providing them with educational opportunities that we can tie in to the classroom.

This guide will help you plan and implement your composting program step-by-step. Follow the instructions and tips inside— they'll equip you with all the information you need. Working together, we'll make composting a success.

Sincerely,

Suzanne Carlson
Director of Environmental Affairs
Chicago Public Schools

P.S. Stay in touch as we continue to develop the program. Go to www.cps.edu/gogreen for more information.

CHICAGO PUBLIC SCHOOLS | CPS

Composting in Chicago Public Schools

A Go-Green Guide

CPS Composting Checklist

Use this checklist to track your school's progress!

- ☐ Delegate responsibilities among key staff members (p.4).
- ☐ Obtain the necessary equipment and materials (p.6).
- ☐ Anticipate issues by answering the questions on p.7.
- ☐ Develop your food scrap collection and composting processes (p.9).
- ☐ Communicate the program and its benefits to staff and students (p.11).
- ☐ Start composting on Kick-off Day (p.12).
- ☐ Troubleshoot—evaluate after the first week and make improvements (p.12).
- ☐ Integrate the program with classroom instruction (p.14).

What Is Composting?

There's a great deal of science involved in the natural processes of composting. Thankfully, you don't need to be a scientist to compost—some basic tips and common sense will see you through.

Composting, most broadly, is the biological reduction of organic wastes to an earthlike substance, called humus. It is a natural part of the life cycle. Humans have known about the benefits of composting as far back as Ancient Mesopotamia, Greece and Rome and have continued the practice to this day. Because composting is a natural process that "recycles" organic waste, it is consistent with recent trends toward sustainable and organic farming and efforts to minimize the large amounts of waste going to landfills.

Whether they occur on a forest floor or in a school compost bin, the natural processes involved in composting are the same. Composting takes place when a series of organisms break down complex biodegradable material into simpler, more usable proteins and carbohydrates, which are released into soil as plant "food." The work is done by soil microorganisms, such as bacteria, fungi and protozoa, and larger "decomposers" like earthworms, mites, nematodes and other insects. As these critters do their work, biochemical processes like oxidation, reduction, and hydrolysis also occur, providing energy and nutrients.

In order to thrive, composting organisms need four things: carbon, nitrogen, oxygen, and water. Carbon provides energy and comes from brown, dry materials such as dry leaves, wood waste, or shredded cardboard. Nitrogen is a nutrient and comes from wet, "green" material such as vegetable or fruit scraps. Oxygen aids the process, while water sustains the organisms. The right ratios of these materials create beneficial conditions for decomposition. Too much or too little of any one material can create unfavorable conditions for microorganisms and hinder the process. Don't worry, however—managing the compost pile isn't difficult and we'll go into more detail later.

Composting Methods

There are many methods of composting: bins, tumblers, open windrow piles, vermicomposting (with earthworms), anaerobic (without air). CPS recommends bin composting for its ease, scale, good airflow and drainage, and compliance with City of Chicago laws. Several district schools have successfully implemented bin composting and the lessons learned are incorporated here. The key materials are the bin, some basic gardening tools, and "feedstocks"—green food scraps and dry, brown material that you will compost.

Why Compost?

Help CPS students make a difference for the environment!

Composting is a growing trend in green schools. It is an ideal, natural form of recycling that provides inspiring, hands-on learning opportunities and numerous environmental benefits.

Here's what your school can achieve by composting:

- Conserve and return valuable nutrients and minerals back to the Earth
- Help students develop and put into practice good ecology habits
- Create learning opportunities to reinforce environmental messages
- Increase your school's reputation for eco-excellence
- Reduce cafeteria landfill waste and its environmental impacts

> **"The best thing about composting is providing hands-on opportunities for student learning and seeing students take ownership of the project."**
>
> *—Patricia Bonness, Vaughn Occupational HS*

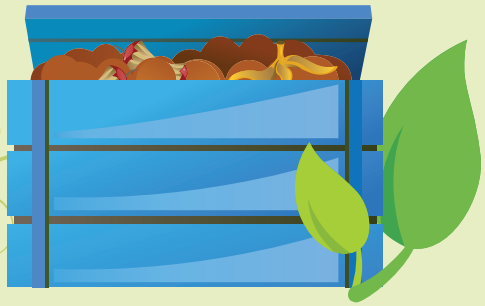
CPS composting schools have reported diverting 85 pounds or more per week of food scraps from landfill. That equates to 2,975 pounds per school year! Schools have also found that composting has led them to rethink food preparation and distribution practices to make them more earth-friendly; for example, by reducing food waste in the first place, encouraging students to take only what they'll eat, and using more sustainable materials.

