STATE OF OHIO
WASTE CHARACTERIZATION STUDY

Prepared for

Ohio Department of Natural Resources
Division of Recycling and Litter Prevention
1889 Fountain Square Court, Building F-2
Columbus, Ohio 43224

Prepared by

Engineering Solutions & Design, Inc.
51 Corporate Woods
9393 W. 110th Street, Suite 500
Overland Park, Kansas 66210
800/298-1851

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OHIO DEPARTMENT OF NATURAL RESOURCES
Division of Recycling and Litter Prevention

Ronald L. Kolbash, Chief

Donna Stusek, Deputy Chief

Jan Voelker

Patricia Raynak

Larry Cooper

Christine Kasselmann

ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT

Janice Switzer

Evan Jahn

ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT

Joe Kasler

Mark Ruof

BROWN COUNTY SOLID WASTE AUTHORITY

Dan Wickerham

John Benton

DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT

Tim Houck

HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT

Jeff Aluotto

Larry Riddle

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Howard Weinerman

Lynda Shipp

LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT

Jim Walters

Alan Ruffell

MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT

Dan Graeter

Don Freels

OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT

Tim Wasserman

David Vossmer

RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY

Robert Taylor

Monty Napier

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Michael Long

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Joe Huston

Scott Gordon

EXECUTIVE SUMMARY

In early 2003, the Ohio Department of Natural Resources (ODNR) retained Engineering Solutions & Design, Inc. (ES&D) to perform a series of waste characterizations — also referred to as waste picks or waste sorts — at 11 selected solid waste management districts located throughout Ohio. The waste characterization study process included field sorting events at facilities located within each of the selected solid waste management districts. One field sorting event was undertaken in May or June 2003 (Spring Sort) and the other field sorting event was undertaken in September or October 2003 (Fall Sort).

One of the main objectives of the study was to determine the characteristics of the Ohio-generated municipal solid waste stream at various locations throughout the state. Sites were selected based on location, size, and willingness to partner with ODNR and to allow access to the solid waste facility or facilities serving the solid waste district.

Participating Facilities

ODNR identified 11 solid waste management districts (SWMD) within the state where a waste pick would be conducted. Then facilities within the selected SWMD's were identified and included privately- and publicly-owned and operated landfill and transfer station facilities. These facilities included:

- Geneva Landfill near Ashtabula, Ohio
  Ashtabula County Solid Waste Management District
- Athens Reclamation Center near Nelsonville, Ohio
  Athens-Hocking Joint Solid Waste Management District
- Brown County Landfill in Georgetown, Ohio
  Brown County Solid Waste Authority
- Defiance County Landfill in Defiance, Ohio
  Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District
- Rumpke Landfill in Cincinnati, Ohio
  Hamilton County Solid Waste Management District
- Cherokee Run Landfill near Bellefontaine, Ohio
  Logan County Solid Waste Management District
- Hoffman Road Landfill in Toledo, Ohio
  Lucas County Solid Waste Management District
- South Transfer Facility in Dayton, Ohio;
  North Transfer Facility in Dayton, Ohio
  Montgomery County Solid Waste Management District

- Ottawa County Landfill near Port Clinton, Ohio
  Ottawa-Sandusky-Seneca Joint Solid Waste Management District

- Richland County Transfer Station in Mansfield, Ohio
  Richland County Regional Solid Waste Management Authority

- Jackson Pike Transfer Station in Columbus, Ohio;
  Morse Road Transfer Station in Columbus, Ohio;
  Franklin County Landfill near Grove City, Ohio
  Solid Waste Authority of Central Ohio

Pre-Sort Assessments

In April and May 2003, ES&D conducted site visits at the 11 districts. ES&D's project manager contacted the landfill or transfer station manager at each facility and explained the waste pick procedure and the waste pick team's needs. Then, key members of the project team visited each facility to conduct further discussions with each manager and assess the facility. Operating procedures at each facility were reviewed and service areas were discussed. The project team conducted an inspection at each facility in order to ascertain the best and least intrusive area for the team to conduct the waste sort.

After the site assessments were completed, a site-specific plan was developed for each facility. This plan addressed all aspects of the sort process including the number of personnel, sorting area arrangement, logistics of the sort team, specific needs at each site, and initial concept of load selection and sample gathering. Safety procedures were reviewed and any special requests were noted.

Waste Sort Protocol

At each facility the waste sort team was comprised of the project manager, an individual to collect and record data, and a minimum of six additional individuals to assist in the sorting process. All waste pick team members were outfitted with Tyvek protective suits, Kevlar lined gloves, safety goggles, hard hats, and safety vests.

The sort process began by selecting a load for sampling. Only collection vehicles transporting residential and/or commercial solid waste that was generated in Ohio were selected for sampling. The collection vehicles were selected randomly. No transfer trailers or collection vehicles transporting industrial waste were sampled.

The selection process began with an interview of the collection vehicle driver. Based on the information gathered during the driver interviews, a determination was made as to whether the load would be sampled.

Once a load was selected for sampling, the vehicle was unloaded. If the waste sort area was near the working face or tipping floor, the load was discharged as close to the sort area as feasible (typically along the edge of the working face or tipping floor). In those instances when the sort area was set up away from the landfill working face, the load was discharged in an area segregated from the working face. After the selected load was discharged from the collection vehicle, a detailed visual inspection was conducted and a decision was made determining what portion of the load would be sampled.

The visual inspection entailed observing the load being discharged from the collection vehicle and walking around the entire perimeter of the load once it was discharged from the collection vehicle (a walk around). The walk around was first conducted in a clockwise direction. Once the entire perimeter was traversed, a second walk around was conducted in a counter-clockwise direction.

The portion of the load to be sampled was randomly selected keeping in mind that a broad spectrum of data was desired. When collecting the sample, the goal was to gather between 200 and 300 pounds of the load. The goal of sampling between 200 and 300 pounds of a selected load was established to ensure accuracy, to allow for continuity between each sort location, and to allow for ease in controlling the sort activities. A key element of this sort effort was to determine an accurate waste stream characterization utilizing a limited number of samples and sites. Given these factors, it was important to sort a consistent sample size for each selected load. This results in greater confidence in the data.

The sample was selected by the same person who conducted the visual inspection. Using information and observations garnered from the visual inspection, locations within the load were selected and the sample materials were collected from these locations. Given the broad spectrum of solid waste found within bags and the large portion of each load that was comprised of solid waste in bags, the major portion of each sample was bags of solid waste.

After a load was selected and the portion to be sampled was determined, the physical waste sort commenced. Waste was gathered from the designated load portion and placed into sampling bins. The sample bins were brought to the sort area and weighed. After the sample bins were weighed, they were taken to one of two sort stations. Each sort station was comprised of two tables with a series of various sized bins. Each bin was labeled with a specific category. Solid waste was removed from the sample bins and placed on the tables where it was sorted into the waste-material categories by placing the material in the bin that best corresponded to the material. As each bin became full, it was weighed on a digital bench scale and its weight recorded. This process was then repeated for each sample.

For some categories, each bin was filled and weighed several times. For other categories, each bin was either fully- or partially-filled and weighed at the end of the waste pick process for that specific sample. When the waste pick for each selected sample was complete, the gross weight (bin + waste), bin weight, and net weight (gross weight - bin weight) for each waste-material category was totaled.

The volume of material was determined based on the type of bin utilized in the sort process. There were a total of four different sized bins. The size of bin was directly related to the anticipated amount of material for each category. Bin selection was also based on the potential dimensions of the material.

In order to determine a volume for each category, it was determined that a correlation could be made between the weight of each sample and its volume. Utilizing the 200+ samples captured during the Spring Waste Sort, each of the categories was segregated based on the number of times a bin was weighed for each sample. For example, if the PET #1 plastic bin was weighed four times, it was assumed the bin was filled at least three times. The final bin weight may not have been of a completely full bin as the final bin weigh out occurs when the entire sample has been sorted.

In order to obtain a weight-to-volume relationship, two samples from each day of sorting were selected. For each sample selected, weights of the assumed full bins for each category were noted. A total of 50 samples were selected. Once all of the full bins' weights were accumulated for each category, the weights were evaluated to identify any anomalies or outliers. Using this evaluation, the data was adjusted and the weights were averaged to obtain a weight-to-volume relationship for each category.

During the Fall Waste Sort, a full bin from each category was weighed and compared to the average obtained in the analysis described above. This process was performed at five of the waste sort locations. The difference between the calculated weights and the measured weights was less than 3%. Using these results, a conversion equation was developed and utilized to convert the category weights to volumes.

Ashtabula County Solid Waste Management District

The waste sorts in the Ashtabula County Solid Waste Management District were undertaken at the Geneva Landfill, which is located in the northwest portion of Ashtabula County. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort). Because of limited space near the working face at the Geneva Landfill, the sort stations were set up in an area away from the working face. Loads were selected and the samples were collected at the working face and then hauled to the sorting area.

A total of 28 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The most prominent single category – by weight – is food; the two most prominent single categories – by volume – are paperboard and HDPE #2. In addition to food, the other predominant single categories – by weight – are newsprint, mixed paper, HDPE #2, and corrugated paper; and by volume the predominant single categories are corrugated paper and office paper.

The outcome of the waste sort may have been impacted by the balanced selection of loads for sampling. There were an almost equal number of residential and commercial loads sampled. This may explain the newsprint and mixed paper numbers. In turn, the high corrugated paper and office paper numbers could reflect the commercial loads. The predominance of food could be the result of the mixed economic base of the area.

A total of 39 large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, small appliances, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items include C & D debris, computer equipment, and car parts.

Athens-Hocking Joint Solid Waste Management District

The waste sorts in the Athens-Hocking Joint Solid Waste Management District were undertaken at the Athens Reclamation Center, which is centrally located in the district along U.S. Route 33 at the Athens-Hocking County Line. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in May 2003 (Spring Sort) and October 2003 (Fall Sort). During both the Spring Sort and the Fall Sort, the sorting process was performed within 100 feet of the landfill's working face.

A total of 27 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics, yard waste, and food. The most prominent single categories – by weight – are corrugated paper and food; yard waste, LDPE #4, and mixed paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Corrugated paper and paperboard were the most dominant single categories – by volume – with LDPE #4 and food placing second and yard waste and HDPE #2 placing third.

With the predominance of residential loads sampled at this site and the rural environment of the area, the amount of mixed paper and paperboard is expected. The limited number of loads sampled during the Spring Sort may have influenced the results given the rare appearance of LDPE #4 as one of the top material categories.

A total of 30 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were plastic barrels/bins, loose wood, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were plastic barrels/bins, C & D debris, and metal containers.

Brown County Solid Waste Authority

The waste sorts in the Brown County Solid Waste Authority district were undertaken at the Brown County Landfill, which is located in the south-central portion of Brown County in Georgetown, Ohio. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort).

A total of 34 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; newsprint, mixed paper, and paperboard are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Paperboard and HDPE #2 were the most dominant single categories – by volume – with office paper and food placing third.

This area is a mixture of urban and rural waste streams. A majority of the loads sampled were a mix of residential and commercial waste. The area also appears to be an extension of the Cincinnati suburbs. This may explain the high amounts of paperboard, food, and newsprint.

A total of 36 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, plastic barrels/bins, and furniture.

Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District

The waste sorts in the Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District were undertaken at the Defiance County Landfill, which is located just south of Defiance, Ohio. The landfill is a publicly-owned and publicly-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and October 2003 (Fall Sort).

A total of 33 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; corrugated paper, newsprint, mixed paper, and paperboard are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Corrugated paper and paperboard were the most dominant single categories – by volume – with HDPE # 2 placing second and yard waste and office paper placing third.

Loads sampled at this facility included only one pure commercial load with residential or a mix of commercial and residential waste being the most dominant. This is likely the reason why corrugated paper was dominant in the spring and paperboard was dominant in the fall. It is also likely why the mixed paper and newsprint categories were high.

A total of 39 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the most frequently observed large items were C & D debris, furniture, car parts, and plastic barrels/bins.

Hamilton County Solid Waste Management District

The waste sorts in the Hamilton County Solid Waste Management District were undertaken at the Rumpke Landfill, which is located in the northernmost portion of Hamilton County, near the Hamilton-Butler County Line, within Cincinnati, Ohio. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in May 2003 (Spring Sort) and October 2003 (Fall Sort).

A total of 69 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single categories – by weight – are food and corrugated paper; yard waste, office paper, and mixed paper are also prominent single categories – by weight.

The other dominant major components – by volume – were plastics and yard waste. Corrugated paper, paperboard, HDPE #2, office paper, and yard waste were the most dominant single categories – by volume.

Well over 5,000 tons of solid waste is delivered to the Rumpke Landfill daily. Residential, commercial, industrial, and construction and demolition debris loads are delivered to the site. Of the 69 loads sampled during the waste sort at this facility, 28 of the loads contained only residential waste and 10 of the loads contained only commercial waste. The remaining 31 sampled loads were a mix of commercial, residential, and/or apartment waste. The best example of the variance in waste can be seen in the difference between the spring and fall numbers. The percentage of residential loads was larger in the fall. This likely impacted the amounts of corrugated paper and office paper.

A total of 41 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, C & D debris, and carpet. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items included C & D debris, furniture, and plastic barrels/bins.

Logan County Solid Waste Management District

The waste sorts in the Logan County Solid Waste Management District were undertaken at the Cherokee Run Landfill, which is located just north of Bellefontaine, Ohio, along U.S. Route 68, in the central portion of Logan County. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort).

A total of 19 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are food and plastics. The most prominent single category – by weight – is food; yard waste, mixed paper, and office paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Paperboard was the most dominant single category – by volume – with office paper, HDPE #2, and yard waste as the other dominant single categories.

The samples gathered at this facility were limited to only waste that was collected in Logan County . This resulted in a smaller sample pool while it also provided relative consistency between the Spring Sort and the Fall Sort. This consistency, with a bias toward residential waste, could explain the higher amounts of mixed paper.

A total of 30 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the most frequently identified large items were loose wood, carpet, small appliances, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, furniture, and plastic barrels/bins.

Lucas County Solid Waste Management District

The waste sorts in the Lucas County Solid Waste Management District were undertaken at the Hoffman Road Landfill located in the northern portion of Lucas County, within Toledo, Ohio. The landfill is a publicly-owned and publicly-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort).

A total of 31 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics, yard waste, and food. The most prominent single category – by weight – is yard waste; food and newsprint are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Yard waste and paperboard were the most dominant single categories – by volume – with HDPE #2 placing third.

Waste delivered to the Hoffman Road Landfill is predominantly residential. Of the 31 loads sampled during the waste sort at this facility, 27 of the loads contained only residential waste. This is likely the reason for the high amounts of yard waste and plastics and why the paper fibers component was less than 40% of the total district-wide weight and volume.

A total of 33 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, carpet, and mattresses. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items included furniture, C & D debris, and plastic barrels/bins.

Montgomery County Solid Waste Management District

For the Montgomery County Solid Waste Management District four days of waste sorts were undertaken at the South Transfer Facility which is located just east of the I-75 in the southern suburbs of Dayton, Ohio. Another two days of waste sorts were conducted at the North Transfer Facility which is located east of I-75 in the northern suburbs of Dayton, Ohio. At the South Transfer Facility, the sorting process was conducted inside the transfer facility building and adjacent to the tipping floor. At the North Transfer Facility, the sorting process was also conducted inside the transfer facility building. However, because the tipping floor at this facility is very restricted, the sorting process was conducted away from the tipping floor. Both transfer facilities are publicly-owned and publicly-operated.

A total of 64 loads of solid waste were selected for sampling at these facilities. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The most prominent single category – by weight – is food; the most prominent single category – by volume – is paperboard. In addition to food, the other predominant single categories – by weight – are yard waste, mixed paper, and paperboard; and by volume, the other predominant single categories are yard waste and HDPE #2.

The outcome of the waste sort may have been impacted by the large number of residential loads sampled. With a greater number of residential loads sampled, the high amounts of food, yard waste, and mixed paper are not surprising. In turn, the lower corrugated paper and office paper numbers could reflect the limited number of commercial loads sampled. The predominance of food could also be the result of the mix of residential loads and commercial loads with apartments and restaurants.

A total of 39 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, carpet, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items include C & D debris, plastic barrels/bins, and furniture.

Ottawa-Sandusky-Seneca Joint Solid Waste Management District

The waste sorts in the Ottawa-Sandusky-Seneca Joint Solid Waste Management District were undertaken at the Ottawa County Landfill, which is located west of Port Clinton, Ohio, and approximately 2.5 miles south of Lake Erie. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort). During the Spring Sort, the waste sort area was located within 100 feet of the landfill's working face. During the Fall Sort, the waste sort area was located a further distance from the working face. The sorting and categorization processes were conducted within a three-tent complex during the Spring Sort and the Fall Sort.

A total of 26 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are food and plastics. The most prominent single category – by weight – is food; yard waste, newsprint, and mixed paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Paperboard was the most dominant single category – by volume – with HDPE #2 placing second and yard waste placing third.

The large amount of food, paperboard, and mixed paper is a reflection of the transient nature of the area. With a large restaurant and tourist base, food waste and other wastes typically associated with food were anticipated to be, and proved to be, high at this site.

A total of 35 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, plastic barrels/bins, and furniture.

Richland County Regional Solid Waste Management Authority

The waste sorts in the Richland County Regional Solid Waste Management Authority were undertaken at the Richland County Transfer Station, which is located within Mansfield, Ohio, in the central portion of Richland County. The transfer station is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in May 2003 (Spring Sort) and October 2003 (Fall Sort).

A total of 36 loads of solid waste were selected for sampling at this facility. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; yard waste, corrugated paper, mixed paper, and office paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Corrugated paper and paperboard were the most dominant single categories – by volume – with yard waste and office paper placing second and LDPE #4 and HDPE #2 placing third.

The majority of loads sampled during the Spring Sort were residential. In addition, only 14 loads were sampled during the Spring Sort compared to the 22 loads that were sampled during the Fall Sort. When the Spring Sort and the Fall Sort are compared, an increase in the commercial/apartment loads that were sampled becomes evident. This variance in loads sampled and the number of samples may explain the variance in the paperboard and mixed paper components.

A total of 33 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and plastic barrels/bins. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were plastic barrels/bins, C & D debris, and furniture.

Solid Waste Authority of Central Ohio

The waste sorts in the Solid Waste Authority of Central Ohio district were conducted at the Jackson Pike Transfer Station which is located in the southern portion of Columbus, Ohio; the Morse Road Transfer Station which is located in the northeastern portion of Columbus, Ohio; and the Franklin County Landfill which is located in the southern portion of the district near Grove City, Ohio. All three of these facilities are publicly-owned and publicly-operated. Field sorting events were undertaken at in this district in May 2003 (Spring Sort) and September/October 2003 (Fall Sort).

A total of 93 loads of solid waste were selected for sampling at these facilities. The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; yard waste, newsprint, mixed paper, and office paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Office paper and HDPE #2 were the most dominant single categories – by volume – with paperboard placing third.

The three facilities within the SWACO district where samples were gathered for this study had the largest number of pure residential and pure commercial loads. When the Spring Sort and the Fall Sort are compared, an increase in the commercial/apartment loads that were sampled becomes evident. This variance, coupled with the fact that the Fall Sort was undertaken at the beginning of the month, may explain the variance in the yard waste and mixed paper components.

A total of 37 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, furniture and plastic barrels/bins.

Statewide Waste Stream Profile

A total of 460 loads of solid waste were selected for sampling during the 2003 Waste Sort. When analyzing the results of the waste characterization study, differences among the 11 districts become apparent. These differences resulted in separating the districts into three distinct groups.

The small districts consist of the: (1) Ashtabula County Solid Waste Management District; (2) Athens-Hocking Joint Solid Waste Management District; (3) Logan County Solid Waste Management District; and (4) Ottawa-Sandusky-Seneca Joint Solid Waste Management District.

The medium-sized districts include the: (1) Brown County Solid Waste Authority; (2) Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District; (3) Lucas County Solid Waste Management District; and (4) Richland County Regional Solid Waste Management Authority.

The remaining districts comprise the large districts and they are the: (1) Hamilton County Solid Waste Management District; (2) Montgomery County Solid Waste Management District; and (3) Solid Waste Authority of Central Ohio.

There are a number of reasons this delineation and grouping of districts is important. First, it allows a better correlation among the districts. It also allows an easier focus on districts based on size, types of waste, and waste generators. Further, potential approaches to waste reduction can be more easily applied to comparably-sized districts throughout the state. This size delineation also affords a better focus on issues that are particular to each size of district. This delineation can also assist in identifying the specifics relating to each of these distinct district sizes, which can result in a more effective approach to solid waste management.

The three major components of the Ohio waste stream are paper fibers, plastics, and metals. These three components comprise more than 60% of the total waste stream. The paper fibers component is divided into six categories. The largest category in this component is mixed paper, with newsprint and office paper second and third. The two categories most associated with cardboard – paperboard and corrugated paper – comprise 14% and 17% of this component, respectively. Combined, these two categories comprise 31% of the paper fiber component.

The plastics component is divided into seven categories. The dominant category in this component is HDPE #2, with LDPE #4 second and other plastics and PET #1 tied for third. The amount of HDPE #2 is reflective of the multiple uses of this product. The LDPE #4 portion of this component is likely due to an increase in its use in bags and packaging.

The metals component of the waste stream is relatively small; it comprises less than 4% of the total waste stream. Tin food cans and aluminum beverage cans comprise almost 80% of this component. The total amount of aluminum in this component is more than 50% of its total.

Results Analysis

The data collected from the waste sorts conducted at the 11 selected solid waste districts located throughout Ohio was analyzed to identify a variety of waste stream aspects and attributes. These analyses were selected to address specific issues identified by the Ohio Department of Natural Resources, Department of Recycling and Litter Prevention. There were six analyses that were conducted as a part of this study.

Detailed Sample Analysis: As a part of the sample collection process, additional independent samples were taken from selected loads. These independent samples were captured in order to determine the impact of moisture on the solid waste. A total of 25 independent samples were gathered. These samples were dried and categorized to determine moisture content and to identify materials most susceptible to moisture contamination.

The most prominent category of materials found in the independent samples was paper. Some plastics, food and diapers were also noted. The major contaminants of the samples were food and water. The other contaminant was diapers.

The most significant aspect of the analysis was the variance in the weight of each sample. The weight loss varies from 13.70% to 60.56%. The average weight loss is 36.45% and the mean is 37.08%. Of the five samples with the lowest percentage of weight loss, the predominant materials included plastics, magazines, books, and paperboard. Only one of these samples had a predominance of mixed paper. In turn, four of the five samples with the highest percentage of moisture, more than 50%, contained mixed paper.

Commercial Loads Analysis: This analysis identified 58 pure commercial loads that were sampled during the combined two-season waste sort. These 58 loads were analyzed based on the characteristics of the waste and how these characteristics compared to the total sample database. The analysis identified a significant amount of paper and plastics in the pure commercial load samples and a marked decrease in yard waste and textiles.

Pure commercial loads have a high paper and plastic content combined with lower yard waste and textiles content. The lower amounts of yard waste and food result in drier loads which can be more difficult to compact. Further, paper and plastics (particularly corrugated paper, LDPE #4, and PET #1) can be difficult to compact both in the collection vehicle and at the disposal site. A reduction in these materials or a modification in how these products are prepared for collection would likely improve the collection and disposal of the commercial loads by increasing the compactability of the waste.

Visual Inspection Analysis: In addition to collecting samples from loads at each of the 14 facilities located within the 11 solid waste management districts, each of the sampled loads was also visually inspected. This inspection involved walking around the load in two directions noting any large items that could be observed in the load. A total of 47 different large items were noted. The largest single item noted was loose wood. Carpeting was the second most frequently noted item and C & D debris was third. More than half of the large items noted were identified in less than 10% of the loads. Items such as oil filters, lead-acid batteries, and dead animals were seldom found in the loads.

Ohio Statewide Profile Compared to National Profile: One of the important aspects of this waste characterization study was how the data developed throughout this study compared to the most recent U.S. Environmental Protection Agency (USEPA) waste characterization data. Based on the information generated as a part of this study, the most significant differences between the Ohio data and the USEPA data occurred in the paper, metals, food, and glass categories. The only categories where the difference was less than 1% occurred in the yard waste and diapers categories.

In order to more accurately assess and compare the data gathered during the waste sorts conducted in Ohio, the 11 selected solid waste management districts were segregated into small, medium, and large sized districts and then compared to the USEPA data. When the Ohio data is segregated into the various sized districts, the differences are also significant. The difference between the USEPA percentages and each of the three different sized districts is even more distinct than the statewide percentages. The greatest differences across all categories occur in the small districts classification. In every category, except diapers, the difference between the percentages for the small districts and the USEPA percentages is greater than 1%, and for the majority of the categories it is well over 2%. The medium districts and large districts each have fewer categories with differences over 2%; however, those differences that are greater than 2% are significantly greater. The glass, food, and paper categories are all over 2% and, except for the paper category in the medium sized districts, most of these differences are well over 3%.

These differences indicate a significant disconnect between USEPA percentages and the percentages generated in this study for Ohio. The differences reflect both the unique characteristics of Ohio as well as the potential inflexibility in the USEPA's approach to determining the character or composition of the municipal waste stream.

Statistical Analysis: This analysis addresses the determination of the 90% confidence level of the data. The analysis focused on the total database and indicates that the database meets the 90% confidence level criteria. In order to simplify and focus the analysis, it performed utilizing the three major components of the waste stream. These components — paper fibers, plastics, and metals — comprise approximately 60% of the total weight of the samples. The weight of each of these three components for each of the 460 samples was graphed to identify its dispersion.

Based on this analysis, it was determined that there was prevalence for more outliers above than below the limits. Within the 90% confidence limits, the data appears to be relatively evenly distributed with no bias toward any certain portion of the area.

The data was then refined to address this skew. Although the adjusted databases somewhat address the outliers and provide a more symmetrical graph for both the paper fibers and plastics components, given the limited modifications to the averages and the standard deviations, it is not enough of an improvement to warrant any adjustments to the database.

Although further refinement and verification of the 90% confidence level could be obtained with a smaller database, the issues regarding types of waste and other constraints would make the selection of any smaller database from the given database suspect. If further statistical analysis is considered, it is recommended that this analysis be focused on each type of waste (residential and commercial) and the samples that best reflect each type of waste.

Application: This analysis involves determining whether the data developed for this waste characterization study could be applied to the other counties and solid waste management districts in Ohio. A number of comparison options were considered and it was determined that the optimal approach would be to utilize specific demographics as the basis of comparison. Ten demographic categories were identified for use in the comparison process. For ease of use, a workbook will be developed which will allow any county or solid waste management district in the state to perform this comparison. The workbook will provide guidance in how to perform the comparison as well as information on each of the 11 participating solid waste management districts such that when the comparison is complete, information on the waste characterization of the comparable district is available.

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This appendix includes a weight data sheet and a volume data sheet for each of the 460 samples. The samples collected during the Spring Sort are presented and organized alphabetically by district and presented first. The samples collected during the Fall Sort are then presented in the same manner.

APPENDIX B VISUAL INSPECTION DATA

This appendix includes a visual inspection summary for each of the 460 samples. Again, the samples collected during the Spring Sort are presented and organized alphabetically by district and presented first. The samples collected during the Fall Sort are then presented in the same manner. The items noted during the visual inspection include the following:

- CPU's
- Keyboards
- Monitors
- Drives
- Printers
- Carpet
- Scrap Tires
- Wood Pallets
- Loose Wood
- Large Appliances
- Small Appliances
- Lead-Acid Batteries
- TV's
- Stereos
- Speakers
- Telephones
- VCR's
- DVD's
- Dead Animals
- C & D Debris
- Gypsum Wallboard
- Baby Cribs
- Wood Furniture
- Plastic Barrels/Bins
- Lawn Mowers
- Bicycles
- Fiberglass
- Car Parts/Body
- Car Parts/Engine
- Car Parts/Seats
- Car Parts/Other
- Metal Tanks
- Plastic Toys
- Life Preservers
- Garden Hose
- Office Furniture
- Styrofoam
- Child Car Seats
- BBQ Grills
- Oil Filters
- Mattresses
- Sofas
- Bed Frames
- Stuffed Toys
- Patio Furniture
- Suitcases
- Strollers

APPENDIX C ADDITIONAL SAMPLE DETAILS

This appendix includes a summary of additional details for each of the 460 samples collected during the Spring Sort and the Fall Sort. The information is presented and organized alphabetically by district. The additional sample detail information includes the following:

- Type of truck (front loader, rear packer, side loader, etc.)
- Net weight of load (in pounds)
- Collection method (dumpsters, cans, bags, toters, etc.)
- Type of waste (residential, commercial, apartments, etc.)
- Where the waste was collected (county and community, if available)
- Area in county or community where waste was collected (center, north, east, etc.)
- Urban or rural designation
- More specific comments related to where the waste was collected

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1. INTRODUCTION

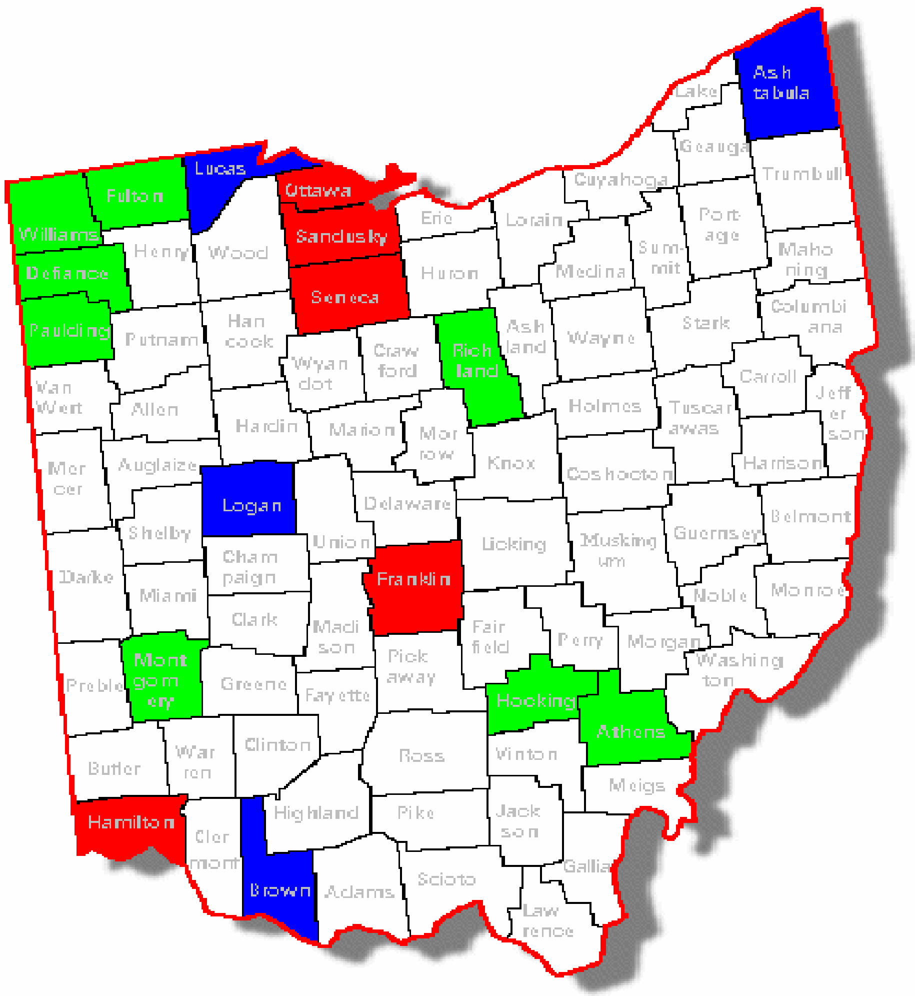
In early 2003, the Ohio Department of Natural Resources (ODNR) retained Engineering Solutions & Design, Inc. (ES&D) to perform a series of waste characterizations — also referred to as waste picks or waste sorts — at 11 selected solid waste management districts located throughout Ohio. The waste characterization study process included field sorting events at facilities located within each of the selected solid waste management districts. One field sorting event was undertaken in May or June 2003 (Spring Sort) and the other field sorting event was undertaken in September or October 2003 (Fall Sort).

One of the main objectives of the study was to determine the characteristics of the Ohio-generated municipal solid waste stream at various locations throughout the state. Sites were selected based on location, size, and willingness to partner with ODNR and allow access to the solid waste facility or facilities serving the solid waste district. The 11 participating solid waste management districts include the following (see Map 1.1):

- Ashtabula County Solid Waste Management District
- Athens-Hocking Joint Solid Waste Management District
- Brown County Solid Waste Authority
- Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District
- Hamilton County Solid Waste Management District
- Logan County Solid Waste Management District
- Lucas County Solid Waste Management District
- Montgomery County Solid Waste Management District
- Ottawa-Sandusky-Seneca Joint Solid Waste Management District
- Richland County Regional Solid Waste Management Authority
- Solid Waste Authority of Central Ohio (Franklin County)

This report presents the results of the sampling conducted as part of both the Spring Sort and the Fall Sort.

MAP 1.1
THE ELEVEN PARTICIPATING SOLID WASTE MANAGEMENT DISTRICTS



Source: <http://www.geocities.com/Athens/Sparta/4692/StateOutlineMaps>

2. DEFINITIONS

Throughout this report a variety of terms specific to the waste characterization process are used. Definitions for some of these terms are listed in Table 2.1.

TABLE 2.1
DEFINITIONS

Term	***Definition***
Waste Pick or Sort	The sorting of a sample of waste to determine its characteristics. This effort can be to define the characteristics of the entire sample or to identify specific items in the waste stream.
Load	The contents of a solid waste collection vehicle.
Sample	The portion of the load that is selected for sorting. Sample size can vary from 200 to 300 pounds depending on sampling containers and the material sampled.
Waste-Material Category	A defined category for a portion of the waste stream.
Visual Inspection	An inspection conducted by walking around the load once it is removed from the collection vehicle. This inspection is utilized to identify large items in a load as well as to ascertain a broad concept of the characteristics of the load.
Residential Waste	Waste generated by households.
Commercial Waste	Waste generated by restaurants, grocery stores, dry goods stores, apartment buildings, small businesses, office buildings, schools, medical centers, and similar facilities.
Mixed Waste	A combination of commercial and residential waste.
Front Loader	A solid waste collection vehicle that collects waste utilizing two forks to lift various size containers. Solid waste is loaded into the top of the truck and compacted within the box. This type of truck is typically utilized for the collection of commercial solid waste.
Rear Packer	A solid waste collection vehicle that collects waste by placing it in an opening at the rear of the truck. The waste can be placed manually or via automated means. The solid waste is mechanically pushed into the box of the truck and compacted. This type of truck is typically utilized to collect residential solid waste.
Side Loader	A solid waste collection vehicle that collects waste by placing it in an opening at the side of the truck. The waste can be placed manually or via automated means. The solid waste is mechanically pushed into the box of the truck and compacted. This type of truck is typically utilized to collect residential solid waste.

TABLE 2.1
DEFINITIONS (continued)

Term	***Definition***
Bags	Non-rigid plastic containers that are filled with solid waste and placed at the curb or in alleys for collection. The opening of the container is usually secured by a metal or plastic tie.
Cans	Rigid metal or plastic containers that are filled with solid waste and placed at the curb or in alleys for collection. The opening in these containers is typically at the top and is secured with a lid.
Carts or Toters	Rigid plastic containers that are filled with solid waste and placed at the curb or in alleys for collection. These containers have wheels and are designed to be utilized by collection vehicles that have automated mechanisms for lifting the container for unloading into the collection vehicle. The opening in these containers is typically at the top and is secured with a lid that is attached to the container.
Dumpsters	Rigid metal or plastic containers that are filled with solid waste. These containers are typically rectangular in shape and are utilized to service large generators of solid waste such as commercial solid waste generators. These containers are collected by front loaders that utilize forks to lift the dumpster onto the top of the truck where the container is tipped and the contents unloaded in the vehicle. The opening in these containers is typically at the top or side and is secured with a lid that is attached to the container.
Manual Collection	The process of collecting solid waste utilizing human power. The solid waste is typically placed in bags or cans and placed at the curb or in alleys. The collection person(s) places the bags into the collection vehicle or unloads the can into the collection vehicle and then returns the can to the curb or in alleys. A rear packer is typically used for this type of collection.
Semi-Automated Collection	The process of collecting solid waste utilizing human and mechanical power. The solid waste is typically placed in bags or cans and placed at the curb or in alleys. The collection person(s) places the bags or contents of the cans into a collection container that has wheels. The collection container is then wheeled to the collection vehicle where it is connected to a lifting mechanism that lifts the container into the truck and unloads the container. A rear packer is typically used for this type of collection.
Automated Collection	The process of collecting solid waste utilizing mechanical power. The solid waste is typically placed in carts or toters and placed at the curb or in alleys. The collection vehicle lifts the cart or toter into the truck and unloads the container. A side loader is typically used for this type of collection.
Curbside or Street Collection	The process of placing bags, cans, carts, and/or toters filled with solid waste at the curbside or edge of street for collection.
Alley Collection	The process of placing bags, cans, carts, and/or toters filled with solid waste in the alley for collection. Typically alley collection utilizes dumpsters that are shared by a number of residential solid waste generators.

3. PARTICIPATING FACILITIES

ODNR identified 11 solid waste management districts (SWMD) within the state where a waste pick would be conducted. Then facilities within the selected SWMD's were identified and included privately- and publicly-operated landfill and transfer station facilities.

The Spring Sort was undertaken in May and June 2003. The Fall Sort was conducted during September and October 2003. The facilities located within each selected solid waste management district are listed below:

- Geneva Landfill near Ashtabula, Ohio
  Ashtabula County Solid Waste Management District

- Athens Reclamation Center near Nelsonville, Ohio
  Athens-Hocking Joint Solid Waste Management District

- Brown County Landfill in Georgetown, Ohio
  Brown County Solid Waste Authority

- Defiance County Landfill in Defiance, Ohio
  Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District

- Rumpke Landfill in Cincinnati, Ohio
  Hamilton County Solid Waste Management District

- Cherokee Run Landfill near Bellefontaine, Ohio
  Logan County Solid Waste Management District

- Hoffman Road Landfill in Toledo, Ohio
  Lucas County Solid Waste Management District

- South Transfer Facility in Dayton, Ohio;
  North Transfer Facility in Dayton, Ohio
  Montgomery County Solid Waste Management District

- Ottawa County Landfill near Port Clinton, Ohio
  Ottawa-Sandusky-Seneca Joint Solid Waste Management District

- Richland County Transfer Station in Mansfield, Ohio
  Richland County Regional Solid Waste Management Authority

- Jackson Pike Transfer Station in Columbus, Ohio;
  Morse Road Transfer Station in Columbus, Ohio;
  Franklin County Landfill near Grove City, Ohio
  Solid Waste Authority of Central Ohio

4. PRE-SORT SITE ASSESSMENTS

In April 2003, ES&D conducted site visits at 10 of the 11 districts. The last district was visited in May 2003. ES&D's project manager contacted the landfill or transfer station manager at each facility and explained the waste pick procedure and the waste pick team's needs. Then, key members of the project team visited each facility to conduct further discussions with each manager and assess the facility. Operating procedures at each facility were reviewed and service areas were discussed. The project team conducted an inspection at each facility in order to ascertain the best and least intrusive area for the team to conduct the waste sort. Detailed discussions were undertaken between the project team and each facility manager to identify the flow of waste into each site, day-to-day variations in solid waste delivered to each site, and any specific peculiarities in the solid waste delivered to each site.

After the site assessments were completed, a site-specific plan was developed for each facility. This plan addressed all aspects of the sort process including the number of personnel, sorting area arrangement, logistics of the sort team, specific needs at each site, and initial concept of load selection and sample gathering. Safety procedures were reviewed and any special requests were noted.

5. WASTE SORT PROTOCOL

At each facility the waste sort team was comprised of the project manager, an individual to collect and record data, and a minimum of six additional individuals to assist in the sorting process. All waste pick team members were outfitted with Tyvek protective suits, Kevlar lined gloves, safety goggles, hard hats, and safety vests.

Load Selection Process

The sort process began by selecting a load for sampling. Only collection vehicles transporting residential and/or commercial solid waste that was generated in Ohio were selected for sampling. The collection vehicles were selected randomly. No transfer trailers or collection vehicles transporting industrial waste were sampled.

The selection process began with an interview of the collection vehicle driver. The following data was gathered from the driver:

- Vehicle Owner
- Type of Truck (front loader, rear packer, side loader, etc.)
- Type of Waste (residential, commercial, mixed). Solid waste generated and collected from apartment complexes was considered commercial waste.
- Service Area
- Net Weight of Load
- Any observations or anomalies within the load.

Based on the information gathered during the driver interviews, a determination was made as to whether the load would be sampled. This decision was based on the location where the solid waste was collected, the type of waste, the method of collection, and any unique aspects of the load. In some instances, if a load was not selected for sampling, it was selected for a visual inspection.

A detailed visual inspection was conducted on every load selected for sampling. Additionally, where the opportunity presented itself, some of the loads not selected for sampling were visually inspected. The visual inspection entailed observing the load being discharged from the collection vehicle and walking around the entire perimeter of the load once it was discharged from the collection vehicle (a walk around). The walk around was first conducted in a clockwise direction. Once the entire perimeter was traversed, a second walk around was conducted in a counter-clockwise direction. This method allowed for a complete observation of the load while also taking into account variations in lighting, the likely skewed position of the load, and viewing the load from a variety of angles.

During both the unloading and walk around inspections, various characteristics of the load were noted and any anomalies were also noted. Special emphasis was placed on such materials as corrugated paper, wood (including pallets), metals, and plastics. Large or unique items such as carpeting, appliances (both large and small), tires, computers and electronics, lead-acid batteries, car parts, and furniture were also noted. Where possible, the predominant materials that comprised the load were determined. If there were some questions remaining about the complete characteristics of the load, an operator was requested to further breakup the load utilizing a compactor or dozer. If the driver discharged the load in sections, this action was not necessary.

Sort Process

Once a load was selected for sampling and the above specifics were obtained, the vehicle was unloaded. If the waste sort area was near the working face or tipping floor, the load was discharged as close to the sort area as feasible (typically along the edge of the working face or tipping floor). In those instances when the sort area was set up away from the landfill working face, the load was discharged in an area segregated from the working face. After the selected load was discharged from the collection vehicle, the detailed visual inspection was conducted and a decision was made determining what portion of the load would be sampled. The portion to be sampled was randomly selected keeping in mind that a broad spectrum of data was desired.

When collecting the sample, the goal was to gather between 200 and 300 pounds of the load. The goal of sampling between 200 and 300 pounds of a selected load was established to ensure accuracy, to allow for continuity between each sort location, and to allow for ease in controlling the sort activities. A key element of this sort effort was to determine an accurate waste stream characterization utilizing a limited number of samples and sites. Given these factors, it was important to sort a consistent sample size for each selected load. This results in greater confidence in the data.

Another important reason the 200 to 300 pound sample size was chosen was as a method of controlling the sort process and the sort team. Because this work was to occur at a variety of sites, it was important to have consistency in the sort staff as well as the methodology. To this end, it was easier to control the quality of the sort when a consistent amount of the load was sampled. In a sort where a smaller amount of the load is selected, it is important to maintain consistency in the sample size as well as the sampling procedure as too many discrepancies and anomalies can occur that are the direct result of the sampling and not the load. By following a rigorous inspection and sampling procedure, any influence from the sorters is diminished and the quality and confidence of the sort is maintained.

The sample was selected by the same person who conducted the visual inspection. Using information and observations garnered from the visual inspection, locations within the load were selected and the sample materials were collected from these locations. Given the broad spectrum of solid waste found within bags and the large portion of each load that was comprised of solid waste in bags, the major portion of each sample was bags of solid waste. Bags were typically not inspected unless the bag appeared to be excessively heavy or contained one large item. Since large items were included in the visual inspection, including them in the sample would skew the sampling results. If a bag was excessively heavy or one large item was discovered within the bag, the bag would be discarded and another bag from the same location was selected. This procedure ensured that the sample was not skewed.

Categorization Process

After a load was selected and the portion to be sampled was determined, the physical waste sort commenced. Waste was gathered from the designated load portion and placed into sampling bins. The sample bins were brought to the sort area and weighed. After the sample bins were weighed, they were taken to one of two sort stations. Each sort station was comprised of two tables with a series of various sized bins. Each bin was labeled with a specific category. Solid waste was removed from the sample bins and placed on the tables where it was sorted into the waste-material categories by placing the material in the bin that best corresponded to the material. As each bin became full, it was weighed on a digital bench scale and its weight recorded. This process was then repeated for each sample. As noted, each bin was labeled with its appropriate waste-material category. A listing and a brief description of each waste material category is presented in Table 5.1.

TABLE 5.1
WASTE MATERIAL COMPONENTS AND CATEGORIES

PAPER FIBERS	
Corrugated Paper	Cartons and boxes, waxed and unwaxed cardboard
Office Paper	High-grade paper, printing and writing papers including ground-wood and thermochemical pulps
Mixed Paper	Paper not included above or that is not easily recycled, including carbon paper, tissue, napkins, paper towels, and foil-lined paper
Newsprint	Printed ground-wood newsprint and other minimally bleached ground-wood
Magazines	Glossy papers in catalogs, magazines, and mailings
Paperboard	Liner board, cereal boxes, stays, and forms
PLASTICS	
PET #1	Soft drink, water, beer, mouthwash bottles, and similar containers with PET or #1 inscribed on the container
HDPE #2	Milk, water, juice container, trash and retail bags, and similar containers with HDPE or #2 inscribed on the container
PVC #3	Clear food packaging, shampoo bottles, wire and cable insulation, and similar materials with PVC or #3 inscribed on the container
LDPE #4	Bread bags, frozen food bags, squeezable bottles, and similar materials with LDPE or #4 inscribed on the container
PP #5	Ketchup bottles, yogurt containers, margarine tubs, and similar materials with #5 inscribed on the container
PS #6	Compact disc jackets, egg cartons, meat trays, and similar materials with #6 inscribed on the container
Other Plastics	All other plastics, including three and five gallon reusable water bottles, some citrus juice and ketchup bottles, and container wraps
METALS	
Aluminum Beverage Cans	Nonferrous metals like aluminum cans
Aluminum Foil/Food Trays	Nonferrous metals including frozen food containers and take-out containers
Other Aluminum	Nonferrous metals including house siding, cookware, and other similar items
Tin Food Cans	Empty ferrous metals including tin cans that contained food to which a magnet will adhere
Other Tin Cans	Empty ferrous metal cans including steel cans, etc. that did not contain food to which a magnet will adhere

TABLE 5.1
WASTE MATERIAL COMPONENTS AND CATEGORIES (continued)

OTHER CATEGORIES	
Yard Waste	Leaves, grass clippings, garden waste, brush
Textiles	Clothing, shoes, cushions, curtains, and carpet
Diapers	Plastic disposable diapers
Food	Vegetative matter, animal byproducts
Glass	Bottles and jars
Empty Aerosol Cans	Pam, hair spray, whip cream, and shaving cream cans are examples
Medical Waste	Sharps, bags for intravenous feeding or blood, used gloves, and similar materials
Fines and Superfines	Very small items mixed with dirt, such that it is impractical to separate
MISCELLANEOUS	
Motor Oil	Oil used in automobiles, trucks, and other equipment
Oil Filters	Filters that treat oil in automobiles, trucks, and other machinery
Air Filters	Filters that treat air in automobiles, trucks, and other equipment
Wax	Paraffin and other materials utilized in making candles and figurines
Wood	Dimension lumber used in construction, plywood, stumps, wooden furniture, large prunings
Other Non-Ferrous Metals	Nonferrous metals to which a magnet does not adhere
Other Ferrous Metals	Ferrous metals to which a magnet adheres
Mixed Metals	A combination of both ferrous and non-ferrous materials
Fluorescent Lighting	Lights that utilize a ballast and are designed to function without a filament
Telephone Books	Books with telephone numbers and similar information
Hard Cover Books	Novels, school books, etc. with a cover that will break when bent
Aseptic Containers	Swabs, liquid containers, etc. material that hold aseptic materials
Cell Phones	Includes phone and battery, if attached
Batteries	Cell phone batteries and dry cell batteries
Computer Parts	Includes boards, wiring, cable links, and similar materials
Paints	Both oil and water based paints -- does not include spray paint cans
Rubber	Hoses, tires, gaskets, stoppers, and similar products

After the team sorted, categorized, and weighed the designated sample, the waste was discarded. Depending on the facility and site constraints, the waste was discarded into a roll-off container placed near the sort area, the bucket of a front-end loader parked near the sort area, the tipping floor, or landfill working face.

Weight and Volume Determination

To facilitate weighing each sampling bin, a portable electronic scale Ohaus ES Bench Scale, Model #ES100L was utilized. The scale's weighing capacity is accurate to 0.1 pound up to a capacity of 220.0 pounds. No one sampling bin's weight totaled more than 140.0 pounds.

At the sorting stations, as each categorized bin became full it was carried to a separate scale and weighed. This scale, a Champ SQ with an Ohaus Model CD-11 indicator, had a weighing capacity of 50.0 pounds and is accurate to 0.01 pounds. The gross weight of the bin and waste was recorded and the bin was transported to a separate area and emptied. For some categories, each bin was filled and weighed several times. For other categories, each bin was either fully- or partially-filled and weighed at the end of the waste pick process for that specific sample. When the waste pick for each selected sample was complete, the gross weight (bin + waste), bin weight, and net weight (gross weight - bin weight) for each waste-material category was totaled.

The volume of material was determined based on the type of bin utilized in the sort process. There were a total of four different sized bins. The size of bin was directly related to the anticipated amount of material for each category. Bin selection was also based on the potential dimensions of the material. For example, corrugated paper varies greatly in size and shape while aluminum cans are very similar in size and shape. Another variance that was considered was the ability of the material to consolidate. For example, newspapers and magazines can be easily consolidated because of their initial shape. In turn, some plastics have very odd shapes or are so light that they do not easily consolidate. Based on all of these considerations, a specific bin size was assigned to each category.

In order to determine a volume for each category, it was determined that a correlation could be made between the weight of each sample and its volume. Utilizing the 200+ samples captured during the Spring Waste Sort, each of the categories was segregated based on the number of times a bin was weighed for each sample. For example, if the PET #1 plastic bin was weighed four times, it was assumed the bin was filled at least three times. The final bin weight may not have been of a completely full bin as the final bin weigh out occurs when the entire sample has been sorted.

In order to obtain a weight-to-volume relationship, two samples from each day of sorting were selected. For each sample selected, weights of the assumed full bins for each category were noted. A total of 50 samples were selected. Once all of the full bins' weights were accumulated for each category, the weights were evaluated to identify any anomalies or outliers. Using this evaluation, the data was adjusted and the weights were averaged to obtain a weight-to-volume relationship for each category.

During the Fall Waste Sort, a full bin from each category was weighed and compared to the average obtained in the analysis described above. This process was performed at five of the waste sort locations. The difference between the calculated weights and the measured weights was less than 3%. Using these results, a conversion equation was developed and utilized to convert the category weights to volumes.

6. ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT

The Ashtabula County Solid Waste Management District is located in the northeast part of Ohio. Lake Erie borders the district on the north; the Ohio-Pennsylvania state line borders the district to the east. Trumbull County borders the district to the south; Lake County and Geauga County border the district to the west (see Map 6.1). The district encompasses Ashtabula County with a population of 102,728 as recorded in 2000, and a land area of 702.7 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).

Source: <http://www.odod.state.oh.us/research>

MAP 6.1
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT

The waste sorts in this district were undertaken at the Geneva Landfill, which is located in the northwest portion of Ashtabula County. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort). Because of limited space near the working face at the Geneva Landfill, the sort stations were set up in an area away from the working face. Loads were selected and the samples were collected at the working face and then hauled to the sorting area.

Spring Sort Conditions

Rainy and breezy conditions were encountered during the Spring Sort at the Geneva Landfill. Light to moderate rain fell throughout the day on Thursday, June 12, 2003, resulting in muddy conditions. The facility operators provided rock for the sort area which reduced the danger of falls. With this adjustment, the sorting process was able to proceed.

A very heavy thunderstorm moved through the area Thursday night dumping more than 3 inches of rain. When the sort team arrived at the site on Friday, June 13, 2002, the working face was flooded and the waste sort was delayed until operators were able to make adjustments and locate a safe area near the working face to interview drivers, select loads, and gather samples. The clouds and rain dissipated by late Friday afternoon.

The rain and resulting muddy conditions did slow the sorting process on both Thursday and Friday. However, with the operators' assistance and adjustments, the waste sort was able to safely proceed.

The waste sort was performed in a three-tent complex away from the working face along the access road. After the samples were sorted and categorized, the discards were placed in a roll-off container that was situated next to the tent complex. At the end of the two-day sort, the roll-off container was transported to the working face and emptied.

Fall Sort Conditions

Clear, calm and comfortable conditions were encountered during the Fall Sort at the Geneva Landfill. On both Tuesday, September 9, 2003, and Wednesday, September 10, 2003, skies were clear with high temperatures in the upper 70's (F). Winds were very calm on Tuesday and there was a slight south breeze on Wednesday.

The waste sort was again performed in a three-tent complex away from the working face. During this field sorting event, the tent complex was set up just to the east of the citizen drop-off area near the landfill scale house. After the samples were sorted and categorized, the discards were placed in one of the two roll-off containers utilized in the citizen drop-off area.

Observations

During both the Spring Sort and the Fall Sort at the Geneva Landfill, the project team observed the following:

1. The working face was very tight due to site constrictions. This resulted in the quick movement of trucks and landfill equipment and did affect the load sampling process;

2. Landfill operators were very concerned about safety and the need to move vehicles in and out as quickly as possible;

3. It rained throughout both days of the Spring Sort. This impacted the sampling and sorting process and also increased the weight of the samples;

4. During the Fall Sort, the weather was clear, warm and dry, which resulted in more favorable conditions for both collecting samples and performing the waste sort;

5. There is a significant inflow of construction and demolition debris and industrial waste at this facility;

5. The majority of commercial loads are delivered to the facility via front loaders. The majority of residential waste is delivered to the facility utilizing rear packers;

6. The City of Ashtabula collects residential and some commercial waste. Waste from the other communities in the area and the county is collected by private companies;

7. It appears that any material left at the curb will be collected by public or private residential collection vehicles;

8. During the Fall Sort, the sorting process was conducted near the citizen drop-off area. The majority of materials dropped off were bulk items such as furniture, appliances, and construction and demolition debris;

9. The waste sort conducted in September was much easier as the site operators and truck drivers were accustomed to our activities and disruptions.