Active, engaged, eco-aware students

Best of all, composting offers fun, hands-on educational opportunities. Students often take the lead in maintaining programs on a daily basis. In addition, concepts related to composting are easily integrated into science, math, and social sciences lessons. Composting can also be linked to school garden and beautification projects and various clubs. These projects can build pride and participation as students put newly-learned eco-habits into practice at school, home and in neighborhoods.

So let's get started! In the remainder of the guide, we will lead you through starting your school composting program.

How to Start Composting at Your School



Starting a composting program can seem intimidating. But many CPS schools are already doing it successfully. This guide draws on their experience. As one CPS composter said, "Go for it! Start out small, and don't worry about being perfect at first. Soon, you'll be up and running!"

Once you get set up, composting is fairly simple. On a daily basis, it only takes about 10–20 minutes. In this "how-to" section, we identify the roles and responsibilities involved and then guide you step-by-step through the process of getting set up. The first thing you will want to do is to get buy-in at your school for the program— then you can start implementing it.

Throughout the guide you'll find best-practice tips, resources and encouragement from veteran composters. Use the checklist at the beginning of the guide to track your progress. And remember, you're not only conserving land and resources, you're helping CPS students become good environmental stewards!

CPS Composting Implementation Process

1. Delegate Responsibilities

To start composting in your school, you'll need to first get buy-in, especially from your principal. After reading this guide, explain the benefits of composting and the process to key personnel, such as your school's principal, engineer, cafeteria staff and monitors, and teachers. Be sure they know that CPS supports and promotes composting initiatives.

Once you get buy-in, you'll need to recruit help. Composting is a team effort and you'll need support throughout the school. Here are some of the tasks that you may need help with:

- Consulting about any potential issues
- Educating and building support with school personnel
- Determining an effective food scrap collection process
- Acquiring the necessary equipment and siting the compost bin
- Communicating the process to students
- Successfully implementing and monitoring the process

We suggest that you seek the following types of support from key personnel:

Composting Coordinator (You!) & Assistant Coordinator

The Coordinator can be any interested staff member. Because the Coordinator may not be there every day, it is important to have a back-up supervisor for the program. (The moral support also helps). Coordinators will:

- Communicate the program to staff and students
- Oversee development and implementation of the process
- Supervise daily operations, which are usually performed by students

Principals

- Build support and maintain commitment to the initiative.
- Provide approval to purchase tools and equipment

School Engineers & Custodians

We can't emphasize enough how important it is to gain the support of your school engineer. Because engineers are responsible for waste collection and disposal and for the school grounds, they tend to have the most concerns. Fully address their concerns early on so that they feel confident that the process won't create problems. Feedback from successful CPS composting schools can help. You'll want your engineer's cooperation to:

- Obtain necessary tools and equipment
- Site the compost bin
- Set up food scrap, recycling, and trash bins and buckets

(continued next page)

Teachers and Cafeteria Staff & Supervisors

Staff support is vital to maintaining a consistent, effective program because coordinators can't monitor every lunch. Participation grows when people understand and feel personally committed to a goal. You can gain this commitment with competent, considerate planning and clear communication of the composting initiative and its benefits for students and the environment. Staff can help you:

- Get students excited about the process
- Monitor cafeteria disposal
- Supervise daily operations

Students

Successful schools have strong student involvement. In fact, many coordinators cite student involvement as the most rewarding aspect of the program. Environmental clubs or "green teams" are effective—and enthusiastic—helpers, and are often responsible for the daily process:

- Monitor student cafeteria disposal
- Collect and process food scraps
- Monitor the bin and harvest finished compost