Waste Sort Results and Analysis

A total of 28 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 6.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 6.1
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Thursday	June 12, 2003	0612D1.01 through 0612D1.07
Friday	June 13, 2003	0613D2.01 through 0613D2.05
	FALL SORT	
Tuesday	September 9, 2003	0909D3.01 through 0909D3.08
Wednesday	September 10, 2003	0910D4.01 through 0910D4.08

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 6.2 and Table 6.3) and the Fall Sort (see Table 6.4 and Table 6.5). Additionally, weight and volume summary data for both waste sorts conducted at the Geneva Landfill in the Ashtabula County Solid Waste Management District are presented in Table 6.6 and Table 6.7. Chart 6.1 and Chart 6.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

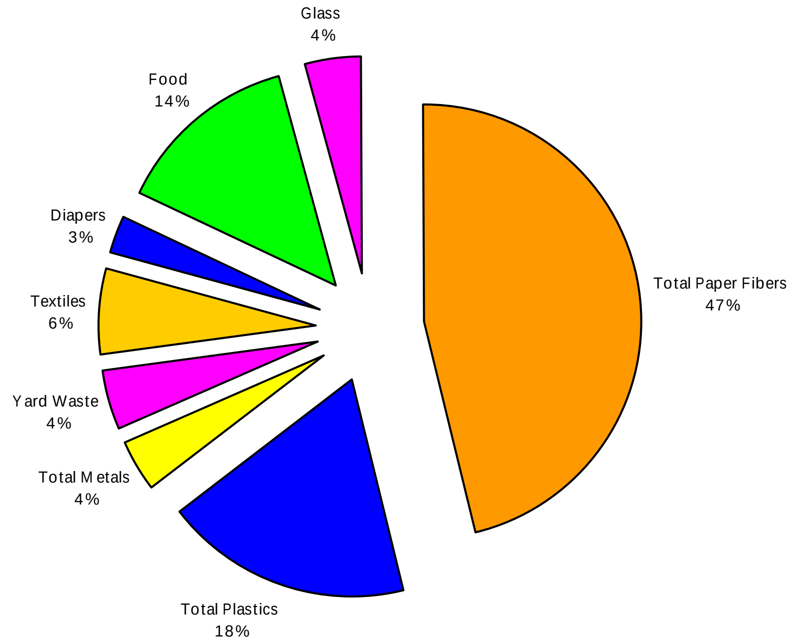


CHART 6.1
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT WEIGHT DISTRIBUTION

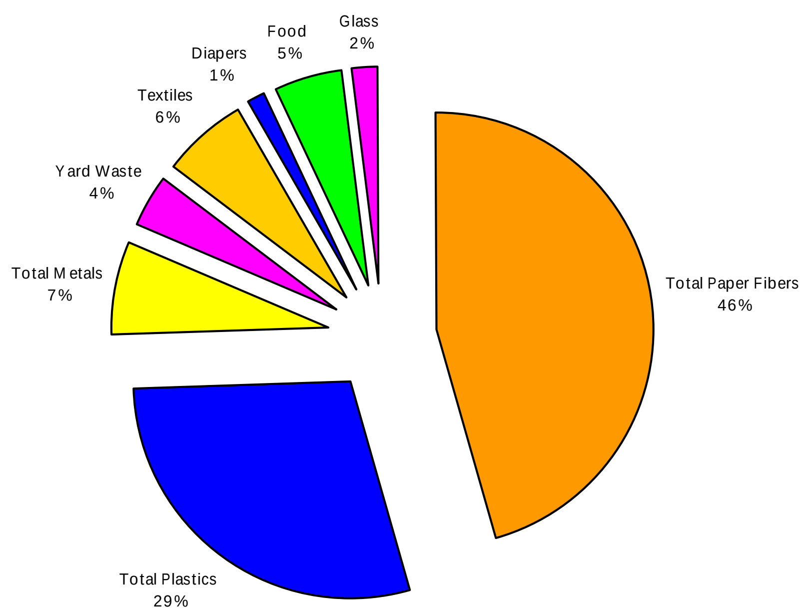


CHART 6.2
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 6.2
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	166.71	12.75%	5.73%
Office Paper	242.09	18.51%	8.32%
Mixed Paper	256.54	19.62%	8.82%
Newsprint	321.40	24.58%	11.05%
Magazines	115.30	8.82%	3.96%
Paperboard	205.74	15.73%	7.07%
TOTAL PAPER FIBERS	1,307.78		44.97%
LDPE #4	56.61	9.73%	1.95%
PET #1	72.24	12.42%	2.48%
HDPE #2	257.13	44.20%	8.84%
PVC #3	14.39	2.47%	0.49%
PP #5	17.38	2.99%	0.60%
PS #6	43.09	7.41%	1.48%
Other Plastics	120.94	20.79%	4.16%
TOTAL PLASTICS	581.78		20.01%
Aluminum Beverage Cans	37.02	32.42%	1.27%
Aluminum Foil/Food Trays	15.35	13.44%	0.53%
Other Aluminum	8.13	7.12%	0.28%
Tin Food Cans	44.10	38.62%	1.52%
Other Tin Cans	9.59	8.40%	0.33%
TOTAL METALS	114.19		3.93%
Yard Waste	156.72		5.39%
Textiles	197.97		6.81%
Diapers	36.65		1.26%
Food	298.18		10.25%
Glass	129.96		4.47%
Empty Aerosol Cans	3.99		0.14%
Medical Waste	10.33		0.36%
Fines and Superfines	3.60		0.12%
Batteries	1.12		0.04%
Mixed Metals	21.24		0.73%
Hard Cover Books	38.00		1.31%
Telephone Books	1.95		0.07%
Wood	4.71		0.16%
NET WEIGHT OF SORTED SAMPLE	2,908.17		100.00%

TABLE 6.3
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	40.85	13.99%	6.28%
Office Paper	59.32	20.31%	9.11%
Mixed Paper	26.68	9.14%	4.10%
Newsprint	34.30	11.75%	5.27%
Magazines	20.85	7.14%	3.20%
Paperboard	110.01	37.67%	16.90%
TOTAL PAPER FIBERS	292.01		44.86%
LDPE #4	15.66	7.90%	2.41%
PET #1	21.25	10.72%	3.26%
HDPE #2	89.92	45.38%	13.81%
PVC #3	7.20	3.63%	1.11%
PP #5	7.90	3.99%	1.21%
PS #6	19.59	9.88%	3.01%
Other Plastics	36.65	18.49%	5.63%
TOTAL PLASTICS	198.16		30.44%
Aluminum Beverage Cans	13.22	31.24%	2.03%
Aluminum Foil/Food Trays	7.31	17.27%	1.12%
Other Aluminum	5.08	12.00%	0.78%
Tin Food Cans	11.92	28.16%	1.83%
Other Tin Cans	4.80	11.33%	0.74%
TOTAL METALS	42.33		6.50%
Yard Waste	30.04		4.62%
Textiles	42.34		6.50%
Diapers	4.12		0.63%
Food	23.30		3.58%
Glass	14.13		2.17%
Empty Aerosol Cans	2.22		0.34%
Medical Waste	2.30		0.35%
Fines and Superfines			
Batteries			
Mixed Metals			
Hard Cover Books			
Telephone Books			
Wood			
NET VOLUME OF SORTED SAMPLE	650.93		100.00%

TABLE 6.4
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	411.30	25.06%	11.32%
Office Paper	155.43	9.47%	4.28%
Mixed Paper	388.41	23.67%	10.69%
Newsprint	298.43	18.19%	8.21%
Magazines	213.12	12.99%	5.87%
Paperboard	174.36	10.62%	4.80%
TOTAL PAPER FIBERS	1,641.05		45.17%
LDPE #4	44.05	7.52%	1.21%
PET #1	75.40	12.87%	2.08%
HDPE #2	309.98	52.92%	8.53%
PVC #3	12.10	2.07%	0.33%
PP #5	10.81	1.85%	0.30%
PS #6	53.53	9.14%	1.47%
Other Plastics	79.89	13.64%	2.20%
TOTAL PLASTICS	585.76		16.12%
Aluminum Beverage Cans	41.78	29.74%	1.15%
Aluminum Foil/Food Trays	8.71	6.20%	0.24%
Other Aluminum	7.91	5.63%	0.22%
Tin Food Cans	52.61	37.45%	1.45%
Other Tin Cans	29.48	20.98%	0.81%
TOTAL METALS	140.49		3.87%
Yard Waste	125.49		3.45%
Textiles	213.93		5.89%
Diapers	135.61		3.73%
Food	601.16		16.55%
Glass	129.85		3.57%
Empty Aerosol Cans	5.08		0.14%
Medical Waste	2.16		0.06%
Fines and Superfines	5.87		0.16%
Batteries	2.44		0.07%
Mixed Metals	22.65		0.62%
Tape	0.61		0.02%
Telephone Books	6.75		0.19%
Other Ferrous Metals	3.01		0.08%
Paints	6.44		0.18%
Wood	3.57		0.10%
Rubber	1.47		0.04%
NET WEIGHT OF SORTED SAMPLE	3,633.39		100.00%

TABLE 6.5
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	100.78	29.39%	13.48%
Office Paper	38.09	11.11%	5.09%
Mixed Paper	40.39	11.78%	5.40%
Newsprint	31.85	9.29%	4.26%
Magazines	38.54	11.24%	5.16%
Paperboard	93.23	27.19%	12.47%
TOTAL PAPER FIBERS	342.88		45.87%
LDPE #4	12.18	6.02%	1.63%
PET #1	22.18	10.96%	2.97%
HDPE #2	108.41	53.59%	14.50%
PVC #3	6.05	2.99%	0.81%
PP #5	4.91	2.43%	0.66%
PS #6	24.33	12.03%	3.25%
Other Plastics	24.21	11.97%	3.24%
TOTAL PLASTICS	202.27		27.06%
Aluminum Beverage Cans	14.92	28.17%	2.00%
Aluminum Foil/Food Trays	4.15	7.83%	0.55%
Other Aluminum	4.94	9.33%	0.66%
Tin Food Cans	14.22	26.84%	1.90%
Other Tin Cans	14.74	27.83%	1.97%
TOTAL METALS	52.97		7.09%
Yard Waste	24.06		3.22%
Textiles	45.75		6.12%
Diapers	15.24		2.04%
Food	46.97		6.28%
Glass	14.11		1.89%
Empty Aerosol Cans	2.82		0.38%
Medical Waste	0.48		0.06%
Fines and Superfines			
Batteries			
Mixed Metals			
Tape			
Telephone Books			
Other Ferrous Metals			
Paints			
Wood			
Rubber			
NET VOLUME OF SORTED SAMPLE	747.55		100.00%

TABLE 6.6
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	578.01	19.60%	8.84%
Office Paper	397.52	13.48%	6.08%
Mixed Paper	644.95	21.87%	9.86%
Newsprint	619.83	21.02%	9.48%
Magazines	328.42	11.14%	5.02%
Paperboard	380.10	12.89%	5.81%
TOTAL PAPER FIBERS	2,948.83		45.08%
LDPE #4	100.66	8.62%	1.54%
PET #1	147.64	12.65%	2.26%
HDPE #2	567.11	48.57%	8.67%
PVC #3	26.49	2.27%	0.40%
PP #5	28.19	2.41%	0.43%
PS #6	96.62	8.28%	1.48%
Other Plastics	200.83	17.20%	3.07%
TOTAL PLASTICS	1,167.54		17.85%
Aluminum Beverage Cans	78.80	30.94%	1.20%
Aluminum Foil/Food Trays	24.06	9.45%	0.37%
Other Aluminum	16.04	6.30%	0.25%
Tin Food Cans	96.71	37.97%	1.48%
Other Tin Cans	39.07	15.34%	0.60%
TOTAL METALS	254.68		3.89%
Yard Waste	282.21		4.31%
Textiles	411.90		6.30%
Diapers	172.26		2.63%
Food	899.34		13.75%
Glass	259.81		3.97%
Empty Aerosol Cans	9.07		0.14%
Medical Waste	12.49		0.19%
Fines and Superfines	9.47		0.14%
Batteries	3.56		0.05%
Mixed Metals	43.89		0.67%
Tape	0.61		0.01%
Telephone Books	8.70		0.13%
Other Ferrous Metals	3.01		0.05%
Paints	6.44		0.10%
Wood	8.28		0.13%
Rubber	1.47		0.02%
Hard Cover Books	38.00		0.58%
NET WEIGHT OF SORTED SAMPLE	6,541.56		100.00%

TABLE 6.7
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	141.63	22.31%	10.13%
Office Paper	97.41	15.34%	6.97%
Mixed Paper	67.07	10.56%	4.80%
Newsprint	66.15	10.42%	4.73%
Magazines	59.39	9.35%	4.25%
Paperboard	203.23	32.01%	14.53%
TOTAL PAPER FIBERS	634.88		45.40%
LDPE #4	27.84	6.95%	1.99%
PET #1	43.42	10.84%	3.11%
HDPE #2	198.33	49.53%	14.18%
PVC #3	13.25	3.31%	0.95%
PP #5	12.81	3.20%	0.92%
PS #6	43.92	10.97%	3.14%
Other Plastics	60.86	15.20%	4.35%
TOTAL PLASTICS	400.43		28.63%
Aluminum Beverage Cans	28.14	29.53%	2.01%
Aluminum Foil/Food Trays	11.46	12.02%	0.82%
Other Aluminum	10.03	10.52%	0.72%
Tin Food Cans	26.14	27.43%	1.87%
Other Tin Cans	19.54	20.50%	1.40%
TOTAL METALS	95.30		6.81%
Yard Waste	54.10		3.87%
Textiles	88.09		6.30%
Diapers	19.36		1.38%
Food	70.26		5.02%
Glass	28.24		2.02%
Empty Aerosol Cans	5.04		0.36%
Medical Waste	2.78		0.20%
Fines and Superfines			
Batteries			
Mixed Metals			
Tape			
Telephone Books			
Other Ferrous Metals			
Paints			
Wood			
Rubber			
Hard Cover Books			
NET VOLUME OF SORTED SAMPLE	1,398.48		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Geneva Landfill. Table 6.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 6.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The most prominent single category – by weight – is food; the two most prominent single categories – by volume – are paperboard and HDPE #2. In addition to food, the other predominant single categories – by weight – are newsprint, mixed paper, HDPE #2, and corrugated paper; and by volume the predominant single categories are corrugated paper and office paper.

The outcome of the waste sort may have been impacted by the balanced selection of loads for sampling. An almost equal number of residential and commercial loads sampled. This may explain the newsprint and mixed paper numbers. In turn, the high corrugated paper and office paper numbers could reflect the commercial loads. The predominance of food could be the result of the mixed economic base of the area.

TABLE 6.8
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY WEIGHT

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 44.97%	Paper – 45.17%	Paper – 45.08%
2	Plastics – 20.01%	Food – 16.55%	Plastic – 17.85%
3	Food – 10.25%	Plastic – 16.12%	Food – 13.75%
TOP MATERIAL CATEGORIES			
1	Newsprint – 11.05%	Food – 16.55%	Food – 13.75%
2	Food – 10.25%	Corrugated Paper – 11.32%	Mixed Paper – 9.86%
3	HDPE #2 – 8.84%	Mixed Paper – 10.69%	Newsprint – 9.48%
BOTTOM MATERIAL CATEGORIES			
1	Batteries	Tape	Tape
2	Fines and Superfines	Rubber	Other Ferrous Materials
3	Empty Aerosol Cans	Batteries	Batteries

TABLE 6.9
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY VOLUME

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 44.86%	Paper – 45.87%	Paper – 45.40%
2	Plastics – 30.44%	Plastics – 27.06%	Plastics – 28.63%
3	Textiles – 6.50%	Metals – 7.09%	Metals – 6.81%
TOP MATERIAL CATEGORIES			
1	Paperboard – 16.90%	HDPE #2 – 14.50%	Paperboard – 14.53%
2	HDPE #2 – 13.81%	Corrugated Paper – 13.48%	HDPE #2 – 13.18%
3	Office Paper – 9.11%	Paperboard – 12.47%	Corrugated Paper – 10.13%
BOTTOM MATERIAL CATEGORIES			
1	Empty Aerosol Cans	Med Waste	Med Waste
2	Med Waste	Empty Aerosol Cans	Empty Aerosol Cans
3	Diapers	Aluminum Foil/Food Trays	Other Aluminum

Visual Inspection Analysis

A total of 39 large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, small appliances, and C & D debris. Table 6.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items include C & D debris, computer equipment, and car parts.

Table 6.11 provides a breakdown of the types of waste selected for sampling. Comparing this data to the information provided in Table 6.10, the equal number of residential and commercial and apartment loads indicates the potential influence the commercial loads may have had in the amount of computer equipment observed in the loads sampled. In turn, the amount of C & D debris and loose wood indicates that both residential and commercial loads provided this type of waste.

TABLE 6.10
ASHTABULA COUNTY SOLID WASTE MANAGEMENT DISTRICT
VISUAL INSPECTION ANALYSIS RESULTS

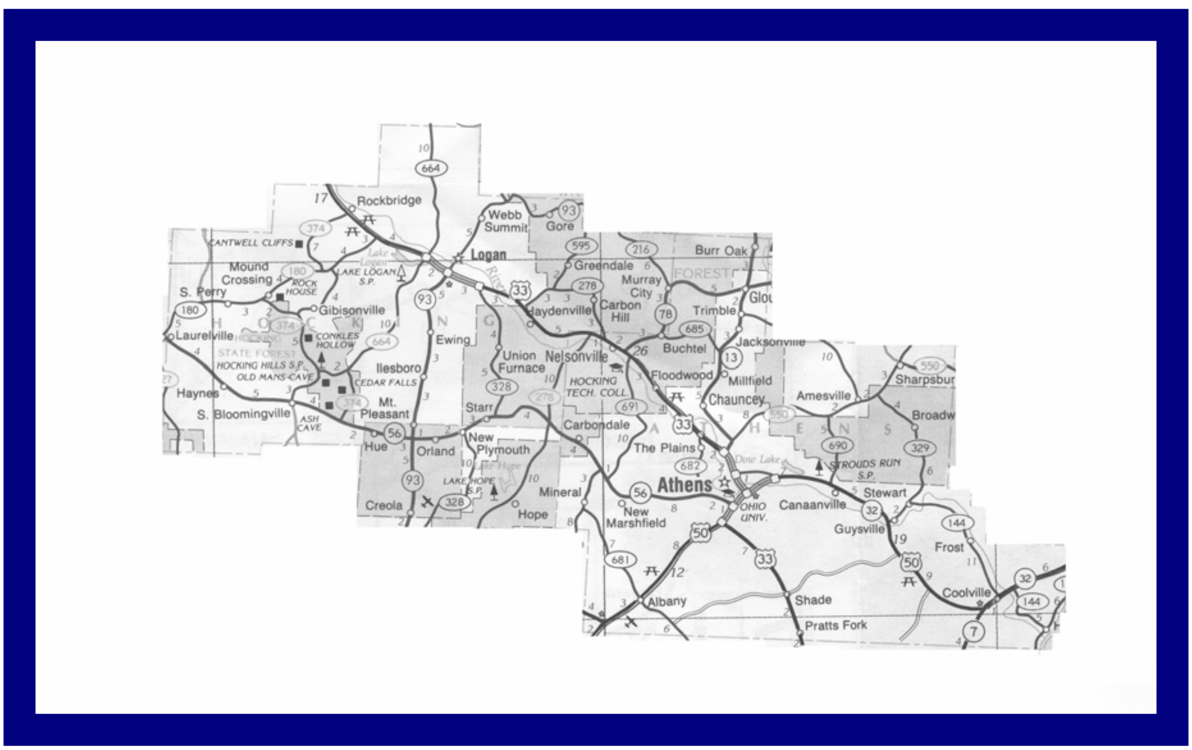
	Spring Sort Total Loads Sampled = 12	**Fall Sort** Total Loads Sampled = 16	**District** Total Loads Sampled = 28
Percent of sampled loads in which the following were noted:			
Computer Equipment	50	31	39
Electronic Equipment	25	6	14
Car Parts	17	38	29
Furniture	33	25	18
Plastic Barrels/Bins	25	19	21
Metal Containers	17	25	21
C & D Debris	75	63	69

TABLE 6.11
ASHTABULA COUNTY SOLID WASTE MANAGEMENTDISTRICT
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
Residential	2	9	11
Residential + Commercial	4	1	5
Residential + Apartments	0	1	1
Residential + Commercial + Apartments	0	0	0
Commercial + Apartments	5	5	10
Commercial	1	0	1
Apartments	0	0	0
TOTAL NUMBER OF LOADS SAMPLED	12	16	28

7. ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT

The Athens-Hocking Joint Solid Waste Management District is located in the southeast part of Ohio. The Ohio River, which delineates the Ohio-West Virginia state line, forms the eastern border of Athens County. Washington County is to the northeast of Athens County and Morgan County borders it to the north. Perry County and Fairfield County border Hocking County to the north. Pickaway County and Ross County border Hocking County to the west. Vinton County borders Hocking County to the south and Meigs County borders Athens County to the south (see Map 7.1). The district encompasses Athens County and Hocking County with a combined population of 90,464 as recorded in 2000. The combined land area of the two counties is 929.6 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).



MAP 7.1
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT

The waste sorts in this district were undertaken at the Athens Reclamation Center, which is centrally located in the district along U.S. Route 33 at the Athens-Hocking County Line. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in May 2003 (Spring Sort) and October 2003 (Fall Sort). During both the Spring Sort and the Fall Sort, the sorting process was performed within 100 feet of the landfill's working face.

Spring Sort Conditions

The Spring Waste Sort conducted at the Athens Reclamation Center occurred on Thursday, May 8, 2003, and Friday, May 9, 2003. The weather was humid and partly cloudy on Thursday and cloudy with thunderstorms on Friday. The waste sort was performed within 100 feet of the working face of the landfill; this allowed for easy access to loads brought to the site. The waste sort was conducted within a three-tent complex. The weather did not impact the sort on Thursday; however, lightning and heavy rain on Friday suspended sorting activities for extended periods of time throughout the day and did significantly impact the sort.

Fall Sort Conditions

The Fall Waste Sort was conducted on Monday, October 27, 2003, and Tuesday, October 28, 2003. Rain had fallen at the site on Sunday. The landfill operations staff had prepared a pad for the sort area. This pad was relatively dry and was placed within 20 feet of the edge of the working face. Tuesday was cloudy and breezy with light showers in the afternoon. The weather did not affect the waste sort on either day.

The working face was very tight with a maximum width of 40 to 50 feet. Because of this, only one truck could be sampled at a time. Fortunately, the number of trucks visiting the site on both Tuesday and Wednesday was low. This resulted in obtaining a reasonable number of samples both days.

Observations

During the waste sort at the Athens-Hocking landfill facility, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. The majority of collection vehicles that deliver solid waste to the landfill are rear packers that collect all waste that is left at the curb;
2. There is significant industrial waste disposed at the site;
3. A number of commercial loads contained large quantities of corrugated paper;
4. There are no transfer trailers delivering municipal solid waste to this landfill – all solid waste is delivered by collection vehicles or private vehicles;
5. The collection vehicle drivers appear to be very conscientious and are aware of what they collect;
6. There are a number of very small solid waste collection companies that deliver waste to the site. These haulers typically collect in the rural areas and drive smaller vehicles that can easily traverse the hilly area;
7. The majority of residential waste is placed in plastic bags by the generator. This is very common for both the very small haulers as well as the larger haulers.

Waste Sort Results and Analysis

A total of 27 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 7.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 7.1
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Thursday	May 8, 2003	0508D1.01 through 0508D1.07
Friday	May 9, 2003	0509D2.01 through 0509D2.04
	FALL SORT	
Monday	October 27, 2003	1027D3.01 through 1027D3.08
Tuesday	October 28, 2003	1028D4.01 through 1027D4.08

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 7.2 and Table 7.3) and the Fall Sort (see Table 7.4 and Table 7.5). Additionally, weight and volume summary data for both waste sorts conducted at the Athens Reclamation Center in the Athens-Hocking Joint Solid Waste Management District are presented in Table 7.6 and Table 7.7. Chart 7.1 and Chart 7.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

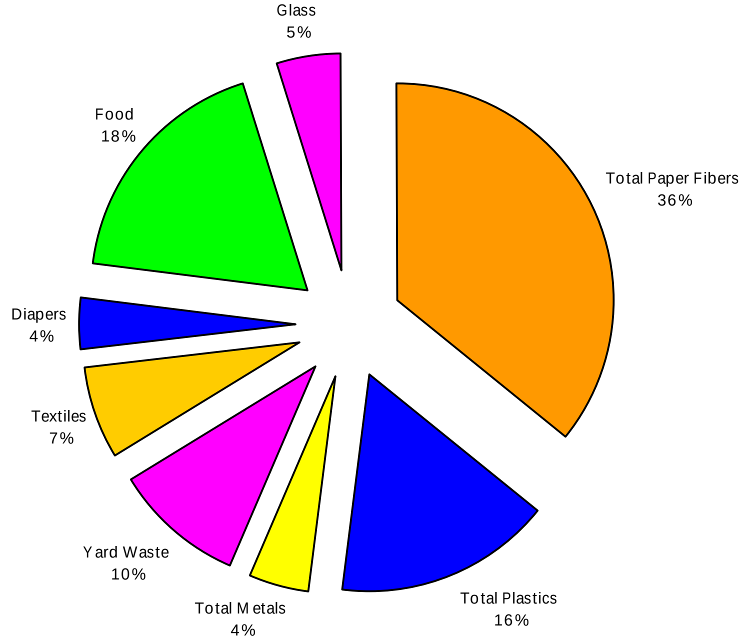


CHART 7.1
ATHENS HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT WEIGHT DISTRIBUTION

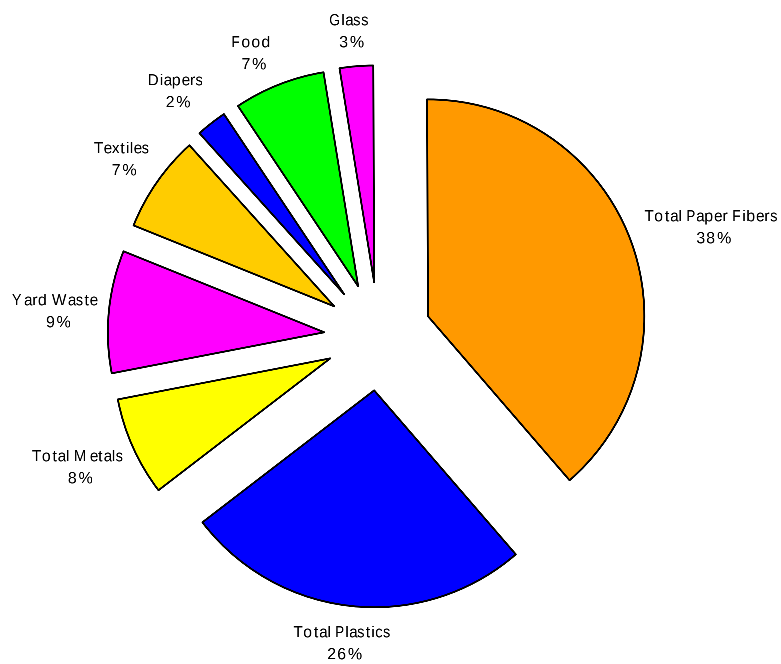


CHART 7.2
ATHENS HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 7.2
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	362.63	34.36%	13.36%
Office Paper	154.43	14.63%	5.69%
Mixed Paper	170.52	16.16%	6.28%
Newsprint	215.79	20.45%	7.95%
Magazines	134.06	12.70%	4.94%
Paperboard	17.87	1.69%	0.66%
TOTAL PAPER FIBERS	1,055.30		38.89%
LDPE #4	250.55	49.00%	9.23%
PET #1	56.22	10.99%	2.07%
HDPE #2	46.89	9.17%	1.73%
PVC #3	35.36	6.91%	1.30%
PP #5	15.17	2.97%	0.56%
PS #6	32.00	6.26%	1.18%
Other Plastics	75.18	14.70%	2.77%
TOTAL PLASTICS	511.37		18.85%
Aluminum Beverage Cans	33.76	30.36%	1.24%
Aluminum Foil/Food Trays	18.60	16.73%	0.69%
Other Aluminum	1.13	1.02%	0.04%
Tin Food Cans	55.84	50.22%	2.06%
Other Tin Cans	1.87	1.68%	0.07%
TOTAL METALS	111.20		4.10%
Yard Waste	305.56		11.26%
Textiles	217.95		8.03%
Diapers	89.71		3.31%
Food	234.03		8.63%
Glass	102.35		3.77%
Empty Aerosol Cans	10.69		0.39%
Medical Waste	16.00		0.59%
Fines and Superfines	9.94		0.37%
Batteries	3.28		0.12%
Mixed Metals	31.83		1.17%
Paints	4.50		0.17%
Hard Cover Books	7.93		0.29%
Other Non-Ferrous Metals	1.73		0.06%
NET WEIGHT OF SORTED SAMPLE	2,713.37		100.00%

TABLE 7.3
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	88.86	44.15%	15.95%
Office Paper	37.84	18.80%	6.79%
Mixed Paper	17.73	8.81%	3.18%
Newsprint	23.03	11.44%	4.13%
Magazines	24.24	12.05%	4.35%
Paperboard	9.55	4.75%	1.71%
TOTAL PAPER FIBERS	201.26		36.12%
LDPE #4	69.30	42.22%	12.44%
PET #1	16.54	10.07%	2.97%
HDPE #2	16.40	9.99%	2.94%
PVC #3	17.68	10.77%	3.17%
PP #5	6.90	4.20%	1.24%
PS #6	14.55	8.86%	2.61%
Other Plastics	22.78	13.88%	4.09%
TOTAL PLASTICS	164.14		29.46%
Aluminum Beverage Cans	12.06	32.03%	2.16%
Aluminum Foil/Food Trays	8.86	23.53%	1.59%
Other Aluminum	0.71	1.88%	0.13%
Tin Food Cans	15.09	40.09%	2.71%
Other Tin Cans	0.94	2.48%	0.17%
TOTAL METALS	37.65		6.76%
Yard Waste	58.58		10.51%
Textiles	46.61		8.37%
Diapers	10.08		1.81%
Food	18.28		3.28%
Glass	11.13		2.00%
Empty Aerosol Cans	5.94		1.07%
Medical Waste	3.56		0.64%
Fines and Superfines			
Batteries			
Mixed Metals			
Paints			
Hard Cover Books			
Other Non-Ferrous Metals			
NET VOLUME OF SORTED SAMPLE	557.22		100.00%

TABLE 7.4
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	142.17	11.64%	3.77%
Office Paper	173.24	14.18%	4.60%
Mixed Paper	297.37	24.35%	7.90%
Newsprint	245.85	20.13%	6.53%
Magazines	86.88	7.11%	2.31%
Paperboard	275.82	22.58%	7.32%
TOTAL PAPER FIBERS	1,221.33		32.43%
LDPE #4	104.73	20.66%	2.78%
PET #1	85.47	16.86%	2.27%
HDPE #2	187.68	37.03%	4.98%
PVC #3	4.85	0.96%	0.13%
PP #5	10.71	2.11%	0.28%
PS #6	36.80	7.26%	0.98%
Other Plastics	76.62	15.12%	2.03%
TOTAL PLASTICS	506.86		13.46%
Aluminum Beverage Cans	59.01	33.99%	1.57%
Aluminum Foil/Food Trays	7.20	4.15%	0.19%
Other Aluminum	12.30	7.08%	0.33%
Tin Food Cans	88.05	50.71%	2.34%
Other Tin Cans	7.07	4.07%	0.19%
TOTAL METALS	173.63		4.61%
Yard Waste	310.85		8.25%
Textiles	211.26		5.61%
Diapers	169.16		4.49%
Food	917.60		24.36%
Glass	201.75		5.36%
Empty Aerosol Cans	10.20		0.27%
Medical Waste	1.10		0.03%
Fines and Superfines	4.79		0.13%
Batteries	2.44		0.06%
Mixed Metals	13.78		0.37%
Wood	6.08		0.16%
Oil Filters	2.54		0.07%
Air Filter	2.34		0.06%
Telephone Books	1.99		0.05%
Hard Cover Books	8.86		0.24%
NET WEIGHT OF SORTED SAMPLE	3,766.56		100.00%

TABLE 7.5
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	34.84	11.70%	4.66%
Office Paper	42.45	14.26%	5.68%
Mixed Paper	30.93	10.39%	4.14%
Newsprint	26.24	8.82%	3.51%
Magazines	15.71	5.28%	2.10%
Paperboard	147.48	49.55%	19.73%
TOTAL PAPER FIBERS	297.64		39.82%
LDPE #4	28.97	17.35%	3.88%
PET #1	25.14	15.05%	3.36%
HDPE #2	65.63	39.31%	8.78%
PVC #3	2.43	1.45%	0.32%
PP #5	4.87	2.92%	0.65%
PS #6	16.73	10.02%	2.24%
Other Plastics	23.22	13.90%	3.11%
TOTAL PLASTICS	166.98		22.34%
Aluminum Beverage Cans	21.08	35.41%	2.82%
Aluminum Foil/Food Trays	3.43	5.76%	0.46%
Other Aluminum	7.69	12.92%	1.03%
Tin Food Cans	23.80	39.98%	3.18%
Other Tin Cans	3.54	5.94%	0.47%
TOTAL METALS	59.52		7.96%
Yard Waste	59.59		7.97%
Textiles	45.18		6.04%
Diapers	19.01		2.54%
Food	71.69		9.59%
Glass	21.93		2.93%
Empty Aerosol Cans	5.67		0.76%
Medical Waste	0.24		0.03%
Fines and Superfines			
Batteries			
Mixed Metals			
Wood			
Oil Filters			
Air Filter			
Telephone Books			
Hard Cover Books			
NET VOLUME OF SORTED SAMPLE	747.45		100.00%

TABLE 7.6
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	504.80	22.17%	7.79%
Office Paper	327.67	14.39%	5.06%
Mixed Paper	467.89	20.55%	7.22%
Newsprint	461.64	20.28%	7.12%
Magazines	220.94	9.70%	3.41%
Paperboard	293.69	12.90%	4.53%
TOTAL PAPER FIBERS	2276.63		35.13%
LDPE #4	355.28	34.89%	5.48%
PET #1	141.69	13.92%	2.19%
HDPE #2	234.57	23.04%	3.62%
PVC #3	40.21	3.95%	0.62%
PP #5	25.88	2.54%	0.40%
PS #6	68.80	6.76%	1.06%
Other Plastics	151.80	14.91%	2.34%
TOTAL PLASTICS	1018.23		15.71%
Aluminum Beverage Cans	92.77	32.57%	1.43%
Aluminum Foil/Food Trays	25.80	9.06%	0.40%
Other Aluminum	13.43	4.72%	0.21%
Tin Food Cans	143.89	50.52%	2.22%
Other Tin Cans	8.94	3.14%	0.14%
TOTAL METALS	284.83		4.40%
Yard Waste	616.41		9.51%
Textiles	429.21		6.62%
Diapers	258.87		3.99%
Food	1151.63		17.77%
Glass	304.10		4.69%
Empty Aerosol Cans	20.89		0.32%
Medical Waste	17.10		0.26%
Fines and Superfines	14.73		0.23%
Batteries	5.72		0.09%
Mixed Metals	45.61		0.70%
Paints	10.58		0.16%
Hard Cover Books	16.79		0.26%
Other Non-Ferrous Metals	1.73		0.03%
Oil Filters	2.54		0.04%
Air Filters	2.34		0.04%
Telephone Books	1.99		0.03%
NET WEIGHT OF SORTED SAMPLE	6,479.93		100.00%

TABLE 7.7
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	123.69	24.79%	9.48%
Office Paper	80.29	16.09%	6.15%
Mixed Paper	48.66	9.75%	3.73%
Newsprint	49.27	9.88%	3.78%
Magazines	39.95	8.01%	3.06%
Paperboard	157.03	31.48%	12.04%
TOTAL PAPER FIBERS	498.89		38.24%
LDPE #4	98.27	29.68%	7.53%
PET #1	41.67	12.59%	3.19%
HDPE #2	82.03	24.77%	6.29%
PVC #3	20.11	6.07%	1.54%
PP #5	11.76	3.55%	0.90%
PS #6	31.27	9.44%	2.40%
Other Plastics	46.00	13.89%	3.53%
TOTAL PLASTICS	331.12		25.38%
Aluminum Beverage Cans	33.13	34.10%	2.54%
Aluminum Foil/Food Trays	12.29	12.64%	0.94%
Other Aluminum	8.39	8.64%	0.64%
Tin Food Cans	38.89	40.02%	2.98%
Other Tin Cans	4.47	4.60%	0.34%
TOTAL METALS	97.17		7.45%
Yard Waste	118.17		9.06%
Textiles	91.80		7.04%
Diapers	29.09		2.23%
Food	89.97		6.90%
Glass	33.05		2.53%
Empty Aerosol Cans	11.61		0.89%
Medical Waste	3.80		0.29%
Fines and Superfines			
Batteries			
Mixed Metals			
Paints			
Hard Cover Books			
Other Non-Ferrous Metals			
Oil Filters			
Air Filters			
Telephone Books			
NET VOLUME OF SORTED SAMPLE	1,304.67		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Athens Reclamation Center. Table 7.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 7.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The other major components of the waste stream – by weight – are plastics, yard waste, and food. The most prominent single categories – by weight – are corrugated paper and food; yard waste, LDPE #4, and mixed paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Corrugated paper and paperboard were the most dominant single categories – by volume – with LDPE #4 and food placing second and yard waste and HDPE #2 placing third.

With the predominance of residential loads sampled at this site and the rural environment of the area, the amount of mixed paper and paperboard is expected. The limited number of loads sampled during the Spring Sort may have influenced the results given the rare appearance of LDPE #4 as one of the top material categories.

TABLE 7.8
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY WEIGHT

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 38.89%	Paper – 32.43%	Paper – 35.13%
2	Plastics – 18.85%	Food – 24.36%	Food – 17.77%
3	Yard Waste – 11.26%	Plastics – 13.45%	Plastics – 15.71%
TOP MATERIAL CATEGORIES			
1	Corrugated Paper – 13.36%	Food – 24.36%	Food – 17.77%
2	Yard Waste – 11.26%	Yard Waste – 8.25%	Yard Waste – 9.51%
3	LDPE #4 – 9.23%	Mixed Paper – 7.90%	Corrugated Paper – 7.79%
BOTTOM MATERIAL CATEGORIES			
1	Other Aluminum	Med Waste	Other Non-Ferrous Metals
2	Other Non-Ferrous Metals	Telephone Books	Telephone Books
3	Other Tin Cans	Air Filters	Air Filters

TABLE 7.9
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY VOLUME

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 36.12%	Paper – 39.82%	Paper – 38.24%
2	Plastics – 29.46%	Plastics – 22.34%	Plastics – 25.38%
3	Yard Waste – 10.51%	Food – 9.59%	Yard Waste – 9.06%
TOP MATERIAL CATEGORIES			
1	Corrugated Paper – 15.95%	Paperboard – 19.73%	Paperboard – 12.04%
2	LDPE #4 – 12.44%	Food – 9.59%	Corrugated Paper – 9.48%
3	Yard Waste – 10.51%	HDPE #2 – 8.78%	Yard Waste – 9.06%
BOTTOM MATERIAL CATEGORIES			
1	Other Aluminum	Med Waste	Med Waste
2	Other Tin Cans	PVC #3	Other Tin Cans
3	Med Waste	Other Tin Cans	Other Aluminum

Visual Inspection Analysis

A total of 30 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were plastic barrels/bins, loose wood, and C & D debris. Table 7.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were plastic barrels/bins, C & D debris, and metal containers.

Table 7.11 provides a breakdown of the types of waste selected for sampling. The data indicates that 63% of the 27 loads sampled were residential. Residential/commercial loads comprised another 22% of the samples loads.

TABLE 7.10
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
VISUAL INSPECTION ANALYSIS RESULTS

	Spring Sort Total Loads Sampled = 11	**Fall Sort** Total Loads Sampled = 16	**District** Total Loads Sampled = 27
Percent of sampled loads in which the following were noted:			
Computer Equipment	27	13	19
Electronic Equipment	0	6	4
Car Parts	0	13	7
Furniture	27	25	26
Plastic Barrels/Bins	82	38	56
Metal Containers	45	19	30
C & D Debris	36	56	48

TABLE 7.11
ATHENS-HOCKING JOINT SOLID WASTE MANAGEMENT DISTRICT
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
Residential	7	10	17
Residential + Commercial	2	4	6
Residential + Apartments	1	0	1
Residential + Commercial + Apartments	0	0	0
Commercial + Apartments	0	2	2
Commercial	1	0	1
Apartments	0	0	0
TOTAL NUMBER OF LOADS SAMPLED	11	16	27

8. BROWN COUNTY SOLID WASTE AUTHORITY

The Brown County Solid Waste Authority is located in the southwest part of Ohio. The Ohio River, which delineates the Ohio-Kentucky state line, forms the southern border of Brown County. Adams County borders Brown County to the east; Highland County and Clinton County border Brown County to the north; Clermont County borders Brown County to the west (see Map 8.1). The Cincinnati metropolitan area is approximately 35 miles west of Brown County. The district encompasses Brown County with a population of 42,285 as recorded in 2000, and a land area of 491.8 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).

Source: <http://www.odod.state.oh.us/research>

MAP 8.1
BROWN COUNTY SOLID WASTE AUTHORITY

The waste sorts in this district were undertaken at the Brown County Landfill, which is located in the south-central portion of Brown County in Georgetown, Ohio. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort).

Spring Sort Conditions

The Spring Sort at the Brown County Landfill occurred on Monday, June 9, 2003, and Tuesday, June 10, 2003. The weather was partly cloudy, warm, and breezy on Monday and cloudy, humid, and breezy on Tuesday. Although the weather did not affect the waste sort on either day, heavy rain had moved through the area over the weekend and the site was very muddy. The waste sort was performed within 100 feet of the working face of the landfill, which allowed for easy access to loads brought to the site. A three-tent complex was utilized for the sorting and categorization processes.

Fall Sort Conditions

The Fall Sort occurred on Thursday September 18, 2003, and Friday, September 19, 2003. The weather was very similar to the conditions encountered during the Spring Sort. The temperature was a little cooler and it was not as breezy. As during the Spring Sort, the waste sort was performed within 100 feet of the working face of the landfill in a three-tent complex. Additionally, the sort area was located on the southern edge of the working face, which allowed the sort team easier access to the site and easier access to the collection vehicles. Because a comfort level and familiarity with the process was developed during the Spring Sort, the landfill operations staff was extremely helpful and allowed greater access time to each selected load. This allowed the sort team more time for the walk around and sample gathering.

Observations

During the waste sort at the Brown County Landfill, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. The collection vehicles that deliver waste to this facility are privately owned;

2. Landfill operators are very concerned about safety and the need to move vehicles in and out as quickly as possible;

3. Landfill operators are sensitive to their surroundings and adjust to changing weather conditions;

4. The inflow of commercial and industrial waste to this landfill is limited;

5. The commercial waste stream includes large amounts of corrugated paper;

6. Commercial loads are delivered to this facility via front loading vehicles. Residential loads are delivered to the facility via either front loading vehicles or rear packers;

7. There is a recycling program in Brown County. It does appear to have an impact on the waste stream from Brown County;

8. Residential waste is placed at the curb in plastic bags or containers and then collected. The collection vehicle drivers collect anything placed at the curb;

9. There appears to be a difference in the type of residential solid waste collected based on the county of origin. Counties to the west of Brown County are more urbanized.

Waste Sort Results and Analysis

A total of 34 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 8.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 8.1
BROWN COUNTY SOLID WASTE AUTHORITY
SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Monday	June 9, 2003	0609D1.01 through 0609D1.06
Tuesday	June 10, 2003	0610D2.01 through 0610D2.08
	FALL SORT	
Thursday	September 18, 2003	0918D3.01 through 0918D3.10
Friday	September 19, 2003	0919D4.01 through 0919D4.10

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 8.2 and Table 8.3) and the Fall Sort (see Table 8.4 and Table 8.5). Additionally, weight and volume summary data for both waste sorts conducted at the Brown County Landfill in the Brown County Solid Waste Authority's district are presented in Table 8.6 and Table 8.7. Chart 8.1 and Chart 8.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

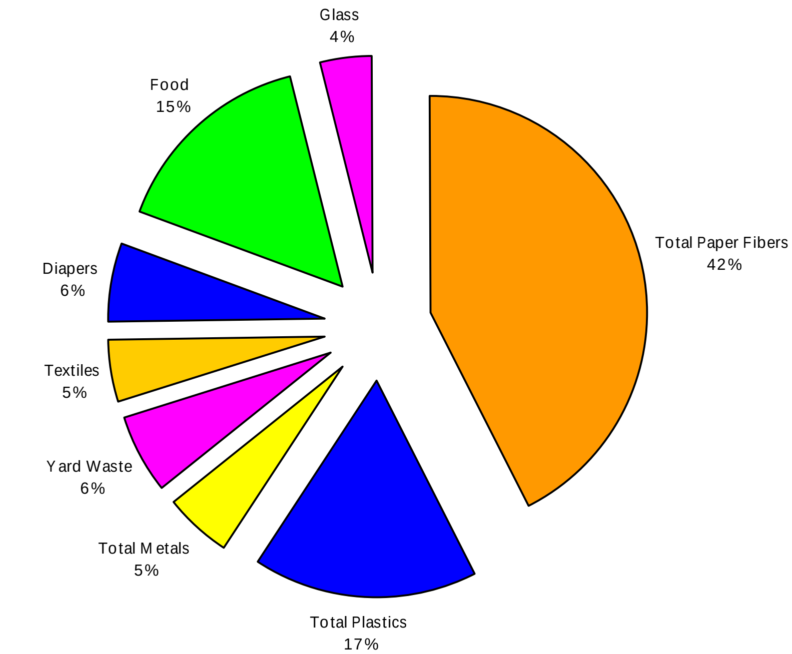


CHART 8.1
BROWN COUNTY SOLID WASTE AUTHORITY
MAJOR COMPONENT WEIGHT DISTRIBUTION

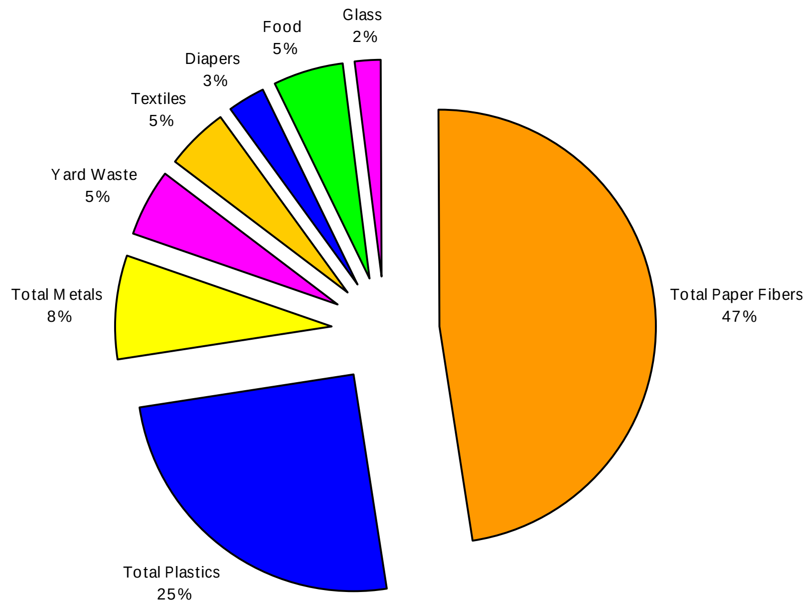


CHART 8.2
BROWN COUNTY SOLID WASTE AUTHORITY
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 8.2
BROWN COUNTY SOLID WASTE AUTHORITY
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	160.37	10.92%	4.85%
Office Paper	223.34	15.21%	6.76%
Mixed Paper	273.42	18.62%	8.27%
Newsprint	373.15	25.41%	11.29%
Magazines	173.37	11.81%	5.24%
Paperboard	264.66	18.02%	8.01%
TOTAL PAPER FIBERS	1468.31		44.42%
LDPE #4	56.44	9.95%	1.71%
PET #1	64.06	11.30%	1.94%
HDPE #2	241.42	42.58%	7.30%
PVC #3	23.12	4.08%	0.70%
PP #5	28.08	4.95%	0.85%
PS #6	47.50	8.38%	1.44%
Other Plastics	106.37	18.76%	3.22%
TOTAL PLASTICS	566.99		17.15%
Aluminum Beverage Cans	50.53	30.25%	1.53%
Aluminum Foil/Food Trays	15.27	9.14%	0.46%
Other Aluminum	8.03	4.81%	0.24%
Tin Food Cans	76.54	45.82%	2.32%
Other Tin Cans	16.69	9.99%	0.50%
TOTAL METALS	167.06		5.05%
Yard Waste	169.67		5.13%
Textiles	131.24		3.97%
Diapers	194.71		5.89%
Food	372.57		11.27%
Glass	131.19		3.97%
Empty Aerosol Cans	13.91		0.42%
Medical Waste	8.02		0.24%
Fines and Superfines	17.05		0.52%
Batteries	5.85		0.18%
Mixed Metals	36.37		1.10%
Oil Filters	6.09		0.18%
Wax	1.78		0.05%
Rubber	1.30		0.04%
Wood	1.59		0.05%
Telephone Books	11.98		0.36%
NET WEIGHT OF SORTED SAMPLE	3,305.68		100.00%

TABLE 8.3
BROWN COUNTY SOLID WASTE AUTHORITY
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	39.30	11.73%	5.41%
Office Paper	54.73	16.33%	7.53%
Mixed Paper	28.44	8.48%	3.91%
Newsprint	39.82	11.88%	5.48%
Magazines	31.35	9.35%	4.31%
Paperboard	141.51	42.22%	19.47%
TOTAL PAPER FIBERS	335.14		46.11%
LDPE #4	15.61	7.92%	2.15%
PET #1	18.84	9.56%	2.59%
HDPE #2	84.43	42.85%	11.62%
PVC #3	11.56	5.87%	1.59%
PP #5	12.76	6.48%	1.76%
PS #6	21.59	10.96%	2.97%
Other Plastics	32.23	16.36%	4.43%
TOTAL PLASTICS	197.03		27.11%
Aluminum Beverage Cans	18.05	30.40%	2.48%
Aluminum Foil/Food Trays	7.27	12.25%	1.00%
Other Aluminum	5.02	8.45%	0.69%
Tin Food Cans	20.69	34.84%	2.85%
Other Tin Cans	8.35	14.06%	1.15%
TOTAL METALS	59.37		8.17%
Yard Waste	32.53		4.47%
Textiles	28.07		3.86%
Diapers	21.88		3.01%
Food	29.11		4.00%
Glass	14.26		1.96%
Empty Aerosol Cans	7.73		1.06%
Medical Waste	1.78		0.25%
Fines and Superfines			
Batteries			
Mixed Metals			
Oil Filters			
Wax			
Rubber			
Wood			
Telephone Books			
NET VOLUME OF SORTED SAMPLE	726.89		100.00%

TABLE 8.4
BROWN COUNTY SOLID WASTE AUTHORITY
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	228.05	12.54%	4.93%
Office Paper	261.02	14.35%	5.65%
Mixed Paper	217.38	11.95%	4.70%
Newsprint	424.24	23.33%	9.18%
Magazines	169.19	9.30%	3.66%
Paperboard	518.50	28.51%	11.21%
TOTAL PAPER FIBERS	1818.38		39.33%
LDPE #4	71.13	10.00%	1.54%
PET #1	125.10	17.60%	2.71%
HDPE #2	337.78	47.51%	7.31%
PVC #3	11.99	1.69%	0.26%
PP #5	17.92	2.52%	0.39%
PS #6	56.07	7.89%	1.21%
Other Plastics	90.98	12.80%	1.97%
TOTAL PLASTICS	710.97		15.38%
Aluminum Beverage Cans	105.24	47.95%	2.28%
Aluminum Foil/Food Trays	12.24	5.58%	0.26%
Other Aluminum	11.27	5.14%	0.24%
Tin Food Cans	86.56	39.44%	1.87%
Other Tin Cans	4.15	1.89%	0.09%
TOTAL METALS	219.46		4.75%
Yard Waste	288.95		6.25%
Textiles	243.06		5.26%
Diapers	257.31		5.57%
Food	819.46		17.72%
Glass	171.06		3.70%
Empty Aerosol Cans	14.55		0.31%
Medical Waste	7.25		0.16%
Fines and Superfines	4.89		0.11%
Batteries	1.44		0.03%
Rubber	2.49		0.05%
Oil Filters	1.66		0.04%
Mixed Metals	44.79		0.97%
Wood	7.16		0.15%
Wire	0.46		0.01%
Electronics	7.38		0.16%
Telephone	1.73		0.04%
Ceramics	0.85		0.02%
NET WEIGHT OF SORTED SAMPLE	4,623.30		100.00%

TABLE 8.5
BROWN COUNTY SOLID WASTE AUTHORITY
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	55.88	11.28%	5.36%
Office Paper	63.96	12.91%	6.14%
Mixed Paper	22.61	4.56%	2.17%
Newsprint	45.28	9.14%	4.35%
Magazines	30.59	6.17%	2.94%
Paperboard	277.23	55.94%	26.61%
TOTAL PAPER FIBERS	495.55		47.56%
LDPE #4	19.67	8.14%	1.89%
PET #1	36.79	15.22%	3.53%
HDPE #2	118.13	48.85%	11.34%
PVC #3	6.00	2.48%	0.58%
PP #5	8.15	3.37%	0.78%
PS #6	25.49	10.54%	2.45%
Other Plastics	27.57	11.40%	2.65%
TOTAL PLASTICS	241.79		23.21%
Aluminum Beverage Cans	37.59	49.50%	3.61%
Aluminum Foil/Food Trays	5.83	7.68%	0.56%
Other Aluminum	7.04	9.28%	0.68%
Tin Food Cans	23.39	30.81%	2.25%
Other Tin Cans	2.08	2.73%	0.20%
TOTAL METALS	75.93		7.29%
Yard Waste	55.39		5.32%
Textiles	51.98		4.99%
Diapers	28.91		2.77%
Food	64.02		6.14%
Glass	18.59		1.78%
Empty Aerosol Cans	8.08		0.78%
Medical Waste	1.61		0.15%
Fines and Superfines			
Batteries			
Rubber			
Oil Filters			
Mixed Metals			
Wood			
Wire			
Electronics			
Telephone			
Ceramics			
NET VOLUME OF SORTED SAMPLE	1,041.87		100.00%

TABLE 8.6
BROWN COUNTY SOLID WASTE AUTHORITY
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	388.42	11.82%	4.90%
Office Paper	484.36	14.74%	6.11%
Mixed Paper	490.80	14.93%	6.19%
Newsprint	797.39	24.26%	10.06%
Magazines	342.56	10.42%	4.32%
Paperboard	783.16	23.83%	9.88%
TOTAL PAPER FIBERS	3286.69		41.45%
LDPE #4	127.57	9.98%	1.61%
PET #1	189.16	14.80%	2.39%
HDPE #2	579.20	45.32%	7.30%
PVC #3	35.11	2.75%	0.44%
PP #5	46.00	3.60%	0.58%
PS #6	103.57	8.10%	1.31%
Other Plastics	197.35	15.44%	2.49%
TOTAL PLASTICS	1277.96		16.12%
Aluminum Beverage Cans	155.77	40.30%	1.96%
Aluminum Foil/Food Trays	27.51	7.12%	0.35%
Other Aluminum	19.30	4.99%	0.24%
Tin Food Cans	163.10	42.20%	2.06%
Other Tin Cans	20.84	5.39%	0.26%
TOTAL METALS	386.52		4.87%
Yard Waste	458.62		5.78%
Textiles	374.30		4.72%
Diapers	452.02		5.70%
Food	1192.03		15.03%
Glass	302.25		3.81%
Empty Aerosol Cans	28.46		0.36%
Medical Waste	15.27		0.19%
Fines and Superfines	21.94		0.28%
Batteries	7.29		0.09%
Mixed Metals	81.16		1.02%
Wood	13.25		0.17%
Telephone Books	1.78		0.02%
Wax	1.30		0.02%
Cell Phones	1.59		0.02%
Small Propane Tanks	11.98		0.15%
Rubber	2.49		0.03%
Oil Filters	1.66		0.02%
Wire	0.46		0.01%
Electronics	7.38		0.09%
Telephone	1.73		0.02%
Ceramics	0.85		0.01%
NET WEIGHT OF SORTED SAMPLE	7,928.98		100.00%

TABLE 8.7
BROWN COUNTY SOLID WASTE AUTHORITY
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	95.18	11.46%	5.38%
Office Paper	118.68	14.29%	6.71%
Mixed Paper	51.04	6.14%	2.89%
Newsprint	85.10	10.24%	4.81%
Magazines	61.95	7.46%	3.50%
Paperboard	418.74	50.41%	23.67%
TOTAL PAPER FIBERS	830.69		46.96%
LDPE #4	35.29	8.04%	1.99%
PET #1	55.64	12.68%	3.15%
HDPE #2	202.56	46.16%	11.45%
PVC #3	17.56	4.00%	0.99%
PP #5	20.91	4.76%	1.18%
PS #6	47.08	10.73%	2.66%
Other Plastics	59.80	13.63%	3.38%
TOTAL PLASTICS	438.82		24.81%
Aluminum Beverage Cans	55.63	41.12%	3.15%
Aluminum Foil/Food Trays	13.10	9.68%	0.74%
Other Aluminum	12.06	8.92%	0.68%
Tin Food Cans	44.08	32.58%	2.49%
Other Tin Cans	10.42	7.70%	0.59%
TOTAL METALS	135.30		7.65%
Yard Waste	87.92		4.97%
Textiles	80.05		4.53%
Diapers	50.79		2.87%
Food	93.13		5.27%
Glass	32.85		1.86%
Empty Aerosol Cans	15.81		0.89%
Medical Waste	3.39		0.19%
Fines and Superfines			
Batteries			
Mixed Metals			
Wood			
Telephone Books			
Wax			
Cell Phones			
Small Propane Tanks			
Rubber			
Oil Filters			
Wire			
Electronics			
Telephone			
Ceramics			
NET VOLUME OF SORTED SAMPLE	1,768.76		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Brown County Landfill. Table 8.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 8.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; newsprint, mixed paper, and paperboard are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Paperboard and HDPE #2 were the most dominant single categories – by volume – with office paper and food placing third.