> **"Our students really took charge and are now responsible for maintaining the program."**
>
> *—Sandy DeChant, Pulaski Elementary*

Best-Practices: School Participation

- "Get students involved! Our students love to do it!"—*Theresa Bernande, Christopher School*
- "Get a team before you start so that you are not alone. It's significant amount of start-up and supervision initially." —*Nichole Moos, Hamilton Elementary*
- "Get input from necessary personnel, including the engineer, cafeteria staff, teachers, and administrators. Their help is needed and their support makes the process much easier."—*Graham Gazdziak, Pasteur Elementary*
- Generate support and enthusiasm for the initiative by doing a waste audit to demonstrate the benefits and inspire improvement.

2. Obtain the Necessary Equipment & Materials

The main resources you will need are: 1) Equipment & Tools—most importantly, a compost bin, along with some basic gardening and custodial items, and 2) "Feedstocks"—the green food scraps and brown material to be used as your composting material. Be sure to consider age-appropriateness for any bins or tools that students will use (e.g., height or weight). Check with your school engineer and custodial staff to determine what items may already be on hand, re-purposed, or easily obtained.

Equipment & Tools

Item	Explanation & Description	Est. Cost
Compost Bins (2)	We recommend large, approximately 3' x 3' x 3' compost bins (approx. 200 gallons or 27 cubic feet) . Most schools use bins made of recycled plastic with galvanized metal screening to maintain airflow. Two bins are best, so when one is full you can compost in the other. Double bins (approx. 3' x 68" x 3') with separated compartments are also acceptable. Compost bins can be purchased from online sources, obtained from CPS (for free programs, inquire at gogreen@cps.k12.il.us), or built. For a plan to build a bin, go to: http://urbanext.illinois.edu/homecomposting/urbanbin.html.	$159–$350 per bin $450–$599 (double bin)
Chopper	Use a standard ice chopper to chop the food scraps.	$16
Spading Fork	Use a four-tine spading fork to turn the compost in the bin.	$17–25
Buckets	Collect food scraps in inexpensive, 5-gallon buckets, which are easiest to find, clean, and carry. Your custodians may have some on-hand.	$5–7
Large Bin (with cover)	Collect "brown material" (p.7) in a standard 44-gallon bin with a cover. Check with your custodians or at gogreen@cps.k12.il.us for repurposed sources.	$34–39
Soil Sifter	(Optional) You may want a soil sifter for screening out any remaining scraps from your finished compost.	$24–30

Basic Composting Bin

Standard Ice Chopper

Spading Fork

"Compost Feedstocks"

"Green" Material	Fruit and vegetable scraps collected from the cafeteria. Note that throughout this guide we call them "food scraps," not "food waste," because they are a resource—which you will be putting to use. You may also use fresh grass clippings that haven't been chemically treated, in moderation. Remember, no meat, fish, dairy, or oily products!
"Brown" Material	Dry leaves (e.g., from school grounds), shredded cardboard, untreated wood dust, straw, used brown bags, newspapers, and napkins from the cafeteria to mix with the "green" food scraps. Avoid any copy paper with toxic inks (newspapers use soy-based inks, so they are OK). If your school has a wood shop, request that it collect untreated sawdust for your composting. Plan ahead by accumulating these materials so you can keep your compost bin in balance.

3. Anticipate Issues

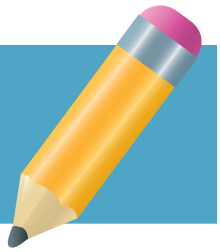
Each school will encounter different issues based on its cafeteria service, size and configuration; its enrollment and grade levels; the school grounds; the number of meal periods; and staffing. The Composting Coordinator should discuss the process with any involved staff in order to anticipate issues and develop solutions. Here are some basic questions to consider when you start:

- What is the current cafeteria disposal process? How can you best integrate the new separation process? Do you currently recycle in the cafeteria? If you aren't, you may want to start. Download the **CPS Carton Recycling Guide** at www.cps.edu/gogreen/Pages/WasteandRecycling.aspx or go to www.eiigreen.org/school_carton_recycling.htm for a general guide.
- How many "disposal stations" (recycling bin, liquid waste bucket, trash can) does your cafeteria use? For example, high schools usually have several disposal bins and may have to rethink that process. Does your school have more than one cafeteria? This will help you determine how many food scrap buckets you will need.
- What is the current cafeteria dismissal process? Is it orderly, or can it be improved? This will help you to determine the best disposal set-up.
- Who are your cafeteria monitors? Do they rotate? All cafeteria monitors must understand the process thoroughly so they can oversee and guide students.
- How can you maximize student help with the compost and student disposal processes?
- What are the best locations for siting the outdoor compost bin?
- How can you best display signage about the composting process?

The main concerns will likely involve collecting the food scraps, composting them, and maintaining orderly cafeteria dismissal. We list several questions on the next page with lessons learned at other schools.

Concerns	Lessons Learned
Will the composting cause unpleasant odors?	No. When composting is done correctly, smell is not an issue. See p.15 for clear directions for maintaining a good compost mix that avoids smell. If smells do develop, they are easily corrected in a few days with simple adjustments.
Will the composting attract vermin or other animals?	No, vermin are not a problem. By not mixing in meat and dairy products, you will avoid attracting vermin and animals. As a further precaution, use compost bins with no openings greater than ¼" to prevent access, as required by law.
How much space do I need for the compost bin?	The standard compost bins that CPS schools have been using are about 3' x 3' x 4' tall, and it is best to get two bins or more. So plan for about 5" x 11" space at least.
What food scraps should I compost?	CPS recommends that schools use bin composting. For bin composting, you can use fruit and vegetable scraps. Used napkins can also be collected. Meat, fish, and dairy cannot be composted.
My school uses compostable food trays. Can these be put in the compost bin?	In "perfect" industrial-grade composting conditions, compostable trays and utensils will decompose. However, school compost bins cannot be controlled to that degree, so we do not recommend including compostable utensils. Compostable trays may be tried as an experiment—if you can shred them first. You will know whether they can work in your bins if they are gone when you harvest your humus. If they do not decompose, you can sift them out of the humus and then either dispose of the shredded pieces or compost them again.
Can the compost bins sit without being tended to over weekends and breaks?	Yes. As long as you are composting properly with a good mix of "green" and "brown" material, and the pile has been regularly turned, breaks are no problem. The natural process will simply continue while you are away.
Will the separation of food scraps create lunchroom messes or delay cafeteria dismissal?	With clear communication to staff and students, composting schools have not experienced lunchroom messes or disruption of their cafeteria routines. Simply integrate food scrap separation into current cafeteria waste sorting and recycling processes and provide sufficient collection buckets.
Will the program create an added burden on lunchroom staff?	During the initial days of the program, students may have questions and require guidance. As the novelty of separating food scraps wears off, it will become second nature to them. The key is clear communication about what to compost.
What if students throw other waste into the recycling cans?	Other materials sometimes find their way into food scrap buckets. Again, clear communication and supervision can head this off. If foreign material winds up in the bucket, simply pull it out.

4. Develop the Collection & Composting Processes



Great work so far! You've gotten buy-in, sourced materials, and anticipated potential issues—your program is well on its way. What's next? Now it's time to develop the processes for cafeteria food scrap collection and composting with participating staff. As you do, try to give students as active a role as possible to maximize environmental lessons and reduce the burden on staff. Here are some tips for developing the processes:

> **"Our students have really bought into the process. Their curiosity and willingness to participate has been great."**
>
> ***—Graham Gazdziak, Pasteur Elementary***

The Collection Process

Cafeteria set-up

- The most effective disposal/recycling set-ups locate food scrap and recycling bins first and trash last. This puts recycling and composting at the forefront to ensure that students do not simply dump their trays in the trash. Some schools have built a disposal counter (see p.15). We recommend the following order:
  1. Sink or five-gallon bucket for dumping out liquid waste.
  2. Recycling bin(s) for milk cartons, plastic bottles, or cans.
  3. Food scrap buckets to collect fruit and vegetable scraps and used napkins. NO meat, fish, cheese, oil or dairy scraps can be composted.
  4. (Optional) A bin for collecting paper bags, which can serve as brown material.
  5. Trash bin for any landfill waste—the goal is to have as little here possible.
- For good traffic flow, space bins and buckets in an orderly line and position supervisors nearby to encourage timely movement and answer questions. If necessary, try multiple set-ups to speed dismissal.
- The cafeteria and disposal stations should feature signage and clearly marked buckets, recycling bins and trash cans. In general, the simpler, the better. Pictures or actual adhered objects work better than lists of items, especially for younger children. Make sure any signage is visible (height-appropriate) to illustrate the process.

Student disposal and dismissal process

- Students should empty their own trays. It's the most efficient process and it teaches them to be environmentally aware and self-sufficient.
- Student "green teams" and/or staff should monitor and instruct students on the disposal process. For the first week, staff up with volunteers to help instruct students as they empty their trays. After that, the new process will quickly become routine. Students are fast learners.
- Elementary schools may consider a "formal" dismissal process—by tables, rows, or some kind of order—for efficiency. High schools may need to create a disposal line.

The Composting Process

Compost bin set-up

- It is best to site bins in a convenient location outdoors on a soil surface (so nutrients will not run off and be wasted) that is close and easily accessed from the cafeteria. Be sure that you can get to the bin easily in inclement weather (e.g., that a path will be shoveled in winter). If your school has a garden or tool shed, you may also consider locating near it.
- Prepare the compost bin. Each time you initiate a new compost pile, cover the bottom with a layer of brown material. Then "inoculate" it with a thin layer of soil or compost from an existing bin.
- Separately collect brown material in a large bin with a cover (to keep it dry) to mix with the food scraps.

Composting your food scraps

Compost team members will deposit the collected food scraps from the cafeteria in the compost bin. Depending on the amount collected and the size of the bin, the team may do this at the end of each period, after all lunch periods are complete, or at the end of the day. Once you identify a good routine, establish a schedule. The whole process is fairly short—10–20 minutes:

- Chop the food scraps into roughly "salad-like" pieces using the ice chopper (be mindful not to damage the bucket bottom).
- Dump the chopped scraps into your compost bin.
- Cover the food scraps with brown material—try a roughly 50/50 mix. If you collect soiled napkins, factor them in as brown material.
- Toss the top layer, like a salad, using a spading fork to mix the food scraps and brown material.
- Assess the compost as you toss it for too much moisture or matting, or odor (see p.13 for guidance). It should have the consistency of a wrung-out sponge—some moisture, but not matted or soggy. Remember, higher temperatures in the compost pile are good—they speed the process.
- Rinse out the food scrap bucket, either outside with a spigot, or inside (e.g., in the custodian room). Once a week, give it a good cleaning.

Completing the process

- Once a compost bin is full, stop adding material and let the composting process finish on its own—it should take about 2–4 months. You can check it after six weeks or so.
- Begin using your other compost bin for new food scraps.
- The process has finished when you have rich, quality humus, or compost—crumbly, brown-black, with a mushroom or forest-foor-like smell and without food scraps. Then you can:
- Harvest your new nutrient-rich compost by collecting it into a bin. [Optional] You can use a sifter to separate out leaves or any remaining solids. They can be deposited in your other compost bin.
- Use your compost! It can be spread in your school garden (in flower or vegetable beds) or flower boxes and pots at school, or sifted for a planting medium for seedlings and young plants. In Chicago, be sure to use your compost *on site*; it can't be transported, and you'll want to reap the benefits.

5. Communicate the Process

Clear communication—especially about what can and cannot be composted—is essential to an effective program. If staff is not clear about this, they will lack confidence and be unable to instruct students properly, which will undermine your program. So make it clear and be thorough!

Composting Coordinators are primarily responsible for school-wide communication efforts, but you may also want to enlist the help of your principal to lend authority to your efforts. School Engineers can help explain program responsibilities for the custodial staff.