This area is a mixture of urban and rural waste streams. A majority of the loads sampled were a mix of residential and commercial waste. The area also appears to be an extension of the Cincinnati suburbs. This may explain the high amounts of paperboard, food, and newsprint.

TABLE 8.8
BROWN COUNTY SOLID WASTE AUTHORITY
ANALYSIS RESULTS BY WEIGHT

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 44.42%	Paper – 39.33%	Paper – 41.45%
2	Plastics – 17.15%	Food – 17.72%	Plastics – 16.12%
3	Food – 11.27%	Plastics – 15.38%	Food – 15.03%
TOP MATERIAL CATEGORIES			
1	Newsprint – 11.29%	Food – 17.72%	Food – 15.03%
2	Food – 11.27%	Paperboard – 11.21%	Newsprint – 10.06%
3	Mixed Paper – 8.27%	Newsprint – 9.18%	Paperboard – 9.88%
BOTTOM MATERIAL CATEGORIES			
1	Rubber	Wire	Wire
2	Wood	Ceramics	Ceramics
3	Wax	Batteries	Wax

TABLE 8.9
BROWN COUNTY SOLID WASTE AUTHORITY
ANALYSIS RESULTS BY VOLUME

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 46.11%	Paper – 47.56%	Paper – 46.96%
2	Plastics – 27.11%	Plastics – 23.21%	Plastics – 24.81%
3	Metals – 8.17%	Metals – 7.29%	Metals – 7.65%
TOP MATERIAL CATEGORIES			
1	Paperboard – 19.47%	Paperboard – 26.61%	Paperboard – 23.67%
2	HDPE #2 – 11.62%	HDPE #2 – 11.34%	HDPE #2 – 11.45%
3	Office Paper – 7.53%	Food – 6.14%	Office Paper – 6.71%
BOTTOM MATERIAL CATEGORIES			
1	Med Waste	Med Waste	Med Waste
2	Other Aluminum	Other Tin Cans	Other Tin Cans
3	Aluminum Foil/Food Trays	Aluminum Foil/Food Trays	Other Aluminum

Visual Inspection Analysis

A total of 36 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. Table 8.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, plastic barrels/bins, and furniture.

Table 8.11 provides a breakdown of the types of waste selected for sampling. The data indicates that residential and residential/commercial loads comprise a majority of the sampled loads during both the Spring Sort and the Fall Sort. More than 75% of the loads sampled were one of these two waste types. Given the mix of suburban and rural areas served by this facility, it is not surprising that loads containing these types of waste are prevalent.

TABLE 8.10
BROWN COUNTY SOLID WASTE AUTHORITY
VISUAL INSPECTION ANALYSIS RESULTS

	Spring Sort Total Loads Sampled = 14	**Fall Sort** Total Loads Sampled = 20	**District** Total Loads Sampled = 34
Percent of sampled loads in which the following were noted:			
Computer Equipment	29	15	21
Electronic Equipment	29	15	15
Car Parts	21	20	21
Furniture	43	35	38
Plastic Barrels/Bins	43	60	53
Metal Containers	14	20	18
C & D Debris	79	50	62

TABLE 8.11
BROWN COUNTY SOLID WASTE AUTHORITY
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
Residential	2	10	12
Residential + Commercial	9	5	14
Residential + Apartments	0	1	1
Residential + Commercial + Apartments	1	1	2
Commercial + Apartments	2	3	5
Commercial	0	0	0
Apartments	0	0	0
TOTAL NUMBER OF LOADS SAMPLED	14	20	34

9 DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT

The Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District is located in the far northwest part of Ohio. The Ohio-Indiana state line borders Paulding County, Defiance County, and Williams County to the west. The Ohio-Michigan state line borders Williams County and Fulton County to the north. Lucas County borders Fulton County to the east. Henry County borders Fulton County to the south and Defiance County to the east. Paulding County is bordered by Putnam County to its east and Van Wert County to its south (see Map 9.1). The district encompasses Paulding County, Defiance County, Williams County, and Fulton County with a combined four-county population of 141,065 as recorded in 2000. The combined four-county land area covers 1,656.1 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).

MAP 9.1
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT

The waste sorts in this district were undertaken at the Defiance County Landfill, which is located just south of Defiance, Ohio. The landfill is a publicly-owned and publicly-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and October 2003 (Fall Sort).

Spring Sort Conditions

On both Thursday, June 5, 2003, and Friday, June 6, 2003, the waste sort at the Defiance County Landfill was performed within 100 feet of the landfill's working face. This allowed for easy access to the loads that were delivered to the site. The samples were taken to a three-tent complex where they were sorted and categorized. It was cloudy, cool and breezy on Thursday, and it was clear, warm and breezy on Friday.

Fall Sort Conditions

The Fall Waste Sort was conducted on Monday, October 20, 2003, and Tuesday, October 21, 2003. Monday was clear and breezy during the morning hours with gusting winds in the afternoon. The gusting winds on Monday caused difficulties with the sorting process and as a result waste sort activities were halted at 3:00 pm. Tuesday was cloudy with wind gusts in the afternoon. However, because the winds on Tuesday were not as high as on Monday, the waste sort was able to proceed unaffected. The sort area, on both Monday and Tuesday, was located within 50 feet of the working face. This close proximity allowed quicker access to loads, but also required the walk around inspections and sample gathering to be conducted as quickly as possible.

Observations

During the waste sort at the Defiance County Landfill, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. A large amount of food waste was delivered to this facility during the two-day Spring Waste Sort. From information supplied by the truck drivers, most of the food was from schools in the area. The drivers' assumptions were that the schools were closing for the summer and reducing on-hand inventory;

2. Landfill operators are very concerned about safety;

3. This site did not receive a significant amount of waste from outside the region;

4. The majority of the solid waste is delivered to the facility via private haulers;

5. Most commercial loads are delivered in front loaders. These loads are sometimes mixed with apartments;

6. The residential collection vehicles are mostly rear packers. These vehicles can carry a large amount of solid waste; the solid waste appears to be placed at the curb in plastic bags or containers. It appears the drivers collect anything placed at the curb.

Waste Sort Results and Analysis

A total of 33 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 9.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 9.1
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT -- SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Thursday	June 5, 2003	0605D1.01 through 0605D1.06
Friday	June 6, 2003	0606D2.01 through 0606D2.09
	FALL SORT	
Monday	October 20, 2003	1020D3.01 through 1020D3.08
Tuesday	October 21, 2003	1020D4.01 through 1021D4.10

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 9.2 and Table 9.3) and the Fall Sort (see Table 9.4 and Table 9.5). Additionally, weight and volume summary data for both waste sorts conducted at the Defiance County Landfill in the Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District are presented in Table 9.6 and Table 9.7. Chart 9.1 and Chart 9.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

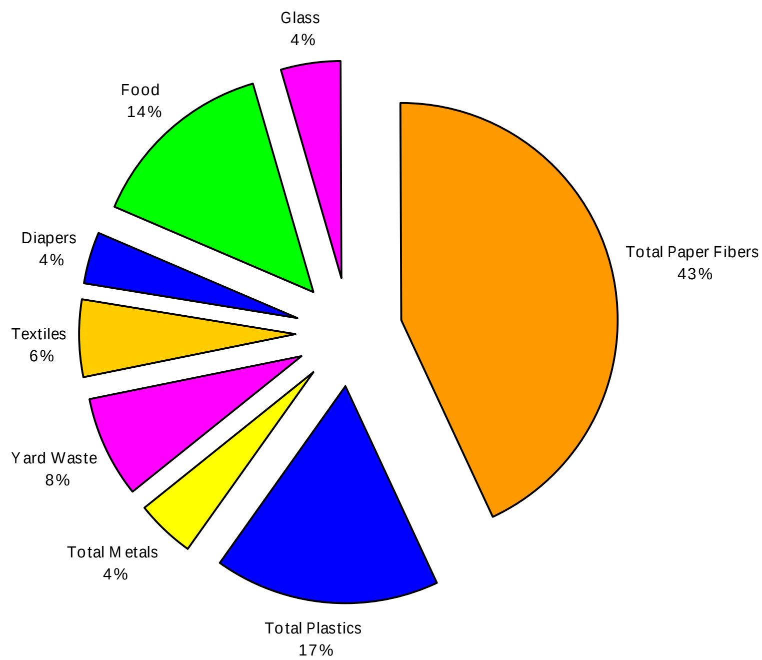


CHART 9.1
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT -- MAJOR COMPONENT WEIGHT DISTRIBUTION

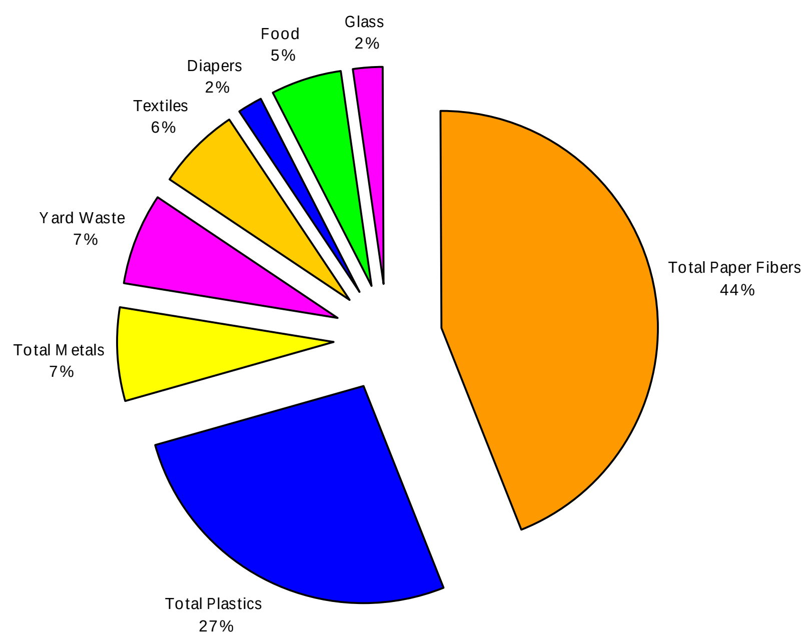


CHART 9.2
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT -- MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 9.2
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	421.90	27.48%	10.74%
Office Paper	219.08	14.27%	5.58%
Mixed Paper	424.93	27.68%	10.82%
Newsprint	328.29	21.38%	8.36%
Magazines	132.79	8.65%	3.38%
Paperboard	8.16	0.53%	0.21%
TOTAL PAPER FIBERS	1535.15		39.07%
LDPE #4	36.14	5.48%	0.92%
PET #1	116.66	17.68%	2.97%
HDPE #2	288.18	43.66%	7.34%
PVC #3	38.24	5.79%	0.97%
PP #5	32.21	4.88%	0.82%
PS #6	47.87	7.25%	1.22%
Other Plastics	100.68	15.26%	2.56%
TOTAL PLASTICS	659.98		16.80%
Aluminum Beverage Cans	43.19	25.29%	1.10%
Aluminum Foil/Food Trays	13.51	7.91%	0.34%
Other Aluminum	7.33	4.29%	0.19%
Tin Food Cans	102.10	59.78%	2.60%
Other Tin Cans	4.67	2.73%	0.12%
TOTAL METALS	170.80		4.35%
Yard Waste	371.51		9.46%
Textiles	326.76		8.32%
Diapers	154.24		3.93%
Food	491.96		12.52%
Glass	145.91		3.71%
Empty Aerosol Cans	9.40		0.24%
Medical Waste	6.73		0.17%
Fines and Superfines	10.55		0.27%
Batteries	4.57		0.12%
Mixed Metals	29.18		0.74%
Paints	1.05		0.03%
Other Ferrous Metals	7.40		0.19%
Rubber	0.15		0.00%
Oil Filters	3.48		0.09%
NET WEIGHT OF SORTED SAMPLE	3,928.82		100.00%

TABLE 9.3
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	103.38	39.06%	13.40%
Office Paper	53.68	20.28%	6.96%
Mixed Paper	44.19	16.70%	5.73%
Newsprint	35.04	13.24%	4.54%
Magazines	24.01	9.07%	3.11%
Paperboard	4.36	1.65%	0.57%
TOTAL PAPER FIBERS	264.67		34.30%
LDPE #4	10.00	4.33%	1.30%
PET #1	34.31	14.85%	4.45%
HDPE #2	100.78	43.61%	13.06%
PVC #3	19.12	8.27%	2.48%
PP #5	14.64	6.33%	1.90%
PS #6	21.76	9.41%	2.82%
Other Plastics	30.51	13.20%	3.95%
TOTAL PLASTICS	231.12		29.95%
Aluminum Beverage Cans	15.43	27.36%	2.00%
Aluminum Foil/Food Trays	6.43	11.41%	0.83%
Other Aluminum	4.58	8.13%	0.59%
Tin Food Cans	27.59	48.95%	3.58%
Other Tin Cans	2.34	4.14%	0.30%
TOTAL METALS	56.37		7.31%
Yard Waste	71.22		9.23%
Textiles	69.89		9.06%
Diapers	17.33		2.25%
Food	38.43		4.98%
Glass	15.86		2.06%
Empty Aerosol Cans	5.22		0.68%
Medical Waste	1.50		0.19%
Fines and Superfines			
Batteries			
Mixed Metals			
Paints			
Other Ferrous Metals			
Rubber			
Oil Filters			
NET VOLUME OF SORTED SAMPLE	771.60		100.00%

TABLE 9.4
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	309.81	14.49%	6.54%
Office Paper	416.05	19.46%	8.78%
Mixed Paper	397.81	18.60%	8.39%
Newsprint	432.84	20.24%	9.13%
Magazines	158.39	7.41%	3.34%
Paperboard	423.35	19.80%	8.93%
TOTAL PAPER FIBERS	2,138.25		45.11%
LDPE #4	148.73	19.88%	3.14%
PET #1	110.16	14.72%	2.32%
HDPE #2	293.27	39.19%	6.19%
PVC #3	5.59	0.75%	0.12%
PP #5	20.52	2.74%	0.43%
PS #6	73.00	9.76%	1.54%
Other Plastics	96.98	12.96%	2.05%
TOTAL PLASTICS	748.25		15.79%
Aluminum Beverage Cans	65.20	32.42%	1.38%
Aluminum Foil/Food Trays	15.99	7.95%	0.34%
Other Aluminum	5.55	2.76%	0.12%
Tin Food Cans	112.24	55.81%	2.37%
Other Tin Cans	2.12	1.05%	0.04%
TOTAL METALS	201.10		4.24%
Yard Waste	271.39		5.73%
Textiles	181.73		3.83%
Diapers	178.25		3.76%
Food	713.02		15.04%
Glass	225.68		4.76%
Empty Aerosol Cans	17.61		0.37%
Medical Waste	0.28		0.01%
Fines and Superfines	3.80		0.08%
Batteries	5.61		0.12%
Mixed Metals	27.67		0.58%
Leather	1.42		0.03%
Rubber	2.00		0.04%
Small Appliance	7.53		0.16%
Wood	8.73		0.18%
Paints	2.71		0.06%
Other Ferrous Metals	2.20		0.05%
Air Filter	1.52		0.03%
Telephone Books	1.09		0.02%
NET WEIGHT OF SORTED SAMPLE	4,739.84		100.00%

TABLE 9.5
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	75.91	14.59%	7.31%
Office Paper	101.95	19.59%	9.82%
Mixed Paper	41.37	7.95%	3.99%
Newsprint	46.19	8.88%	4.45%
Magazines	28.64	5.50%	2.76%
Paperboard	226.36	43.49%	21.81%
TOTAL PAPER FIBERS	520.43		50.14%
LDPE #4	41.14	16.40%	3.96%
PET #1	32.40	12.92%	3.12%
HDPE #2	102.56	40.90%	9.88%
PVC #3	2.80	1.11%	0.27%
PP #5	9.33	3.72%	0.90%
PS #6	33.18	13.23%	3.20%
Other Plastics	29.39	11.72%	2.83%
TOTAL PLASTICS	250.79		24.16%
Aluminum Beverage Cans	23.29	35.41%	2.24%
Aluminum Foil/Food Trays	7.61	11.58%	0.73%
Other Aluminum	3.47	5.27%	0.33%
Tin Food Cans	30.34	46.13%	2.92%
Other Tin Cans	1.06	1.61%	0.10%
TOTAL METALS	65.76		6.34%
Yard Waste	52.03		5.01%
Textiles	38.87		3.74%
Diapers	20.03		1.93%
Food	55.70		5.37%
Glass	24.53		2.36%
Empty Aerosol Cans	9.78		0.94%
Medical Waste	0.06		0.01%
Fines and Superfines			
Batteries			
Mixed Metals			
Leather			
Rubber			
Small Appliance			
Wood			
Paints			
Other Ferrous Metals			
Air Filter			
Telephone Books			
NET VOLUME OF SORTED SAMPLE	1,037.99		100.00%

TABLE 9.6
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	731.71	19.92%	8.44%
Office Paper	635.13	17.29%	7.33%
Mixed Paper	822.74	22.40%	9.49%
Newsprint	761.13	20.72%	8.78%
Magazines	291.18	7.93%	3.36%
Paperboard	431.51	11.75%	4.98%
TOTAL PAPER FIBERS	3673.40		42.38%
LDPE #4	184.87	13.13%	2.13%
PET #1	226.82	16.11%	2.62%
HDPE #2	581.45	41.29%	6.71%
PVC #3	43.83	3.11%	0.51%
PP #5	52.73	3.74%	0.61%
PS #6	120.87	8.58%	1.39%
Other Plastics	197.66	14.04%	2.28%
TOTAL PLASTICS	1408.23		16.25%
Aluminum Beverage Cans	108.39	29.14%	1.25%
Aluminum Foil/Food Trays	29.50	7.93%	0.34%
Other Aluminum	12.88	3.46%	0.15%
Tin Food Cans	214.34	57.63%	2.47%
Other Tin Cans	6.79	1.83%	0.08%
TOTAL METALS	371.90		4.29%
Yard Waste	642.90		7.42%
Textiles	508.49		5.87%
Diapers	332.49		3.84%
Food	1204.98		13.90%
Glass	371.59		4.29%
Empty Aerosol Cans	27.01		0.31%
Medical Waste	7.01		0.08%
Fines and Superfines	14.35		0.17%
Batteries	10.18		0.12%
Mixed Metals	56.85		0.66%
Leather	1.42		0.02%
Rubber	2.15		0.02%
Small Appliance	7.53		0.09%
Wood	8.73		0.10%
Paints	3.76		0.04%
Other Ferrous Metals	9.60		0.11%
Air Filter	1.52		0.02%
Telephone Books	1.09		0.01%
Oil Filters	3.48		0.04%
NET WEIGHT OF SORTED SAMPLE	8,668.66		100.00%

TABLE 9.7
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	179.29	22.84%	9.91%
Office Paper	155.63	19.82%	8.60%
Mixed Paper	85.56	10.90%	4.73%
Newsprint	81.23	10.35%	4.49%
Magazines	52.65	6.71%	2.91%
Paperboard	230.72	29.39%	12.75%
TOTAL PAPER FIBERS	785.09		43.39%
LDPE #4	51.13	10.61%	2.83%
PET #1	66.71	13.84%	3.69%
HDPE #2	203.34	42.20%	11.24%
PVC #3	21.92	4.55%	1.21%
PP #5	23.97	4.97%	1.32%
PS #6	54.94	11.40%	3.04%
Other Plastics	59.90	12.43%	3.31%
TOTAL PLASTICS	481.91		26.63%
Aluminum Beverage Cans	38.71	31.70%	2.14%
Aluminum Foil/Food Trays	14.05	11.50%	0.78%
Other Aluminum	8.05	6.59%	0.44%
Tin Food Cans	57.93	47.43%	3.20%
Other Tin Cans	3.40	2.78%	0.19%
TOTAL METALS	122.13		6.75%
Yard Waste	123.25		6.81%
Textiles	108.75		6.01%
Diapers	37.36		2.06%
Food	94.14		5.20%
Glass	40.39		2.23%
Empty Aerosol Cans	15.01		0.83%
Medical Waste	1.56		0.09%
Fines and Superfines			
Batteries			
Mixed Metals			
Leather			
Rubber			
Small Appliance			
Wood			
Paints			
Other Ferrous Metals			
Air Filter			
Telephone Books			
Oil Filters			
NET VOLUME OF SORTED SAMPLE	1,809.59		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Defiance County Landfill. Table 9.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 9.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; corrugated paper, newsprint, mixed paper, and paperboard are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Corrugated paper and paperboard were the most dominant single categories – by volume – with HDPE # 2 placing second and yard waste and office paper placing third.

Loads sampled at this facility included only one pure commercial load with residential or a mix of commercial and residential waste being the most dominant. This is likely the reason why corrugated paper was dominant in the spring and paperboard was dominant in the fall. It is also likely why the mixed paper and newsprint categories were high.

TABLE 9.8
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT -- ANALYSIS RESULTS BY WEIGHT

	Spring Sort June 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 39.07%	Paper – 45.11%	Paper – 42.38%
2	Plastics – 16.80%	Plastics – 15.79%	Plastics – 16.25%
3	Food – 12.52%	Food – 15.04%	Food – 13.90%
TOP MATERIAL CATEGORIES			
1	Food – 12.52%	Food – 15.04%	Food – 13.90%
2	Mixed Paper – 10.82%	Newsprint – 9.13%	Mixed Paper – 9.49%
3	Corrugated Paper – 10.74%	Paperboard – 8.93%	Newsprint – 8.78%
BOTTOM MATERIAL CATEGORIES			
1	Rubber	Med Waste	Telephone Books
2	Paints	Telephone Books	Leather
3	Oil Filters	Leather	Air Filters

TABLE 9.9
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT -- ANALYSIS RESULTS BY VOLUME

	Spring Sort June 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 34.40%	Paper – 50.14%	Paper – 43.39%
2	Plastics – 29.95%	Plastics – 24.15%	Plastics – 26.63%
3	Yard Waste – 9.23%	Metals – 6.34%	Yard Waste – 6.81%
TOP MATERIAL CATEGORIES			
1	Corrugated Paper – 13.40%	Paperboard – 21.81%	Paperboard – 12.74%
2	HDPE #2 – 13.06%	HDPE #2 – 9.88%	HDPE #2 – 11.24%
3	Yard Waste – 9.23%	Office Paper – 9.82%	Corrugated Paper – 9.91%
BOTTOM MATERIAL CATEGORIES			
1	Med Waste	Med Waste	Med Waste
2	Other Tin Cans	Other Tin Cans	Other Tin Cans
3	Paperboard	PVC #3	Other Aluminum

Visual Inspection Analysis

A total of 39 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. Table 9.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the most frequently observed large items were C & D debris, furniture, car parts, and plastic barrels/bins.

Table 9.11 provides a breakdown of the types of waste selected for sampling. The data indicates that loads sampled during the Spring Sort were comprised of a mix of waste types while a larger percentage of residential loads were sampled during the Fall Sort. Comparing this data to the information provided in Table 9.10, the possible impact of this variance is evident in the percentage of loads in which computer items were observed in the spring and the large amount of furniture present in the loads in the fall.

TABLE 9.10
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT -- VISUAL INSPECTION ANALYSIS RESULTS

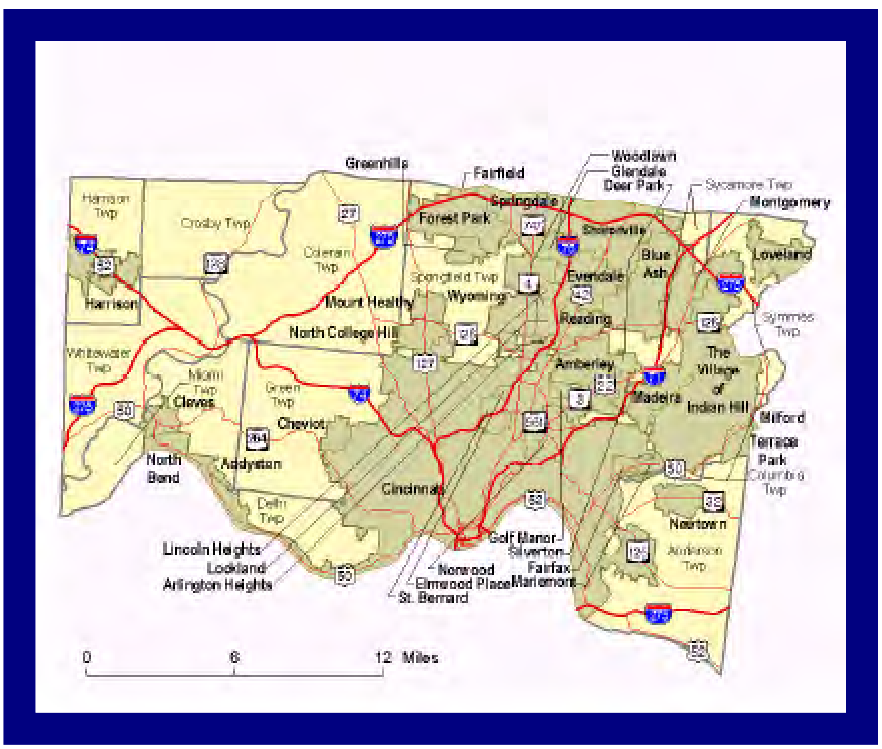
	Spring Sort Total Loads Sampled = 15	**Fall Sort** Total Loads Sampled = 18	**District** Total Loads Sampled = 33
Percent of sampled loads in which the following were noted:			
Computer Equipment	20	6	12
Electronic Equipment	20	22	21
Car Parts	20	17	18
Furniture	27	28	27
Plastic Barrels/Bins	33	6	18
Metal Containers	20	11	15
C & D Debris	67	61	64

TABLE 9.11
DEFIANCE-FULTON-PAULDING-WILLIAMS JOINT SOLID WASTE MANAGEMENT DISTRICT -- TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort June 2003	**Fall Sort** October 2003	**District**
Residential	4	9	13
Residential + Commercial	3	1	4
Residential + Apartments	2	1	3
Residential + Commercial + Apartments	5	4	9
Commercial + Apartments	1	2	3
Commercial	0	1	1
Apartments	0	0	0
TOTAL NUMBER OF LOADS SAMPLED	15	18	33

10. HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT

The Hamilton County Solid Waste Management District is located in the far southwest corner of Ohio. The Ohio River, which delineates the Ohio-Kentucky state line, forms the southern border of Hamilton County. The Ohio-Indiana state line borders Hamilton County to the west. Clermont County borders Hamilton County to the east; Butler County and Warren County border Hamilton County to the north. The Cincinnati metropolitan area lies within Hamilton County (see Map 10.1). The district encompasses Hamilton County with a population of 845,303 as recorded in 2000, and a land area of 407.4 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).



Source: <http://www.odod.state.oh.us/research>

MAP 10.1
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT

The waste sorts in this district were undertaken at the Rumpke Landfill, which is located in the northernmost portion of Hamilton County, near the Hamilton-Butler County Line, within Cincinnati, Ohio. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in May 2003 (Spring Sort) and October 2003 (Fall Sort).

Spring Sort Conditions

The waste sort at the Rumpke Landfill occurred on Monday, May 19, 2003, Tuesday, May 20, 2003, and Wednesday, May 21, 2003. The weather was partly cloudy and cool on Monday; cloudy, rainy, and cool on Tuesday; and partly cloudy, windy, and cool Wednesday. The waste sort was performed within 100 feet of the working face of the landfill, which allowed for easy access to loads brought to the site. The sorting and categorization processes were conducted within a three-tent complex. The weather did not impact the sort on Monday or Tuesday. However, windy conditions on Wednesday did significantly impact the sort. Because the sort team was unable to contain fugitive waste and maintain the integrity of the samples, sort activities for the day were suspended. Visual sorts of incoming residential and commercial loads were continued and significant data was gathered during this process.