Staff Awareness

- After developing your composting plan, schedule a brief meeting with your principal and key personnel to review it. Engineers can pass on any information to the custodial staff.
- After getting your principal's approval, prepare and send out a memo announcing the initiative to all staff
- If possible, present the initiative and its benefits at a staff meeting. Explain to all how the program will work, what can and cannot be composted, and how to supervise student participation. Some schools have done this at a "Green Lunch" before school starts—a working lunch, perhaps with a cool video that reviews and demonstrates how the program will work. Offering a written procedure can also help.
- Keep key staff posted. Send an email reminder just before the composting kick-off day.

Student Awareness

The better you prepare students, the more effective your composting initiative will be. Students learn quickly and the process becomes second nature—if they get clear instructions from the start. They can also be a key resource for monitoring and executing daily composting tasks.

- If possible, explain the composting program room-to-room to ensure that students pay attention and understand. Alternately, present the program by grade or in a school assembly.
- Staff should physically demonstrate the new sorting process—food scraps, recycling and trash—to students in the cafeteria at lunch periods, with disposal stations in place, on the day you start composting:
  - Use an example lunch-sack or tray and empty liquids, recycle containers (and possibly brown bags), toss or scrape off food scraps, and discard any trash.
  - Convey the programs's importance to instill a sense of responsibility in students.
- Encourage students to bring or take only food that they will eat and then to finish their meals.
- Support efforts with prominently displayed signage in the cafeteria or on disposal bins.
- Principals can remind students of the effort on kick-off day with a school-wide announcement.

6. Kick-Off Day—Start Composting!

It's kick-off day, and you're ready to go! Here's what to do:

1. **Principals:** begin Kick-Off Day with a morning announcement reminding students and staff about the composting kick-off.
2. **Composting Coordinators:** check that the composting signage is properly displayed.
3. **Engineers / Composting Coordinators:** check that the disposal station, including the composting bucket or bin, is properly set up and that all bins are in the correct order.
4. **Composting Coordinators & Cafeteria Supervisors:** at the start of each meal period, briefly announce the program kick-off and demonstrate the process for students. Also, inform students about any change to the dismissal process.
5. **Cafeteria Monitors:** as the meal period winds down, initiate as orderly a dismissal as possible to help students familiarize themselves with the process. Help students correctly recycle and dispose of lunch remains and note areas of confusion or refinements to be made. It is important to be very vigilant initially about having students follow the process correctly to cement good habits and understanding.
6. **Composting Coordinators, Assistants & Students Helpers:**
   a. Monitor the composting bucket and empty it as necessary or planned.
   b. Process the food scraps (chop, deposit, and "toss"—see p.10).
   c. Rinse out the compost bucket.
7. **All Personnel:** Have a short de-briefing afterwards to determine whether adjustments should be made.

7. Troubleshooting—Assess Your Process

After you've implemented the program for one week and made adjustments, troubleshoot both the collection process and the composting process. Bring together key staff and students to evaluate and determine what, if any, improvements to make. If helpful, contact personnel at other schools to find out what's worked for them.

Collection process

- ☐ Are students exiting in a timely way? If not, you may need another disposal station, improved traffic flow, or better communication.
- ☐ Are nearly all of the compostable food scraps being collected properly? If not, why?
- ☐ Is foreign material being mixed in with the food scraps?
- ☐ Is your staff overburdened? Why? Can students do more to help? Remember, to be flexible and keep the program manageable.
- ☐ How are the younger children doing? They may need extra help at the beginning.

Composting Bin Fine-tuning

You should assess your compost regularly as you deposit new food scraps. When you do, you may run into some issues. Thankfully, Mother Nature is forgiving and most issues can be easily corrected within a few days with simple actions. Here are some common issues and their solutions:

> **"It's a process—not an art. It doesn't have to be perfect. Flexibility is key for students, teachers, and support staff."**
>
> ***—Nichole Moos, Hamilton Elementary***