Fall Sort Conditions

The Fall Sort at the Rumpke Landfill was conducted on Tuesday, October 7, 2003; Wednesday, October 8, 2003; Thursday, October 9, 2003; and Friday, October 10, 2003. Unlike conditions encountered during the Spring Sort at this facility, the weather throughout the Fall Sort was calm, slightly cool, and very comfortable. The sort area was located away from the main working face and adjacent to the access road. This allowed for easy access to the collection vehicles and less disruption to facility operations. Landfill operators allowed those loads selected for sampling to be unloaded adjacent to the sort area. A maximum of three trucks could be unloaded at one time. Once the walk around and the sample gathering were complete, the operators were notified and the loads were moved to the main working face. This arrangement provided an added benefit. Because the sort area was in a secure location away from the main working face, landfill operators allowed our three-tent complex and sorting tables to remain in place overnight. The setup process was much quicker each morning and there was less delay in selecting loads and obtaining samples.

Observations

During the waste sort at the Rumpke Landfill, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. Landfill operators are very concerned about safety and the need to move vehicles in and out as quickly as possible;

2. Landfill operators are sensitive to their surroundings and adjust to changing weather conditions;

3. There is a significant inflow of commercial and industrial waste to this landfill;

4. During the Spring Waste Sort, both commercial and industrial waste streams included large amounts of corrugated paper. During the Fall Waste Sort, the level of corrugated paper in the commercial loads appeared to be less;

5. The industrial waste stream includes large amounts of slag or wasted raw materials, plastic, food, and wood (mostly wood pallets);

6. A number of industrial loads are from one source and appear to be loads of excess and out-of-date materials;

7. The residential collection vehicles are mostly rear packers. These vehicles can carry a large amount of solid waste – the solid waste appears to be placed at the curb in plastic bags or containers. In particular, the City of Cincinnati drivers collect anything placed at the curb;

8. During both the Spring Sort and the Fall Sort, landfill operators prepared a location for the waste sort activities that allowed for easy access to collection vehicles while minimizing impact to the landfill's operation.

Waste Sort Results and Analysis

A total of 69 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 10.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 10.1
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Monday	May 19, 2003	0519D1.01 through 0519D1.08
Tuesday	May 20, 2003	0520D2.01 through 0520D2.11
	FALL SORT	
Tuesday	October 7, 2003	1007D3.01 through 1007D3.16
Wednesday	October 8, 2003	1008D4.01 through 1008D4.14
Thursday	October 9, 2003	1009D5.01 through 1009D5.14
Friday	October 10, 2003	1010D6.01 through 1010D6.06

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 10.2 and Table 10.3) and the Fall Sort (see Table 10.4 and Table 10.5). Additionally, weight and volume summary data for both waste sorts conducted at the Rumpke Landfill in the Hamilton County Solid Waste Management District are presented in Table 10.6 and Table 10.7. Chart 10.1 and Chart 10.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

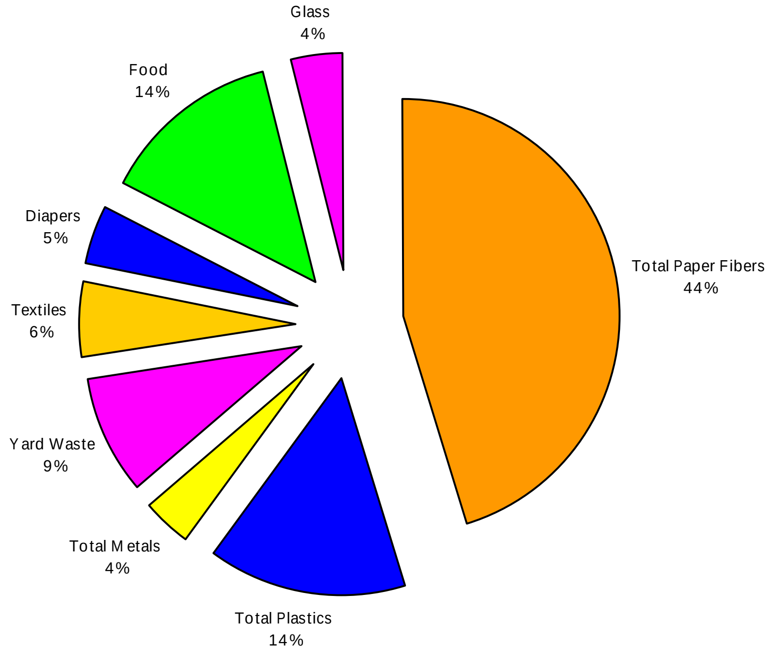


CHART 10.1
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT WEIGHT DISTRIBUTION

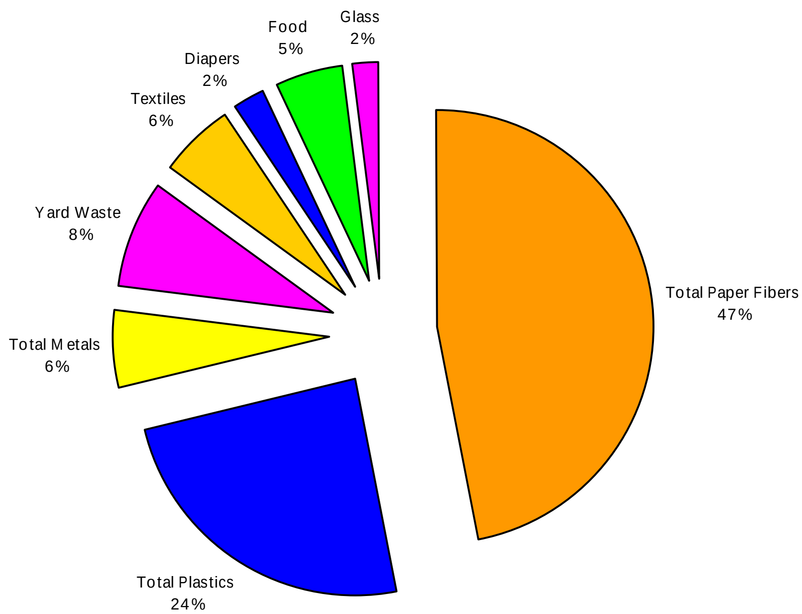


CHART 10.2
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 10.2
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	741.74	33.27%	14.62%
Office Paper	495.34	22.22%	9.76%
Mixed Paper	452.99	20.32%	8.93%
Newsprint	358.24	16.07%	7.06%
Magazines	174.34	7.82%	3.44%
Paperboard	6.94	0.31%	0.14%
TOTAL PAPER FIBERS	2,229.59		43.95%
LDPE #4	53.67	6.34%	1.06%
PET #1	145.23	17.17%	2.86%
HDPE #2	372.53	44.03%	7.34%
PVC #3	24.07	2.84%	0.47%
PP #5	40.28	4.76%	0.79%
PS #6	137.05	16.20%	2.70%
Other Plastics	73.24	8.66%	1.44%
TOTAL PLASTICS	846.07		16.68%
Aluminum Beverage Cans	69.97	38.41%	1.38%
Aluminum Foil/Food Trays	20.91	11.48%	0.41%
Other Aluminum	14.97	8.22%	0.30%
Tin Food Cans	69.07	37.91%	1.36%
Other Tin Cans	7.26	3.99%	0.14%
TOTAL METALS	182.18		3.59%
Yard Waste	500.87		9.87%
Textiles	289.44		5.71%
Diapers	205.67		4.05%
Food	510.72		10.07%
Glass	189.58		3.74%
Empty Aerosol Cans	15.17		0.30%
Medical Waste	5.59		0.11%
Fines and Superfines	14.31		0.28%
Other Minor Categories	83.58		1.65%
NET WEIGHT OF SORTED SAMPLE	5,072.77		100.00%

TABLE 10.3
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	181.75	42.90%	17.41%
Office Paper	121.37	28.65%	11.62%
Mixed Paper	47.11	11.12%	4.51%
Newsprint	38.23	9.02%	3.66%
Magazines	31.53	7.44%	3.02%
Paperboard	3.71	0.88%	0.36%
TOTAL PAPER FIBERS	423.71		40.58%
LDPE #4	14.84	4.90%	1.42%
PET #1	42.71	14.11%	4.09%
HDPE #2	130.28	43.04%	12.48%
PVC #3	12.04	3.98%	1.15%
PP #5	18.31	6.05%	1.75%
PS #6	62.30	20.58%	5.97%
Other Plastics	22.19	7.33%	2.13%
TOTAL PLASTICS	302.67		28.99%
Aluminum Beverage Cans	24.99	37.52%	2.39%
Aluminum Foil/Food Trays	9.96	14.95%	0.95%
Other Aluminum	9.36	14.05%	0.90%
Tin Food Cans	18.67	28.03%	1.79%
Other Tin Cans	3.63	5.45%	0.35%
TOTAL METALS	66.60		6.38%
Yard Waste	96.02		9.20%
Textiles	61.90		5.93%
Diapers	23.11		2.21%
Food	39.90		3.82%
Glass	20.61		1.97%
Empty Aerosol Cans	8.43		0.81%
Medical Waste	1.24		0.12%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	1,044.19		100.00%

TABLE 10.4
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	679.17	12.65%	5.64%
Office Paper	1,240.32	23.10%	10.29%
Mixed Paper	1,142.24	21.27%	9.48%
Newsprint	866.41	16.13%	7.19%
Magazines	567.20	10.56%	4.71%
Paperboard	874.47	16.28%	7.26%
TOTAL PAPER FIBERS	5,369.81		44.56%
LDPE #4	427.24	25.96%	3.55%
PET #1	256.62	15.59%	2.13%
HDPE #2	469.54	28.53%	3.90%
PVC #3	43.03	2.61%	0.36%
PP #5	60.63	3.68%	0.50%
PS #6	185.46	11.27%	1.54%
Other Plastics	203.45	12.36%	1.69%
TOTAL PLASTICS	1,645.97		13.66%
Aluminum Beverage Cans	169.68	40.52%	1.41%
Aluminum Foil/Food Trays	48.18	11.51%	0.40%
Other Aluminum	26.68	6.37%	0.22%
Tin Food Cans	163.59	39.07%	1.36%
Other Tin Cans	10.58	2.53%	0.09%
TOTAL METALS	418.71		3.47%
Yard Waste	975.15		8.09%
Textiles	635.64		5.28%
Diapers	551.36		4.58%
Food	1,763.89		14.64%
Glass	482.87		4.01%
Empty Aerosol Cans	22.12		0.18%
Medical Waste	1.82		0.02%
Fines and Superfines	10.50		0.09%
Other Minor Categories	171.86		1.43%
NET WEIGHT OF SORTED SAMPLE	12,049.70		100.00%

TABLE 10.5
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	166.42	13.30%	6.55%
Office Paper	303.92	24.28%	11.96%
Mixed Paper	118.79	9.49%	4.67%
Newsprint	92.47	7.39%	3.64%
Magazines	102.57	8.19%	4.03%
Paperboard	467.56	37.35%	18.39%
TOTAL PAPER FIBERS	1,251.73		49.24%
LDPE #4	118.17	21.37%	4.65%
PET #1	75.48	13.65%	2.97%
HDPE #2	164.21	29.70%	6.46%
PVC #3	21.52	3.89%	0.85%
PP #5	27.56	4.98%	1.08%
PS #6	84.30	15.25%	3.32%
Other Plastics	61.65	11.15%	2.43%
TOTAL PLASTICS	552.88		21.75%
Aluminum Beverage Cans	60.60	40.48%	2.38%
Aluminum Foil/Food Trays	22.94	15.32%	0.90%
Other Aluminum	16.68	11.14%	0.66%
Tin Food Cans	44.21	29.53%	1.74%
Other Tin Cans	5.29	3.53%	0.21%
TOTAL METALS	149.72		5.89%
Yard Waste	186.95		7.35%
Textiles	135.95		5.35%
Diapers	61.95		2.44%
Food	137.80		5.42%
Glass	52.49		2.06%
Empty Aerosol Cans	12.29		0.48%
Medical Waste	0.40		0.02%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	2,542.16		100.00%

TABLE 10.6
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,420.91	18.70%	8.30%
Office Paper	1,735.66	22.84%	10.14%
Mixed Paper	1,595.23	20.99%	9.32%
Newsprint	1,224.65	16.12%	7.15%
Magazines	741.54	9.76%	4.33%
Paperboard	881.41	11.60%	5.15%
TOTAL PAPER FIBERS	7,599.40		44.38%
LDPE #4	480.91	19.30%	2.81%
PET #1	401.85	16.13%	2.35%
HDPE #2	842.07	33.79%	4.92%
PVC #3	67.10	2.69%	0.39%
PP #5	100.91	4.05%	0.59%
PS #6	322.51	12.94%	1.88%
Other Plastics	276.69	11.10%	1.62%
TOTAL PLASTICS	2,492.04		14.55%
Aluminum Beverage Cans	239.65	39.88%	1.40%
Aluminum Foil/Food Trays	69.09	11.50%	0.40%
Other Aluminum	41.65	6.93%	0.24%
Tin Food Cans	232.66	38.72%	1.36%
Other Tin Cans	17.84	2.97%	0.10%
TOTAL METALS	600.89		3.51%
Yard Waste	1,476.02		8.62%
Textiles	925.08		5.40%
Diapers	757.03		4.42%
Food	2,274.61		13.28%
Glass	672.45		3.93%
Empty Aerosol Cans	37.29		0.22%
Medical Waste	7.41		0.04%
Fines and Superfines	24.81		0.14%
Other Minor Categories	255.44		1.49%
NET WEIGHT OF SORTED SAMPLE	17,122.47		100.00%

TABLE 10.7
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	348.17	20.78%	9.71%
Office Paper	425.29	25.38%	11.86%
Mixed Paper	165.90	9.90%	4.63%
Newsprint	130.70	7.80%	3.64%
Magazines	134.09	8.00%	3.74%
Paperboard	471.27	28.13%	13.14%
TOTAL PAPER FIBERS	1,675.44		46.72%
LDPE #4	133.02	15.55%	3.71%
PET #1	118.19	13.81%	3.30%
HDPE #2	294.49	34.42%	8.21%
PVC #3	33.55	3.92%	0.94%
PP #5	45.87	5.36%	1.28%
PS #6	146.60	17.13%	4.09%
Other Plastics	83.85	9.80%	2.34%
TOTAL PLASTICS	855.55		23.86%
Aluminum Beverage Cans	85.59	39.57%	2.39%
Aluminum Foil/Food Trays	32.90	15.21%	0.92%
Other Aluminum	26.03	12.03%	0.73%
Tin Food Cans	62.88	29.07%	1.75%
Other Tin Cans	8.92	4.12%	0.25%
TOTAL METALS	216.32		6.03%
Yard Waste	282.97		7.89%
Textiles	197.85		5.52%
Diapers	85.06		2.37%
Food	177.70		4.96%
Glass	73.09		2.04%
Empty Aerosol Cans	20.72		0.58%
Medical Waste	1.65		0.05%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	3,586.35		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Rumpke Landfill. Table 10.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 10.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single categories – by weight – are food and corrugated paper; yard waste, office paper, and mixed paper are also prominent single categories – by weight.

The other dominant major components – by volume – were plastics and yard waste. Corrugated paper, paperboard, HDPE #2, office paper, and yard waste were the most dominant single categories – by volume.

Well over 5,000 tons of solid waste is delivered to the Rumpke Landfill daily. Residential, commercial, industrial, and construction and demolition debris loads are delivered to the site. Of the 69 loads sampled during the waste sort at this facility, 28 of the loads contained only residential waste and 10 of the loads contained only commercial waste. The remaining 31 sampled loads were a mix of commercial, residential, and/or apartment waste. The best example of the variance in waste can be seen in the difference between the spring and fall numbers. The percentage of residential loads was larger in the fall. This likely impacted the amounts of corrugated paper and office paper.

TABLE 10.8
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY WEIGHT

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 43.95%	Paper – 44.56%	Paper – 44.38%
2	Plastics – 16.68%	Food – 14.64%	Plastics – 14.55%
3	Food – 10.07%	Plastics – 13.76%	Food – 13.28%
TOP MATERIAL CATEGORIES			
1	Corrugated Paper – 14.63%	Food – 14.64%	Food – 13.28%
2	Food – 10.07%	Office Paper – 10.29%	Office Paper – 10.14%
3	Yard Waste – 9.87%	Mixed Paper – 9.48%	Mixed Paper – 9.32%
BOTTOM MATERIAL CATEGORIES			
1	Soap	Lighter	Lighter
2	Wax	Soap	Kerosene
3	Air Filters	Kerosene	Soap

TABLE 10.9
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY VOLUME

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 40.58%	Paper – 49.55%	Paper – 46.72%
2	Plastics – 28.99%	Plastics – 21.91%	Plastics – 23.86%
3	Yard Waste – 9.20%	Yard Waste – 6.75%	Yard Waste – 7.89%
TOP MATERIAL CATEGORIES			
1	Corrugated Paper – 17.41%	Paperboard – 18.54%	Paperboard – 13.14%
2	HDPE #2 – 12.48%	Office Paper – 12.15%	Office Paper – 11.86%
3	Office Paper – 11.62%	Yard Waste – 6.75%	Corrugated Paper – 9.71%
BOTTOM MATERIAL CATEGORIES			
1	Med Waste	Med Waste	Med Waste
2	Other Tin Cans	Other Tin Cans	Other Tin Cans
3	Paperboard	Empty Aerosol Cans	Empty Aerosol Cans

Visual Inspection Analysis

A total of 41 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, C & D debris, and carpet. Table 10.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items included C & D debris, furniture, and plastic barrels/bins.

Table 10.11 provides a breakdown of the types of waste selected for sampling. The majority of waste selected for sampling was residential or a mix of residential with commercial. Comparing this data to the information provided in Table 10.10, the impact of the residential-commercial mix is evident in the limited number of computer and electronic items and the large amount of C & D debris, furniture, and plastic items.

TABLE 10.10
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
VISUAL INSPECTION ANALYSIS RESULTS

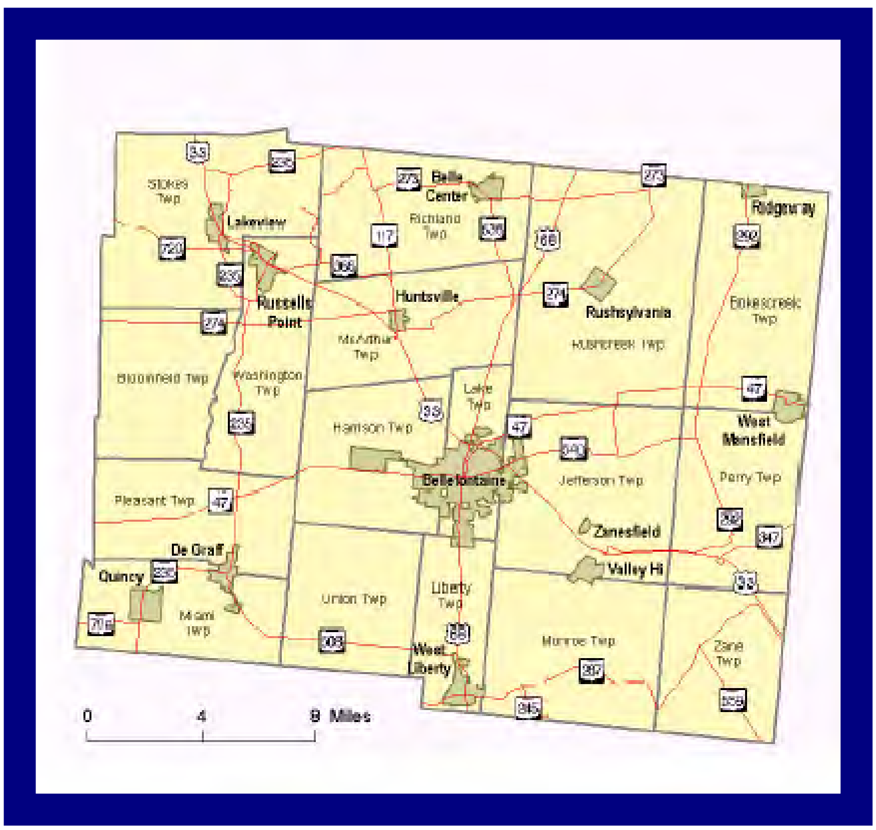
	Spring Sort Total Loads Sampled = 19	**Fall Sort** Total Loads Sampled = 50	**District** Total Loads Sampled = 69
Percent of sampled loads in which the following were noted:			
Computer Equipment	42	26	30
Electronic Equipment	32	22	34
Car Parts	21	4	9
Furniture	47	48	48
Plastic Barrels/Bins	32	50	45
Metal Containers	16	12	13
C & D Debris	58	74	70

TABLE 10.11
HAMILTON COUNTY SOLID WASTE MANAGEMENT DISTRICT
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
Residential	9	19	28
Residential + Commercial	0	2	2
Residential + Apartments	0	5	5
Residential + Commercial + Apartments	1	3	4
Commercial + Apartments	3	16	19
Commercial	5	5	10
Apartments	1	0	1
TOTAL NUMBER OF LOADS SAMPLED	19	50	69

11. LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT

The Logan County Solid Waste Management District is located in the west-central portion of Ohio. Logan County is bordered by Union County to the east, Hardin County to the north, Auglaize County to the north and west, Shelby County to the west, and Champaign County to the south (see Map 11.1). The district encompasses Logan County with a population of 46,005 as recorded in 2000, and a land area of 458.5 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).



Source: <http://www.odod.state.oh.us/research>

MAP 11.1
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT

The waste sorts in this district were undertaken at the Cherokee Run Landfill, which is located just north of Bellefontaine, Ohio, along U.S. Route 68, in the central portion of Logan County. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort).

Spring Sort Conditions

The waste sort at the Cherokee Run Landfill occurred on Wednesday, June 25, 2003, and Thursday, June 26, 2003. On Wednesday, it was clear, hot and humid with afternoon breezes. It was hazy and humid on Thursday with strong gusting winds in the afternoon. Because of the strong winds, fugitive waste and blowing debris became a problem. The waste sort was stopped in the early afternoon and only four samples were sorted on Thursday. The waste sort was performed in a three-tent complex away from the working face. Loads were selected and the samples were collected at the working face and then hauled to the sorting area. After the samples were sorted, the discards were then hauled back to the working face and disposed

Fall Sort Conditions

The Fall Waste Sort was conducted on Monday, September 22, 2003, and Tuesday, September 23, 2003. Unlike during the spring, the waste sort site was located adjacent to the working face. Rain had fallen at the site the day before the start of the Fall Waste Sort. Steady to heavy rain continued during the day on Monday. The operations staff built a pad for the waste sort site. The pad was constructed of fractured shale, which remained firm during the rain event. The sort efforts were hampered all day Monday by the rain, which did end in the afternoon but was replaced with high winds out of the northwest. The high winds blew down the three-tent sorting complex Monday afternoon and as a result sorting for the day was halted.

On Tuesday the skies cleared and the temperature dropped. A strong breeze from the northwest blew most of the day. The high winds affected the sort efforts and sorting for the day was halted at 3:00 pm. Although the weather conditions were exceptionally difficult during the Fall Waste Sort, the landfill operations staff was very helpful and supportive.

Observations

During the waste sorts at the Cherokee Run Landfill in Bellefontaine, Ohio, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. Large amounts of food and office paper were delivered to this facility during the two-day Spring Sort. Some of the loads that were sampled included waste from schools. It is possible these schools were completing the removal of materials left over from the recently concluded school year;

2. Landfill operators are very concerned about safety and required strict adherence to safety procedures;

3. Only solid waste from Logan County was selected for sampling. One load from an adjacent county was sampled inadvertently;

4. There is a significant inflow of transfer trailers to this facility from outside Logan County;

5. The majority of waste brought to the site is by private haulers;

6. Most commercial loads are brought to the site by front loader. These trucks also collect apartments;

7. The residential collection vehicles are mostly rear packers. These vehicles can carry a large amount of solid waste; the solid waste appears to be placed at the curb in plastic bags or containers. The drivers appear to collect anything placed at the curb;

8. The landfill has increased its daily inflow of solid waste. In August 2003, the landfill began accepting solid waste from Montgomery County. Although this did not impact the waste sort, it did impact the landfill operation;

9. Because of the increased truck traffic at the site, the landfill is open earlier. Although the landfill is accepting more waste, it does not appear to adversely impact its operation or the continued emphasis on safety.