Concerns	Lessons Learned
The compost is starting to smell…	Aerate the compost pile by tossing it thoroughly with the spading fork. It needs oxygen to stimulate the aerobic bacteria that decomposes food scraps without causing odors, so keep it loose and aerated.
The compost seems sloppy—too wet and matted…	Mix in more browns. Brown material will absorb moisture and prevent odor. Be sure to aerate the pile afterwards by tossing it with the spading fork. If the excess moisture is the result of rain, consider covering the bin.
Nothing seems to be happening with the compost pile—no decomposition...	This usually means the pile is too dry. One solution may be to simply add water and stir it in. But you may also be using too much carbon material. If the pile is dry, and largely brown, adjust the ratio of green material—add more food scraps and, if available, green leaves or fresh clean grass clippings. That will add moisture and heat up the compost pile, speeding the decomposition process.
I went to my bin and there were a lot of flies…	Occasionally fly swarms pass through, just as they do in backyards. Most often it's just a passing thing not caused by the composting. Remember, there should be many good bugs living in the bin helping the composting process—you will want to see some of them.

Congratulations! Your composting initiative puts you in the forefront of CPS green schools and helps students and the environment. On the next two pages we provide resources to integrate your composting program into the classroom and some ideas for expanding your efforts when you're ready.

8. Classroom Integration

Composting offers educators a rich topic for classroom study and activities. As one veteran composter shared, "Across the grade levels, students are excited about composting and regularly share their accomplishments."

You can build on this enthusiasm by linking your composting program to teaching in the classroom. Integrating the program as "globally" as possible—into classroom curricula, school programs (e.g., environmental, science or gardening clubs), and activities will ensure its longevity and maintain commitment. Although composting itself is fairly simple, it involves biological, chemical, and physical processes that can be integrated into science, social studies, math, and language arts class work.

Resources

Here are some resources for composting-related lessons and activities:

http://cwmi.css.cornell.edu/resources.htm
The **Cornell University Waste Management Institute** website provides AV materials, guides, quizzes, research projects and activity booklets for classroom integration (scroll down to the "Youth and teacher" heading). You can also go to http://compost.css.cornell.edu/schools.html for more K–12 ideas and activities.

http://www.thegreenteam.org/library.html
The **Massachusetts Department of Environmental Protection "Green Team"** resources and materials provide teachers with a variety of lessons on environmental topics including composting.

http://www.teachersdomain.org/resource/ess05.sci.ess.earthsys.lp_recycle/
Teachers' Domain offers an interactive lesson plan on Composting & Recycling that includes videos, PDF documents, activities and discussion guides for K–5 grade levels. The site also contains other related topics.

http://www.lessonplanet.com/lesson-plans/compost
LessonPlanet offers a variety compost lesson plans and activities for different grade levels, with user ratings.

http://www.calacademy.org/teachers/resources/lessons/composting-a-scientific-investigation/
California Academy of Sciences provides a composting lesson plan with activities geared to different grade levels, as well as suggestions for lesson extensions and references.

http://www.kidsgardening.com/Dig/Dig.taf
The **National Gardening Association**'s website kidsgardening.com has several articles devoted to lessons and activities involving composting. Type in "composting" in the article search for resources.

http://learningtogive.org/lessons/unit507/
"Cool Kids Compost" is an educational/service project developed in Michigan schools. It uses a cafeteria food-waste survey to teach lessons about waste, composting and recycling, which are put into action.

9. "Composting 2.0"

Once you've got your cafeteria composting program going, you may be ready to expand your efforts. Here are a few options for "turbo-charging" your program:

- **Expand the program's scope.**
  For example, if your school serves breakfast, consider composting breakfast food scraps as well. Also consider a bin in staff areas for food scraps or coffee grounds and filters.
- **Involve other departments or programs.**
  For example, school kitchens or culinary programs can contribute food scraps, while wood shops can collect untreated sawdust for use as brown material.
- **Create a student "Green Team."**
  If you don't currently have one, a Green Team can make a huge difference in educating and monitoring students. Schools have found that providing the team with hip green-team t-shirts can promote interest and make the initiative cool so that student leaders contribute and recruit others.
- **Conduct a cafeteria waste audit.**
  If you haven't done one, conduct a waste audit to measure the amount of food scraps you are diverting and to determine how you can improve the process. It's usually an eye-opener for staff and students and can build commitment. Also, you can use the results from the audit to apply for Illinois state zero-waste grants for items such as hand dryers or other relevant equipment to make your school more eco-friendly! To do so, get a basic hanging (or "fisherman's") scale to weigh the food scraps you are composting. They are readily available online and at sporting goods stores.
- **Consider small program incentives.**
  Stickers, bookmarks, or other ideas can help to encourage increased composting, by lunch period, grade level, or school-wide.
- **Build a cafeteria disposal counter.**
  Some schools have built a disposal counter with a small row of cupboards at bottom and holes cut into the top for the various materials (liquid waste, recyclables, food scraps, used brown bags, landfill waste). Students drop materials into the hole, where they fall into buckets or bins in the cupboards. This set-up enables students to rest their trays while sorting, reduces messes, and allows space for clear signage.
- **Consider a Sharing Table in your cafeteria.**
  Many schools find that food sharing tables are a great way to redistribute uneaten fruit or packaged items that otherwise might go to waste. Students place uneaten fresh fruit with rinds, such as oranges and bananas, or fruit wrapped in plastic, like apples or pears, on a table for other students to enjoy. Check with your principal or school dining staff to start a sharing table at your school.

Remember to stay posted for future related initiatives and updates to this guide—and keep up the great work!

CHICAGO PUBLIC SCHOOLS | CPS

CPS Composting Partner

Environmental Impact Initiative (EII) is a nonprofit think-and-do tank that helps governments, schools, and businesses to implement emerging green practices and technologies. By bringing practical solutions to eco-ideals, we make green make sense for people and organizations. For more information, visit www.eiigreen.org .

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Appendix C
Site Sampling Schedule

12/5/2011

Schools	CPCC	County Facilities
Nations Ford Elementary	Harper Campus	Hal Marshall Annex Building
Sterling Elementary	West Campus	Hal Marshall Building
Smithfield Elementary	Culinary Arts Building	Hal Marshall Building
Huntingtown Farms Elementary	FSC Building	Hal Marshall Annex Building
Montclaire Elementary	IT Building Central Campus	Crisis Assistance Ministry
Pinewood Elementary	Professional Development Building	Medic Station
Selwyn Elementary	Colony Court	
Park Road Elementary	Academy & Performing Arts Center	
Collinswood Elementary		
Marie G Davis Military Academy		
Barringer Elementary		
Reid Park Elementary		

12/6/2011

Schools	Schools	County Facilities
Carmel Middle	Northpoint Transportation	Crisis Assistance Ministry
South Charlotte Middle	Northpoint Transportation	Tom Ray Center
Community House Middle	Maintenance	Carlton Watkins Center
Jay M Robinson Middle	School Bus Garage	Strawn
Eastway Middle	ORR Road Transporation	Medic Center
Randolph Middle	CMS Operational Services	Meck County Bldgs & Grounds
McClintock Middle	Albermarle Road Middle	Freedom Mall City Building

12/7/2011

Schools	Schools	Schools
Olympic High	Highland Rennaisance Elementary	Mountain Island Elementary
Ardrey Kell High	Walter G Byers Elementary	Paw Creek Elementary
David W Butler High	Statesville Road Elementary	River Oaks Academy Elementary
Rocky River High	Ranson Middle	Druid Hills Elementary
Independence High	Winding Springs Elementary	Morehead Elementary
Oakdale Elementary	Nathaniel Alexander Elementary	

12/8/2011

Schools	Schools	CPCC
Quail Hollow Middle	Kennedy Middle	FSC Building
Alexander Graham Middle	Southwest Middle	Colony Court
Spaugh Middle	Sedgefield Middle	IT Building Central Campus
Northwest Middle	Ballantyne Elementary	Centeral Parking Deck #3
Coulwood Middle	Elon Park Elementary	Culinary Arts Building
Whitewater Middle	Hawkridge Elementary	Professional Development Building
		Academy & Performing Arts Building

12/9/2011

Schools	CPCC	CPCC
Ardrey Kell Highi	IT Building Central Campus	Culinary Arts Building
David W Butler High	Academy & Performing Arts Building	Professional Development Building
Indpendence High	FSC Building	
Rocky River High	Colony Court	
East Meck High	Central Parking Deck #3	