Waste Sort Results and Analysis

A total of 19 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 11.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 11.1
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Wednesday	June 25, 2003	0625D1.01 through 0625D1.07
Thursday	June 26, 2003	0626D2.01 through 0626D2.04
	FALL SORT	
Monday	September 22, 2003	0922D3.01 through 0922D3.05
Tuesday	September 23, 2003	0923D4.01 through 0923D4.03

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 11.2 and Table 11.3) and the Fall Sort (see Table 11.4 and Table 11.5). Additionally, weight and volume summary data for both waste sorts conducted at the Cherokee Run Landfill in the Logan County Solid Waste Management District are presented in Table 11.6 and Table 11.7. Chart 11.1 and Chart 11.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

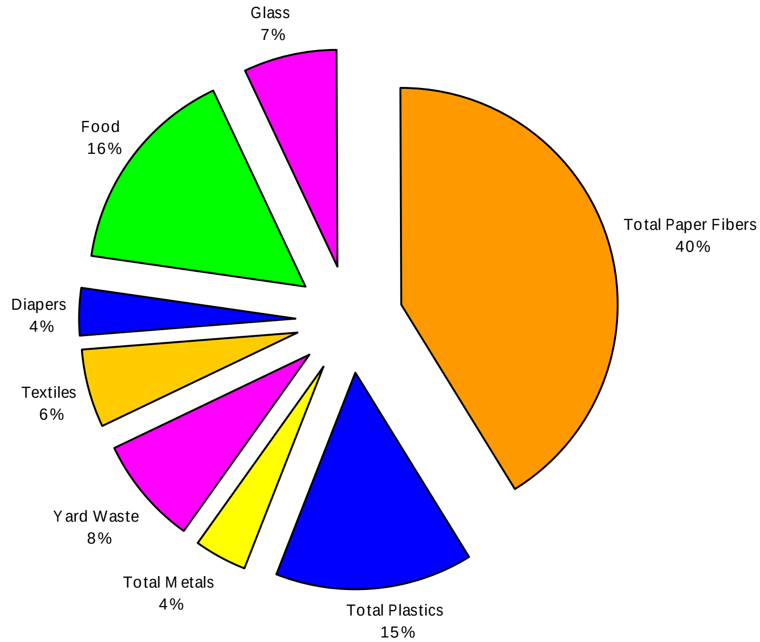


CHART 11.1
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT WEIGHT DISTRIBUTION

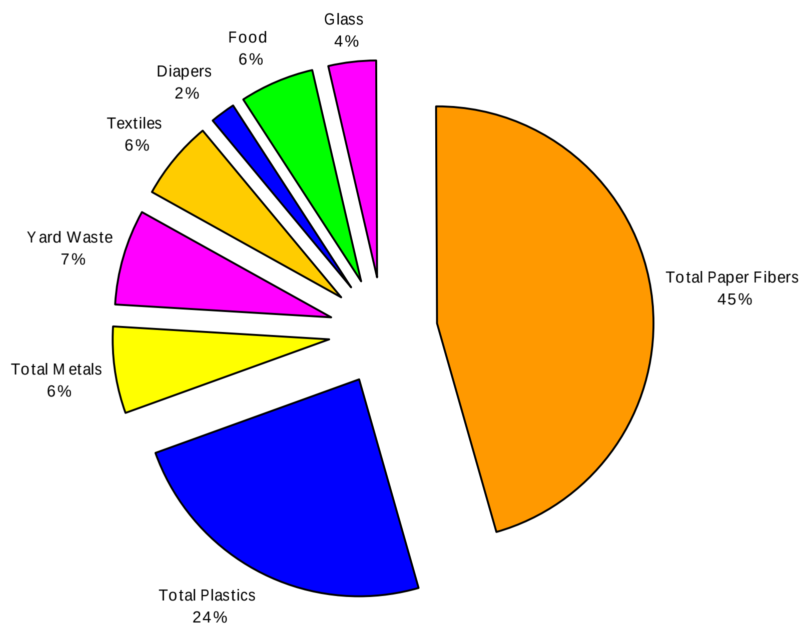


CHART 11.2
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 11.2
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	144.78	15.07%	6.35%
Office Paper	232.97	24.25%	10.21%
Mixed Paper	188.70	19.64%	8.27%
Newsprint	133.50	13.90%	5.85%
Magazines	90.99	9.47%	3.99%
Paperboard	169.81	17.67%	7.44%
TOTAL PAPER FIBERS	960.75		42.11%
LDPE #4	26.79	8.11%	1.17%
PET #1	50.69	15.35%	2.22%
HDPE #2	144.15	43.65%	6.32%
PVC #3	8.26	2.50%	0.36%
PP #5	17.22	5.21%	0.75%
PS #6	35.15	10.64%	1.54%
Other Plastics	47.96	14.52%	2.10%
TOTAL PLASTICS	330.22		14.47%
Aluminum Beverage Cans	33.23	38.31%	1.46%
Aluminum Foil/Food Trays	9.29	10.71%	0.41%
Other Aluminum	6.22	7.17%	0.27%
Tin Food Cans	32.26	37.19%	1.41%
Other Tin Cans	5.75	6.63%	0.25%
TOTAL METALS	86.75		3.80%
Yard Waste	160.00		7.01%
Textiles	158.65		6.95%
Diapers	73.59		3.23%
Food	366.50		16.06%
Glass	106.41		4.66%
Empty Aerosol Cans	6.29		0.28%
Medical Waste	6.27		0.27%
Fines and Superfines	2.28		0.10%
Batteries	1.29		0.06%
Mixed Metals	6.62		0.29%
Other Non-Ferrous Metals	2.51		0.11%
Wood	0.54		0.02%
Gypsum Drywall	0.94		0.04%
Power Tools	3.69		0.16%
Cell Phones	0.52		0.02%
Computer Parts	0.25		0.01%
Telephone Books	4.46		0.20%
Copier Toner	2.14		0.09%
Wax	0.95		0.04%
Rubber	0.00		0.00%
NET VOLUME OF SORTED SAMPLE	2,281.62		100.00%

TABLE 11.3
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	35.48	15.18%	7.11%
Office Paper	57.09	24.43%	11.45%
Mixed Paper	19.62	8.40%	3.94%
Newsprint	14.25	6.10%	2.86%
Magazines	16.45	7.04%	3.30%
Paperboard	90.79	38.85%	18.21%
TOTAL PAPER FIBERS	233.68		46.87%
LDPE #4	7.41	6.43%	1.49%
PET #1	14.91	12.94%	2.99%
HDPE #2	50.41	43.76%	10.11%
PVC #3	4.13	3.59%	0.83%
PP #5	7.83	6.79%	1.57%
PS #6	15.98	13.87%	3.20%
Other Plastics	14.53	12.62%	2.91%
TOTAL PLASTICS	115.20		23.10%
Aluminum Beverage Cans	11.87	37.35%	2.38%
Aluminum Foil/Food Trays	4.42	13.92%	0.89%
Other Aluminum	3.89	12.24%	0.78%
Tin Food Cans	8.72	27.44%	1.75%
Other Tin Cans	2.88	9.05%	0.58%
TOTAL METALS	31.77		6.37%
Yard Waste	30.67		6.15%
Textiles	33.93		6.81%
Diapers	8.27		1.66%
Food	28.63		5.74%
Glass	11.57		2.32%
Empty Aerosol Cans	3.49		0.70%
Medical Waste	1.39		0.28%
Fines and Superfines			
Batteries			
Mixed Metals			
Other Non-Ferrous Metals			
Wood			
Gypsum Drywall			
Power Tools			
Cell Phones			
Computer Parts			
Telephone Books			
Copier Toner			
Wax			
Rubber			
NET VOLUME OF SORTED SAMPLE	498.61		100.00%

TABLE 11.4
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	88.63	12.25%	4.62%
Office Paper	126.96	17.55%	6.62%
Mixed Paper	180.57	24.95%	9.41%
Newsprint	95.16	13.15%	4.96%
Magazines	101.73	14.06%	5.30%
Paperboard	130.54	18.04%	6.80%
TOTAL PAPER FIBERS	723.59		37.70%
LDPE #4	34.05	12.30%	1.77%
PET #1	45.13	16.30%	2.35%
HDPE #2	117.07	42.28%	6.10%
PVC #3	7.25	2.62%	0.38%
PP #5	5.57	2.01%	0.29%
PS #6	32.79	11.84%	1.71%
Other Plastics	35.04	12.65%	1.83%
TOTAL PLASTICS	276.90		14.43%
Aluminum Beverage Cans	23.47	33.13%	1.22%
Aluminum Foil/Food Trays	7.75	10.94%	0.40%
Other Aluminum	5.14	7.25%	0.27%
Tin Food Cans	33.86	47.79%	1.76%
Other Tin Cans	0.63	0.89%	0.03%
TOTAL METALS	70.85		3.69%
Yard Waste	171.37		8.93%
Textiles	82.02		4.27%
Diapers	71.30		3.72%
Food	284.97		14.85%
Glass	179.36		9.35%
Empty Aerosol Cans	22.95		1.20%
Medical Waste	1.80		0.09%
Fines and Superfines	1.69		0.09%
Batteries	0.55		0.03%
Mixed Metals	13.07		0.68%
Other Non-Ferrous Metals	0.00		0.00%
Wood	5.89		0.31%
Gypsum Drywall	0.00		0.00%
Power Tools	0.00		0.00%
Cell Phones	0.59		0.03%
Computer Parts	0.00		0.00%
Telephone Books	0.00		0.00%
Copier Toner	0.00		0.00%
Wax	0.00		0.00%
Rubber	12.31		0.64%
NET WEIGHT OF SORTED SAMPLE	1,919.21		100.00%

TABLE 11.5
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	21.72	12.78%	5.38%
Office Paper	31.11	18.30%	7.71%
Mixed Paper	18.78	11.05%	4.66%
Newsprint	10.16	5.98%	2.52%
Magazines	18.40	10.82%	4.56%
Paperboard	69.80	41.07%	17.31%
TOTAL PAPER FIBERS	169.96		42.14%
LDPE #4	9.42	9.88%	2.34%
PET #1	13.27	13.93%	3.29%
HDPE #2	40.94	42.95%	10.15%
PVC #3	3.63	3.80%	0.90%
PP #5	2.53	2.66%	0.63%
PS #6	14.90	15.64%	3.70%
Other Plastics	10.62	11.14%	2.63%
TOTAL PLASTICS	95.31		23.63%
Aluminum Beverage Cans	8.38	33.87%	2.08%
Aluminum Foil/Food Trays	3.69	14.91%	0.91%
Other Aluminum	3.21	12.98%	0.80%
Tin Food Cans	9.15	36.97%	2.27%
Other Tin Cans	0.32	1.27%	0.08%
TOTAL METALS	24.75		6.14%
Yard Waste	32.85		8.15%
Textiles	17.54		4.35%
Diapers	8.01		1.99%
Food	22.26		5.52%
Glass	19.50		4.83%
Empty Aerosol Cans	12.75		3.16%
Medical Waste	0.40		0.10%
Fines and Superfines			
Batteries			
Mixed Metals			
Other Non-Ferrous Metals			
Wood			
Gypsum Drywall			
Power Tools			
Cell Phones			
Computer Parts			
Telephone Books			
Copier Toner			
Wax			
Rubber			
NET VOLUME OF SORTED SAMPLE	403.33		100.00%

TABLE 11.6
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	233.41	13.86%	5.56%
Office Paper	359.93	21.37%	8.57%
Mixed Paper	369.27	21.92%	8.79%
Newsprint	228.66	13.58%	5.44%
Magazines	192.72	11.44%	4.59%
Paperboard	300.35	17.83%	7.15%
TOTAL PAPER FIBERS	1,684.34		40.10%
LDPE #4	60.84	10.02%	1.45%
PET #1	95.82	15.78%	2.28%
HDPE #2	261.22	43.03%	6.22%
PVC #3	15.51	2.55%	0.37%
PP #5	22.79	3.75%	0.54%
PS #6	67.94	11.19%	1.62%
Other Plastics	83.00	13.67%	1.98%
TOTAL PLASTICS	607.12		14.45%
Aluminum Beverage Cans	56.70	35.98%	1.35%
Aluminum Foil/Food Trays	17.04	10.81%	0.41%
Other Aluminum	11.36	7.21%	0.27%
Tin Food Cans	66.12	41.95%	1.57%
Other Tin Cans	6.38	4.05%	0.15%
TOTAL METALS	157.60		3.75%
Yard Waste	331.37		7.89%
Textiles	240.67		5.73%
Diapers	144.89		3.45%
Food	651.47		15.51%
Glass	285.77		6.80%
Empty Aerosol Cans	29.24		0.70%
Medical Waste	8.07		0.19%
Fines and Superfines	3.97		0.09%
Batteries	1.84		0.04%
Mixed Metals	19.69		0.47%
Other Non-Ferrous Metals	2.51		0.06%
Wood	6.43		0.15%
Gypsum Drywall	0.94		0.02%
Power Tools	3.69		0.09%
Cell Phones	1.11		0.03%
Computer Parts	0.25		0.01%
Telephone Books	4.46		0.11%
Copier Toner	2.14		0.05%
Wax	0.95		0.02%
Rubber	12.31		0.29%
NET WEIGHT OF SORTED SAMPLE	4,200.83		100.00%

TABLE 11.7
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	57.19	14.17%	6.34%
Office Paper	88.19	21.85%	9.78%
Mixed Paper	38.40	9.51%	4.26%
Newsprint	24.40	6.05%	2.71%
Magazines	34.85	8.63%	3.86%
Paperboard	160.59	39.79%	17.80%
TOTAL PAPER FIBERS	403.64		44.75%
LDPE #4	16.83	7.99%	1.87%
PET #1	28.18	13.39%	3.12%
HDPE #2	91.35	43.40%	10.13%
PVC #3	7.76	3.68%	0.86%
PP #5	10.36	4.92%	1.15%
PS #6	30.88	14.67%	3.42%
Other Plastics	25.15	11.95%	2.79%
TOTAL PLASTICS	210.51		23.34%
Aluminum Beverage Cans	20.25	35.83%	2.25%
Aluminum Foil/Food Trays	8.11	14.36%	0.90%
Other Aluminum	7.10	12.56%	0.79%
Tin Food Cans	17.87	31.62%	1.98%
Other Tin Cans	3.19	5.64%	0.35%
TOTAL METALS	56.52		6.27%
Yard Waste	63.53		7.04%
Textiles	51.47		5.71%
Diapers	16.28		1.80%
Food	50.90		5.64%
Glass	31.06		3.44%
Empty Aerosol Cans	16.24		1.80%
Medical Waste	1.79		0.20%
Fines and Superfines			
Batteries			
Mixed Metals			
Other Non-Ferrous Metals			
Wood			
Gypsum Drywall			
Power Tools			
Cell Phones			
Computer Parts			
Telephone Books			
Copier Toner			
Wax			
Rubber			
NET VOLUME OF SORTED SAMPLE	901.95		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Cherokee Run Landfill. Table 11.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 11.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The other major components of the waste stream – by weight – are food and plastics. The most prominent single category – by weight – is food; yard waste, mixed paper, and office paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Paperboard was the most dominant single category – by volume – with office paper, HDPE #2, and yard waste as the other dominant single categories.

The samples gathered at this facility were limited to only waste that was collected in Logan County . This resulted in a smaller sample pool while it also provided relative consistency between the Spring Sort and the Fall Sort. This consistency, with a bias toward residential waste, could explain the higher amounts of mixed paper.

TABLE 11.8
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY WEIGHT

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 42.11%	Paper – 37.70%	Paper – 40.10 %
2	Food – 16.06%	Food – 14.85%	Food – 15.51%
3	Plastics – 14.47%	Plastics – 14.43%	Plastics – 14.45%
TOP MATERIAL CATEGORIES			
1	Food – 16.06%	Food – 14.85%	Food – 15.51%
2	Office Paper – 10.21%	Mixed Paper – 9.41%	Mixed Paper – 8.79%
3	Mixed Paper – 8.27%	Yard Waste – 8.93%	Office Paper – 8.57%
BOTTOM MATERIAL CATEGORIES			
1	Computer Parts	Batteries	Computer Parts
2	Cell Phones	Cell Phones	Gypsum Drywall
3	Wood	Other Tin Cans	Other Tin Cans

TABLE 11.9
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY VOLUME

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 46.87%	Paper – 42.14%	Paper – 44.75%
2	Plastics – 23.10%	Plastics – 23.63%	Plastics – 23.34%
3	Textiles – 6.81%	Yard Waste – 8.15%	Yard Waste – 7.04%
TOP MATERIAL CATEGORIES			
1	Paperboard – 18.21%	Paperboard – 17.31%	Paperboard – 17.80%
2	Office Paper – 11.45%	HDPE #2 – 10.15%	HDPE #2 - 10.13%
3	HDPE#2 – 10.11%	Yard Waste – 8.15%	Office Paper – 9.78%
BOTTOM MATERIAL CATEGORIES			
1	Med Waste	Other Tin Cans	Med Waste
2	Other Tin Cans	Med Waste	Other Tin Cans
3	Empty Aerosol Cans	PP #5	Other Aluminum

Visual Inspection Analysis

A total of 30 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the most frequently identified large items were loose wood, carpet, small appliances, and C & D debris. Table 11.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, furniture, and plastic barrels/bins.

Table 11.11 provides a breakdown of the types of waste selected for sampling. The data indicates a consistency in the types of waste for the sampled loads during both the Spring Sort and the Fall Sort. This likely occurred because only waste that was collected in Logan County was sorted, which limited the sample size. Comparing this data to the information provided in Table 11.10, the possible impact of the limited sample size and consistency in the types of waste sampled is evident in the large variance among the seven major categories.

TABLE 11.10
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
VISUAL INSPECTION ANALYSIS RESULTS

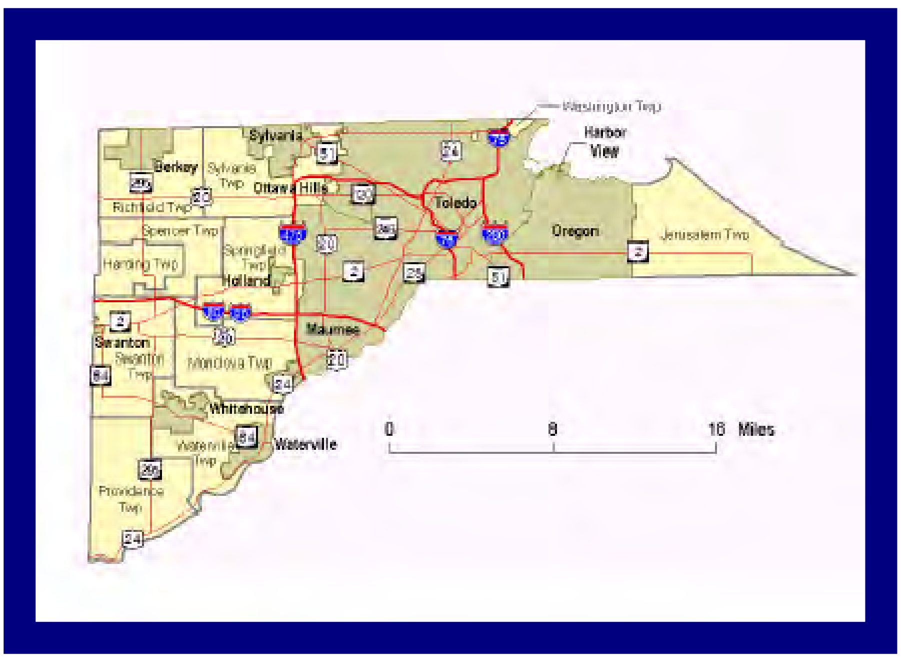
	Spring Sort Total Loads Sampled = 11	**Fall Sort** Total Loads Sampled = 8	**District** Total Loads Sampled = 19
Percent of sampled loads in which the following were noted:			
Computer Equipment	27	13	21
Electronic Equipment	18	13	16
Car Parts	0	0	0
Furniture	36	38	37
Plastic Barrels/Bins	9	63	32
Metal Containers	0	0	0
C & D Debris	55	25	42

TABLE 11.11
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
Residential	3	2	5
Residential + Commercial	2	2	4
Residential + Apartments	1	0	1
Residential + Commercial + Apartments	1	0	1
Commercial + Apartments	4	3	7
Commercial	0	1	1
Apartments	0	0	0
TOTAL NUMBER OF LOADS SAMPLED	11	8	19

12. LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT

The Lucas County Solid Waste Management District is located in the northwest portion of Ohio. Wood County is directly south of Lucas County. The Maumee River forms the Lucas-Wood County Line. Maumee Bay borders Lucas County to the northeast. The Ohio-Michigan state line delineates the north border of Lucas County. Lucas County is bordered by Fulton County to the west. The Toledo metropolitan area lies within Lucas County (see Map 12.1). The district encompasses Lucas County with a population of 455,054 as recorded in 2000, and a land area of 340.4 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).



Source: <http://www.odod.state.oh.us/research>

MAP 12.1
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT

The waste sorts in this district were undertaken at the Hoffman Road Landfill located in the northern portion of Lucas County, within Toledo, Ohio. The landfill is a publicly-owned and publicly-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort).

Spring Sort Conditions

Windy and rainy conditions were encountered during the Spring Sort at the Hoffman Road Landfill. The waste sort was performed in a three-tent complex within 100 feet of the working face of the landfill and allowed for easy access to loads brought to the site. The weather was clear and cool on Monday, June 16, 2003, with strong gusting winds in the afternoon. The windy conditions slowed the sort process in the afternoon.

On Tuesday, June 17, 2003, it was very rainy and wet. The rainy and wet conditions caused several safety concerns. Consequently, the waste sort was conducted within the facility's maintenance building. The loads were selected and samples were collected at the working face and then hauled to the maintenance building for sorting. After each sample was sorted and categorized, the discards were placed into the bucket of a front-end loader that was parked in front of the building. As the bucket became full, the waste was taken to the citizen drop-off area and disposed in one of the roll-off containers to be transported to the landfill working face at a later time.

Fall Sort Conditions

Clear, calm and comfortable conditions were encountered during the Fall Sort at the Hoffman Road Landfill. On both Thursday, September 11, 2003, and Friday, September 12, 2003, skies were clear. Winds were very calm on Thursday and there was a slight south breeze on Friday.

On both days, the waste sort was performed in the facility's maintenance building. Two vehicle truck bays were cleared for out use. As during the Spring Sort, the loads were selected and samples were collected at the working face and then hauled to the maintenance building for sorting. Discards were placed into the bucket of a front-end loader and then disposed in roll-off containers in the citizen drop-off area.

Observations

During the waste sort at the Hoffman Road Landfill, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. Most of the trucks delivering waste to this facility arrived in waves. There was a rush of trucks around 9:00 am and then again between 11:30 am and 1:00 pm. The facility begins accepting waste at 8:00 am and closes at 2:00 pm;

2. A large amount of yard waste was delivered to this facility during the Spring Waste Sort. The weekend immediately prior to this sort was dry and warm which increased yard waste activity;

3. During the Fall Sort the amount of yard waste diminished. The amount of summer items -- lawn furniture, BBQ grills, and sporting equipment, and outdoor toys -- were more predominant;

4. Landfill operators are very concerned about safety and the need to move vehicles in and out as quickly as possible;

5. Landfill operators are sensitive to their surroundings and adjust to changing weather conditions;

6. There is little commercial and industrial waste delivered to this landfill;

7. Most commercial and industrial waste is taken to a nearby private landfill;

8. The majority of the waste delivered to this landfill is residential waste generated in Toledo;

9. The majority of the waste is collected by the City of Toledo via rear packer trucks utilizing two- or three-person crews;

10. The solid waste is collected either at the curb or in alleys. The City of Toledo drivers collect anything placed at the curb or in the alleys;

11. During the second day of the Spring Sort and both days of the Fall Sort, the sorting process was conducted within the maintenance building. This allowed for safer and more pleasant conditions for the sorting crew;

12. The sorting location was also near the citizen drop-off area for the landfill. The majority of materials dropped off by the general public were bulk items such as furniture, appliances, construction and demolition debris, and yard waste.

Waste Sort Results and Analysis

A total of 31 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 12.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 12.1
LOGAN COUNTY SOLID WASTE MANAGEMENT DISTRICT
SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Monday	June 16, 2003	0616D1.01 through 0616D1.08
Tuesday	June 17, 2003	0617D2.01 through 0617D2.10
	FALL SORT	
Thursday	September 11, 2003	0911D3.01 through 0911D3.06
Friday	September 12, 2003	0912D4.01 through 0912D4.07

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 12.2 and Table 12.3) and the Fall Sort (see Table 12.4 and Table 12.5). Additionally, weight and volume summary data for both waste sorts conducted at the Hoffman Road Landfill in the Lucas County Solid Waste Management District are presented in Table 12.6 and Table 12.7. Chart 12.1 and Chart 12.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

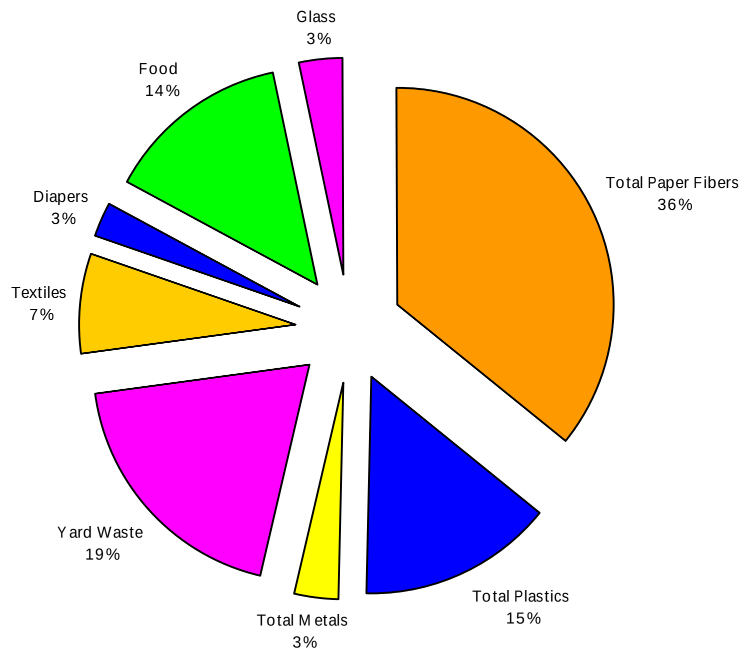


CHART 12.1
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT WEIGHT DISTRIBUTION

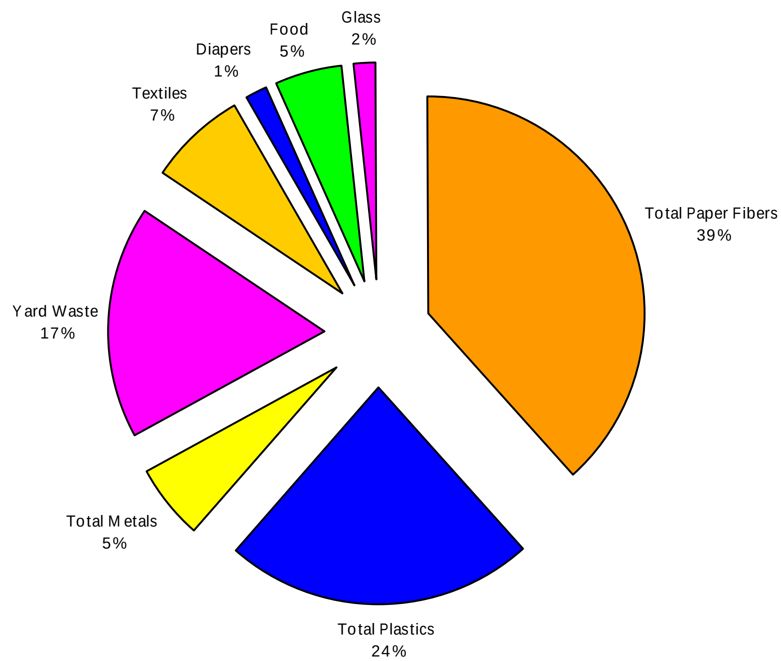


CHART 12.2
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 12.2
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	256.74	16.99%	5.75%
Office Paper	173.19	11.46%	3.88%
Mixed Paper	338.66	22.41%	7.58%
Newsprint	404.38	26.76%	9.06%
Magazines	116.60	7.72%	2.61%
Paperboard	221.38	14.65%	4.96%
TOTAL PAPER FIBERS	1,510.95		33.83%
LDPE #4	58.05	8.75%	1.30%
PET #1	78.91	11.90%	1.77%
HDPE #2	311.15	46.92%	6.97%
PVC #3	7.87	1.19%	0.18%
PP #5	11.68	1.76%	0.26%
PS #6	58.41	8.81%	1.31%
Other Plastics	137.05	20.67%	3.07%
TOTAL PLASTICS	663.12		14.85%
Aluminum Beverage Cans	56.86	39.47%	1.27%
Aluminum Foil/Food Trays	10.51	7.30%	0.24%
Other Aluminum	10.81	7.50%	0.24%
Tin Food Cans	52.22	36.25%	1.17%
Other Tin Cans	13.65	9.48%	0.31%
TOTAL METALS	144.05		3.23%
Yard Waste	805.41		18.04%
Textiles	388.44		8.70%
Diapers	123.01		2.75%
Food	584.42		13.09%
Glass	140.27		3.14%
Empty Aerosol Cans	10.98		0.25%
Medical Waste	37.62		0.84%
Fines and Superfines	9.92		0.22%
Batteries	3.81		0.09%
Mixed Metals	11.10		0.25%
Telephone Books	12.51		0.28%
Computer Parts	3.12		0.07%
Wood	8.80		0.20%
Wax	0.23		0.01%
Hard Cover Books	3.30		0.07%
Small Appliances	4.62		0.10%
NET WEIGHT OF SORTED SAMPLE	4,465.68		100.00%

TABLE 12.3
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	62.91	19.47%	6.78%
Office Paper	42.44	13.13%	4.57%
Mixed Paper	35.22	10.90%	3.79%
Newsprint	43.16	13.35%	4.65%
Magazines	21.08	6.52%	2.27%
Paperboard	118.37	36.63%	12.75%
TOTAL PAPER FIBERS	323.18		34.82%
LDPE #4	16.06	7.12%	1.73%
PET #1	23.21	10.30%	2.50%
HDPE #2	108.81	48.28%	11.72%
PVC #3	3.94	1.75%	0.42%
PP #5	5.31	2.36%	0.57%
PS #6	26.55	11.78%	2.86%
Other Plastics	41.53	18.42%	4.47%
TOTAL PLASTICS	225.40		24.28%
Aluminum Beverage Cans	20.31	38.31%	2.19%
Aluminum Foil/Food Trays	5.00	9.44%	0.54%
Other Aluminum	6.76	12.75%	0.73%
Tin Food Cans	14.11	26.63%	1.52%
Other Tin Cans	6.83	12.88%	0.74%
TOTAL METALS	53.01		5.71%
Yard Waste	154.41		16.63%
Textiles	83.08		8.95%
Diapers	13.82		1.49%
Food	45.66		4.92%
Glass	15.25		1.64%
Empty Aerosol Cans	6.10		0.66%
Medical Waste	8.36		0.90%
Fines and Superfines			
Batteries			
Mixed Metals			
Telephone Books			
Computer Parts			
Wood			
Wax			
Hard Cover Books			
Small Appliances			
NET VOLUME OF SORTED SAMPLE	928.26		100.00%

TABLE 12.4
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	166.59	14.67%	5.33%
Office Paper	161.25	14.20%	5.16%
Mixed Paper	203.39	17.91%	6.51%
Newsprint	258.21	22.74%	8.27%
Magazines	107.59	9.47%	3.44%
Paperboard	238.55	21.01%	7.64%
TOTAL PAPER FIBERS	1,135.58		36.35%
LDPE #4	78.94	19.04%	2.53%
PET #1	46.94	11.32%	1.50%
HDPE #2	194.00	46.80%	6.21%
PVC #3	9.89	2.39%	0.32%
PP #5	9.50	2.29%	0.30%
PS #6	25.57	6.17%	0.82%
Other Plastics	49.71	11.99%	1.59%
TOTAL PLASTICS	414.55		13.27%
Aluminum Beverage Cans	33.88	36.51%	1.08%
Aluminum Foil/Food Trays	7.54	8.13%	0.24%
Other Aluminum	4.82	5.19%	0.15%
Tin Food Cans	38.17	41.14%	1.22%
Other Tin Cans	8.38	9.03%	0.27%
TOTAL METALS	92.79		2.97%
Yard Waste	623.83		19.97%
Textiles	151.77		4.86%
Diapers	74.85		2.40%
Food	445.94		14.28%
Glass	98.79		3.16%
Empty Aerosol Cans	5.96		0.19%
Medical Waste	1.52		0.05%
Fines and Superfines	3.88		0.12%
Batteries	3.05		0.10%
Mixed Metals	9.33		0.30%
Telephone Books	4.03		0.13%
Electronics	9.05		0.29%
Paints	1.98		0.06%
Propane Tanks	0.90		0.03%
Wood	8.82		0.28%
Rubber	0.44		0.01%
Asphalt Shingles	3.93		0.13%
Linoleum	21.56		0.69%
Air Filters	1.16		0.04%
Hard Cover Books	7.48		0.24%
Oil Filters	2.56		0.08%
NET WEIGHT OF SORTED SAMPLE	3,123.75		100.00%

TABLE 12.5
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	40.82	14.79%	6.20%
Office Paper	39.51	14.31%	6.00%
Mixed Paper	21.15	7.66%	3.21%
Newsprint	27.56	9.98%	4.19%
Magazines	19.46	7.05%	2.96%
Paperboard	127.55	46.21%	19.37%
TOTAL PAPER FIBERS	276.05		41.93%
LDPE #4	21.83	15.66%	3.32%
PET #1	13.81	9.90%	2.10%
HDPE #2	67.84	48.66%	10.30%
PVC #3	4.95	3.55%	0.75%
PP #5	4.32	3.10%	0.66%
PS #6	11.62	8.34%	1.77%
Other Plastics	15.06	10.80%	2.29%
TOTAL PLASTICS	139.43		21.18%
Aluminum Beverage Cans	12.10	36.44%	1.84%
Aluminum Foil/Food Trays	3.59	10.81%	0.55%
Other Aluminum	3.01	9.07%	0.46%
Tin Food Cans	10.32	31.06%	1.57%
Other Tin Cans	4.19	12.62%	0.64%
TOTAL METALS	33.21		5.04%
Yard Waste	119.59		18.16%
Textiles	32.46		4.93%
Diapers	8.41		1.28%
Food	34.84		5.29%
Glass	10.74		1.63%
Empty Aerosol Cans	3.31		0.50%
Medical Waste	0.34		0.05%
Fines and Superfines			
Batteries			
Mixed Metals			
Telephone Books			
Electronics			
Paints			
Propane Tanks			
Wood			
Rubber			
Asphalt Shingles			
Linoleum			
Air Filters			
Hard Cover Books			
Oil Filters			
NET VOLUME OF SORTED SAMPLE	658.38		100.00%

TABLE 12.6
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	423.33	16.00%	5.58%
Office Paper	334.44	12.64%	4.41%
Mixed Paper	542.05	20.48%	7.14%
Newsprint	662.59	25.04%	8.73%
Magazines	224.19	8.47%	2.95%
Paperboard	459.93	17.38%	6.06%
TOTAL PAPER FIBERS	2,646.53		34.87%
LDPE #4	136.99	12.71%	1.81%
PET #1	125.85	11.68%	1.66%
HDPE #2	505.15	46.87%	6.66%
PVC #3	17.76	1.65%	0.23%
PP #5	21.18	1.97%	0.28%
PS #6	83.98	7.79%	1.11%
Other Plastics	186.76	17.33%	2.46%
TOTAL PLASTICS	1,077.67		14.20%
Aluminum Beverage Cans	90.74	38.31%	1.20%
Aluminum Foil/Food Trays	18.05	7.62%	0.24%
Other Aluminum	15.63	6.60%	0.21%
Tin Food Cans	90.39	38.17%	1.19%
Other Tin Cans	22.03	9.30%	0.29%
TOTAL METALS	236.84		3.12%
Yard Waste	1,429.24		18.83%
Textiles	540.21		7.12%
Diapers	197.86		2.61%
Food	1,030.36		13.58%
Glass	239.06		3.15%
Empty Aerosol Cans	16.94		0.22%
Medical Waste	39.14		0.52%
Fines and Superfines	13.80		0.18%
Other Minor Categories	121.78		1.60%
NET WEIGHT OF SORTED SAMPLE	7,589.43		100.00%

TABLE 12.7
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	103.73	17.31%	6.54%
Office Paper	81.95	13.68%	5.16%
Mixed Paper	56.37	9.41%	3.55%
Newsprint	70.71	11.80%	4.46%
Magazines	40.54	6.77%	2.56%
Paperboard	245.92	41.04%	15.50%
TOTAL PAPER FIBERS	599.22		37.77%
LDPE #4	37.89	10.39%	2.39%
PET #1	37.01	10.15%	2.33%
HDPE #2	176.66	48.42%	11.13%
PVC #3	8.88	2.43%	0.56%
PP #5	9.63	2.64%	0.61%
PS #6	38.17	10.46%	2.41%
Other Plastics	56.59	15.51%	3.57%
TOTAL PLASTICS	364.84		22.99%
Aluminum Beverage Cans	32.41	37.59%	2.04%
Aluminum Foil/Food Trays	8.60	9.97%	0.54%
Other Aluminum	9.77	11.33%	0.62%
Tin Food Cans	24.43	28.34%	1.54%
Other Tin Cans	11.02	12.78%	0.69%
TOTAL METALS	86.22		5.43%
Yard Waste	274.00		17.27%
Textiles	115.54		7.28%
Diapers	22.23		1.40%
Food	80.50		5.07%
Glass	25.98		1.64%
Empty Aerosol Cans	9.41		0.59%
Medical Waste	8.70		0.55%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	1,586.64		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Hoffman Road Landfill. Table 12.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 12.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume – during both seasons and in total. The other major components of the waste stream – by weight – are plastics, yard waste, and food. The most prominent single category – by weight – is yard waste; food and newsprint are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Yard waste and paperboard were the most dominant single categories – by volume – with HDPE #2 placing third.

Waste delivered to the Hoffman Road Landfill is predominantly residential. Of the 31 loads sampled during the waste sort at this facility, 27 of the loads contained only residential waste. This is likely the reason for the high amounts of yard waste and plastics and why the paper fibers component was less than 40% of the total district-wide weight and volume.

TABLE 12.8
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY WEIGHT

	Spring Sort June 2003	**Fall Sort** September 2003	**District (pounds)**
TOP COMPONENTS			
1	Paper – 33.83%	Paper – 36.35%	Paper – 34.87%
2	Yard Waste – 18.04%	Yard Waste – 19.97%	Yard Waste – 18.83%
3	Plastics – 14.85%	Food – 14.28%	Plastics – 14.20%
TOP MATERIAL CATEGORIES			
1	Yard Waste – 18.04%	Yard Waste – 19.97%	Yard Waste – 18.83%
2	Food – 13.09%	Food – 14.28%	Food – 13.58%
3	Newsprint – 9.06%	Newsprint – 8.27%	Newsprint – 8.73%
BOTTOM MATERIAL CATEGORIES			
1	Wax	Rubber	Wax
2	Computer Parts	Propane Tanks	Rubber
3	Hard Cover Books	Med Waste	Propane Tanks

TABLE 12.9
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY VOLUME

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 24.28%	Paper – 41.93%	Paper – 37.77%
2	Plastics - 24.28%	Plastics – 21.18%	Plastics – 22.99%
3	Yard Waste – 16.63%	Yard Waste – 18.16%	Yard Waste – 17.27%
TOP MATERIAL CATEGORIES			
1	Yard Waste – 16.63%	Paperboard – 19.37%	Yard Waste – 17.27%
2	Paperboard – 12.75%	Yard Waste – 18.16%	Paperboard – 15.50%
3	HDPE #2 – 11.72%	HDPE #2 – 10.30%	HDPE #2 – 11.13%
BOTTOM MATERIAL CATEGORIES			
1	PVC #3	Med Waste	Med Waste
2	Aluminum Foil/Food Trays	Other Aluminum	Aluminum Foil/Food Trays
3	PP #5	Empty Aerosol Cans	Empty Aerosol Cans

Visual Inspection Analysis

A total of 33 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, carpet, and mattresses. Table 12.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items included furniture, C & D debris, and plastic barrels/bins.

Table 12.11 provides a breakdown of the types of waste selected for sampling. The vast majority of waste selected for sampling was residential. Comparing this data to the information provided in Table 12.10, the impact of the residential waste is evident in the limited number of computer and electronic items and the large amount of furniture and plastic items present in the loads.

TABLE 12.10
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
VISUAL INSPECTION ANALYSIS RESULTS

	Spring Sort Total Loads Sampled = 18	**Fall Sort** Total Loads Sampled = 13	**District** Total Loads Sampled = 31
Percent of sampled loads in which the following were noted:			
Computer Equipment	22	8	13
Electronic Equipment	22	8	16
Car Parts	11	15	13
Furniture	50	38	45
Plastic Barrels/Bins	11	38	23
Metal Containers	0	0	0
C & D Debris	28	23	26

TABLE 12.11
LUCAS COUNTY SOLID WASTE MANAGEMENT DISTRICT
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
Residential	15	12	27
Residential + Commercial	0	0	0
Residential + Apartments	0	0	0
Residential + Commercial + Apartments	0	0	0
Commercial + Apartments	3	1	4
Commercial	0	0	0
Apartments	0	0	0
TOTAL NUMBER OF LOADS SAMPLED	18	13	31

13. MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT

The Montgomery County Solid Waste Management District is located in the southwest portion of Ohio. Butler County and Warren County border Montgomery County to the south. Montgomery County is bordered by Greene County to the east and Clark County to the northeast. Miami County lies directly north of Montgomery County; Preble County lies directly west of Montgomery County. Darke County borders Montgomery County to the northwest. A majority of the Dayton metropolitan area lies within Montgomery County (see Map 13.1). The district encompasses Montgomery County with a population of 559,062 as recorded in 2000, and a land area of 461.7 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).

Source: <http://www.odod.state.oh.us/research>

MAP 13.1
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT

Four days of waste sorts were undertaken at the South Transfer Facility which is located just east of the I-75 in the southern suburbs of Dayton, Ohio. Another two days of waste sorts were conducted at the North Transfer Facility which is located east of I-75 in the northern suburbs of Dayton, Ohio. At the South Transfer Facility, the sorting process was conducted inside the transfer facility building and adjacent to the tipping floor. At the North Transfer Facility, the sorting process was also conducted inside the transfer facility building. However, because the tipping floor at this facility is very restricted, the sorting process was conducted away from the tipping floor. The loads were selected and samples were collected on the tipping floor and then hauled to the sorting area. Both transfer facilities are publicly-owned and publicly-operated.

Spring Sort Conditions

The Spring Waste Sort at the South Transfer Facility was conducted on Wednesday, June 18, 2003, and Friday, June 20, 2003. The weather was partly cloudy and muggy on Wednesday and clear and cool on Friday. The weather did not adversely impact the waste sort on either day as the sorts were conducted inside the transfer facility building near the tipping floor.

The Spring Waste Sort at the North Transfer Facility was conducted on Thursday, June 19, 2003. The weather on Thursday was cloudy and rainy. The waste sort was conducted inside the transfer facility building and away from the tipping floor. The loads were selected and samples were collected on the tipping floor and then hauled to the sorting area.

Fall Sort Conditions

The Fall Waste Sort at the South Transfer Facility was undertaken on Monday, September 15, 2003 and Tuesday, September 16, 2003. It was clear and warm with calm winds on Monday. There were light rain showers in the area overnight. On Tuesday it was again clear and warm with calm winds. The weather did not impact the waste sort on either day as the sorts were conducted inside the transfer facility building. This is a very busy facility with four commercial truck unloading areas – each segregated from the other. Residential waste is unloaded directly onto the tipping floor. Many times throughout the two days the waste sort was underway, as many as three residential trucks would be unloading simultaneously.

The Fall Waste Sort at the North Transfer Facility was undertaken on Wednesday, September 17, 2003. The weather was clear, cool and humid in the morning hours and breezy and warm during the afternoon. The sorting process was conducted inside the transfer facility building and away from the tipping floor. The loads were selected and samples were collected on the tipping floor and then hauled to the sorting area. This facility's tipping floor was very restricted. The tight working area reduced the opportunity to capture loads for sampling. For safety reasons, access to the tipping floor was not allowed during busy periods, thus eliminating the ability to capture any loads for sampling.

Observations

During the waste sort at the South Transfer Facility and the North Transfer Facility (both located in Dayton), the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. A large amount of yard waste was delivered to these facilities during the three-day Spring Waste Sort. The weekend immediately prior to this waste sort was one of the few dry and warm weekends of the season;

2. Transfer station operators are very concerned about safety and the need to move vehicles in and out as quickly as possible;

3. At both facilities, spotters were utilized for traffic control and safety reasons;

4. There is a significant inflow of commercial waste to the South Transfer Facility and only a limited inflow at the North Transfer Facility;

5. A number of commercial and industrial waste loads are direct hauled to a private landfill south of Dayton;

6. The City of Dayton utilizes automated side and front loaders as well as rear packer trucks;

7. It is the City of Dayton's policy to collect all items left at the curb or in the alley;

8. Both facilities have very tight working areas. This leads to some queuing and the rapid movement of both transfer station vehicles and waste hauling vehicles.

9. At the South Transfer Facility, trucks transporting commercial waste were segregated from trucks transporting residential waste. This made access to commercial loads rather difficult.

10. Between the Spring Waste Sort and the Fall Waste Sort, Montgomery County's disposal arrangements changed. During the Fall Waste Sort in September, solid waste from both transfer facilities was being transported to a landfill approximately 80 miles north of Dayton. This change impacted the operations at both facilities and also access to vehicles for sample selection.

11. Although both transfer facilities are extremely busy, the operators were very cooperative and assisted us whenever they could.

Waste Sort Results and Analysis

A total of 64 loads of solid waste were selected for sampling at these facilities. Data for each individual sample can be found in Appendix A (see Table 13.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 13.1
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
SAMPLE NUMBERS

Day of Week	Date	Facility	Sample Numbers
		SPRING SORT	
Wednesday	June 18, 2003	South Transfer Facility	0618D1.01 through 0618D1.12
Thursday	June 19, 2003	North Transfer Facility	0619D2.01 through 0619D2.09
Friday	June 20, 2003	South Transfer Facility	0620D3.01 through 0620D3.12
		FALL SORT	
Monday	September 15, 2003	South Transfer Facility	0915D4.01 through 0915D4.12
Tuesday	September 16, 2003	South Transfer Facility	0916D5.01 through 0916D5.12
Wednesday	September 17, 2003	North Transfer Facility	0917D6.01 through 0917D6.07

Weight and volume tables were compiled that summarize the data collected at these facilities during the Spring Sort (see Table 13.2 and Table 13.3) and the Fall Sort (see Table 13.4 and Table 13.5). Additionally, weight and volume summary data for the waste sorts conducted at the South Transfer Facility and the North Transfer Facility in the Montgomery County Solid Waste Management District are presented in Table 13.6 and Table 13.7. Chart 13.1 and Chart 13.2 provide a graphic summary of the major components of the waste stream as sampled at these facilities.

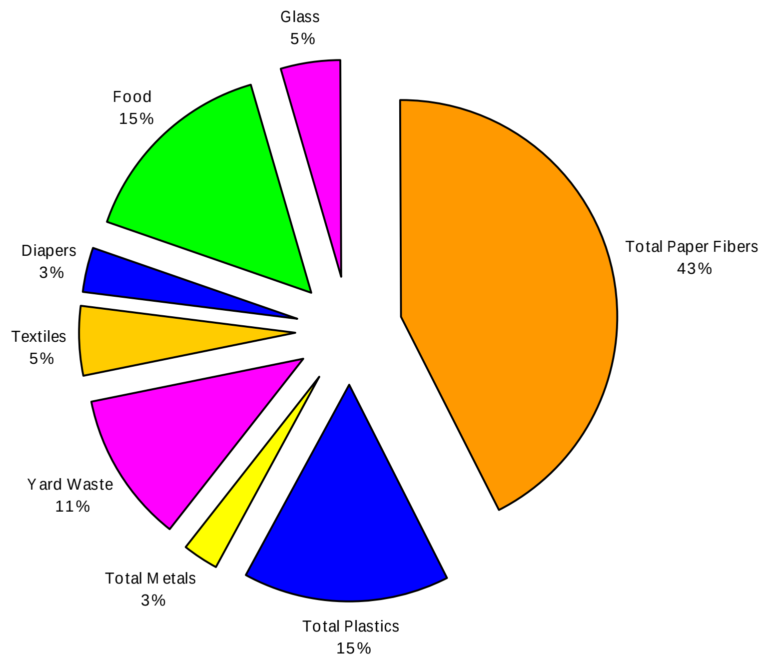


CHART 13.1
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT WEIGHT DISTRIBUTION

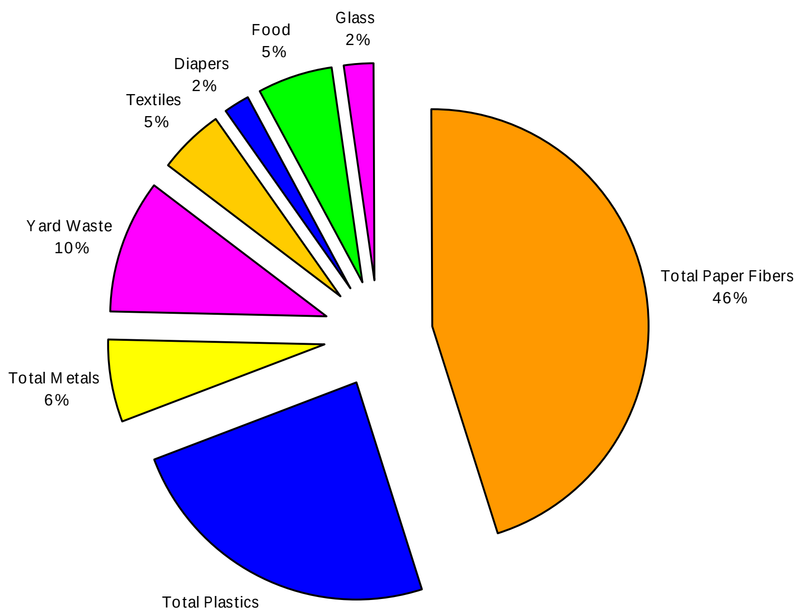


CHART 13.2
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 13.2
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	421.94	12.79%	5.34%
Office Paper	690.29	20.93%	8.74%
Mixed Paper	764.64	23.18%	9.68%
Newsprint	735.46	22.30%	9.31%
Magazines	271.60	8.23%	3.44%
Paperboard	414.59	12.57%	5.25%
TOTAL PAPER FIBERS	3,298.52		41.77%
LDPE #4	137.97	12.21%	1.75%
PET #1	165.18	14.61%	2.09%
HDPE #2	477.98	42.29%	6.05%
PVC #3	23.15	2.05%	0.29%
PP #5	34.10	3.02%	0.43%
PS #6	116.76	10.33%	1.48%
Other Plastics	175.23	15.50%	2.22%
TOTAL PLASTICS	1,130.37		14.31%
Aluminum Beverage Cans	99.78	35.85%	1.26%
Aluminum Foil/Food Trays	24.01	8.63%	0.30%
Other Aluminum	18.28	6.57%	0.23%
Tin Food Cans	108.99	39.16%	1.38%
Other Tin Cans	27.29	9.80%	0.35%
TOTAL METALS	278.35		3.52%
Yard Waste	883.51		11.19%
Textiles	392.23		4.97%
Diapers	246.88		3.13%
Food	1,147.67		14.53%
Glass	335.65		4.25%
Empty Aerosol Cans	30.45		0.39%
Medical Waste	62.19		0.79%
Fines and Superfines	16.36		0.21%
Batteries	1.19		0.02%
Mixed Metals	27.46		0.35%
Small Appliances	3.03		0.04%
Wood	10.47		0.13%
Wax	0.57		0.01%
Telephone Books	8.73		0.11%
Rubber	3.41		0.04%
Computer Parts	2.22		0.03%
Hard Cover Books	6.70		0.08%
Linoleum Flooring	10.10		0.13%
Air Filters	0.22		0.00%
Other Non-Ferrous Metals	1.28		0.02%
NET WEIGHT OF SORTED SAMPLE	7,897.56		100.00%

TABLE 13.3
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	103.39	14.74%	6.35%
Office Paper	169.14	24.12%	10.39%
Mixed Paper	79.52	11.34%	4.88%
Newsprint	78.49	11.19%	4.82%
Magazines	49.11	7.00%	3.02%
Paperboard	221.67	31.61%	13.62%
TOTAL PAPER FIBERS	701.33		43.08%
LDPE #4	38.16	9.86%	2.34%
PET #1	48.58	12.55%	2.98%
HDPE #2	167.16	43.18%	10.27%
PVC #3	11.58	2.99%	0.71%
PP #5	15.50	4.00%	0.95%
PS #6	53.07	13.71%	3.26%
Other Plastics	53.10	13.72%	3.26%
TOTAL PLASTICS	387.15		23.78%
Aluminum Beverage Cans	35.64	35.08%	2.19%
Aluminum Foil/Food Trays	11.43	11.25%	0.70%
Other Aluminum	11.43	11.25%	0.70%
Tin Food Cans	29.46	28.99%	1.81%
Other Tin Cans	13.65	13.43%	0.84%
TOTAL METALS	101.60		6.24%
Yard Waste	169.38		10.40%
Textiles	83.89		5.15%
Diapers	27.74		1.70%
Food	89.66		5.51%
Glass	36.48		2.24%
Empty Aerosol Cans	16.92		1.04%
Medical Waste	13.82		0.85%
Fines and Superfines			
Batteries			
Mixed Metals			
Small Appliances			
Wood			
Wax			
Telephone Books			
Rubber			
Computer Parts			
Hard Cover Books			
Linoleum Flooring			
Air Filters			
Other Non-Ferrous Metals			
NET VOLUME OF SORTED SAMPLE	1,627.97		100.00%

TABLE 13.4
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	356.43	12.76%	5.21%
Office Paper	533.27	19.09%	7.79%
Mixed Paper	537.98	19.26%	7.86%
Newsprint	538.20	19.27%	7.86%
Magazines	246.28	8.82%	3.60%
Paperboard	580.87	20.80%	8.49%
TOTAL PAPER FIBERS	2,793.03		40.81%
LDPE #4	108.07	10.38%	1.58%
PET #1	170.36	16.36%	2.49%
HDPE #2	401.50	38.56%	5.87%
PVC #3	36.78	3.53%	0.54%
PP #5	22.05	2.12%	0.32%
PS #6	91.68	8.81%	1.34%
Other Plastics	210.69	20.24%	3.08%
TOTAL PLASTICS	1,041.13		15.21%
Aluminum Beverage Cans	91.77	39.89%	1.34%
Aluminum Foil/Food Trays	22.56	9.81%	0.33%
Other Aluminum	26.30	11.43%	0.38%
Tin Food Cans	80.37	34.94%	1.17%
Other Tin Cans	9.04	3.93%	0.13%
TOTAL METALS	230.04		3.36%
Yard Waste	713.24		10.42%
Textiles	360.44		5.27%
Diapers	249.69		3.65%
Food	1,011.20		14.77%
Glass	315.05		4.60%
Empty Aerosol Cans	16.00		0.23%
Medical Waste	9.74		0.14%
Fines and Superfines	29.27		0.43%
Batteries	5.30		0.08%
Mixed Metals	30.75		0.45%
Wood	5.51		0.08%
Paints	1.17		0.02%
Paint Brushes	1.71		0.02%
Cell Phones	1.31		0.02%
Asbestos (Wet)	12.71		0.19%
Other Ferrous Metals	8.72		0.13%
Telephone Books	3.22		0.05%
Rubber	2.38		0.03%
C & D	2.40		0.04%
NET WEIGHT OF SORTED SAMPLE	6,844.01		100.00%

TABLE 13.5
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	87.34	12.72%	5.85%
Office Paper	130.67	19.03%	8.75%
Mixed Paper	55.95	8.15%	3.75%
Newsprint	57.44	8.37%	3.85%
Magazines	44.54	6.49%	2.98%
Paperboard	310.58	45.24%	20.80%
TOTAL PAPER FIBERS	686.51		45.98%
LDPE #4	29.89	8.44%	2.00%
PET #1	50.11	14.14%	3.36%
HDPE #2	140.41	39.63%	9.40%
PVC #3	18.39	5.19%	1.23%
PP #5	10.02	2.83%	0.67%
PS #6	41.67	11.76%	2.79%
Other Plastics	63.85	18.02%	4.28%
TOTAL PLASTICS	354.34		23.73%
Aluminum Beverage Cans	32.78	38.02%	2.19%
Aluminum Foil/Food Trays	10.74	12.46%	0.72%
Other Aluminum	16.44	19.07%	1.10%
Tin Food Cans	21.72	25.20%	1.45%
Other Tin Cans	4.52	5.24%	0.30%
TOTAL METALS	86.20		5.77%
Yard Waste	136.74		9.16%
Textiles	77.09		5.16%
Diapers	28.06		1.88%
Food	79.00		5.29%
Glass	34.24		2.29%
Empty Aerosol Cans	8.89		0.60%
Medical Waste	2.16		0.14%
Fines and Superfines			
Batteries			
Mixed Metals			
Wood			
Paints			
Paint Brushes			
Cell Phones			
Asbestos (Wet)			
Other Ferrous Metals			
Telephone Books			
Rubber			
C & D			
NET VOLUME OF SORTED SAMPLE	1,493.22		100.00%

TABLE 13.6
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	778.37	12.78%	5.28%
Office Paper	1,223.56	20.09%	8.30%
Mixed Paper	1,302.62	21.38%	8.84%
Newsprint	1,273.66	20.91%	8.64%
Magazines	517.88	8.50%	3.51%
Paperboard	995.46	16.34%	6.75%
TOTAL PAPER FIBERS	6,091.55		41.32%
LDPE #4	246.04	11.33%	1.67%
PET #1	335.54	15.45%	2.28%
HDPE #2	879.48	40.50%	5.97%
PVC #3	59.93	2.76%	0.41%
PP #5	56.15	2.59%	0.38%
PS #6	208.44	9.60%	1.41%
Other Plastics	385.92	17.77%	2.62%
TOTAL PLASTICS	2,171.50		14.73%
Aluminum Beverage Cans	191.55	37.68%	1.30%
Aluminum Foil/Food Trays	46.57	9.16%	0.32%
Other Aluminum	44.58	8.77%	0.30%
Tin Food Cans	189.36	37.25%	1.28%
Other Tin Cans	36.33	7.15%	0.25%
TOTAL METALS	508.39		3.45%
Yard Waste	1,596.75		10.83%
Textiles	752.67		5.11%
Diapers	496.57		3.37%
Food	2,158.87		14.64%
Glass	650.70		4.41%
Empty Aerosol Cans	46.45		0.32%
Medical Waste	71.93		0.49%
Fines and Superfines	45.63		0.31%
Other Minor Categories	150.56		1.02%
NET WEIGHT OF SORTED SAMPLE	14,741.57		100.00%

TABLE 13.7
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	190.73	13.74%	6.11%
Office Paper	299.81	21.60%	9.61%
Mixed Paper	135.47	9.76%	4.34%
Newsprint	135.93	9.79%	4.36%
Magazines	93.65	6.75%	3.00%
Paperboard	532.25	38.35%	17.05%
TOTAL PAPER FIBERS	1,387.84		44.47%
LDPE #4	68.05	9.18%	2.18%
PET #1	98.69	13.31%	3.16%
HDPE #2	307.57	41.48%	9.85%
PVC #3	29.97	4.04%	0.96%
PP #5	25.52	3.44%	0.82%
PS #6	94.75	12.78%	3.04%
Other Plastics	116.95	15.77%	3.75%
TOTAL PLASTICS	741.49		23.76%
Aluminum Beverage Cans	68.41	36.43%	2.19%
Aluminum Foil/Food Trays	22.18	11.81%	0.71%
Other Aluminum	27.86	14.84%	0.89%
Tin Food Cans	51.18	27.25%	1.64%
Other Tin Cans	18.17	9.67%	0.58%
TOTAL METALS	187.79		6.02%
Yard Waste	306.11		9.81%
Textiles	160.98		5.16%
Diapers	55.79		1.79%
Food	168.66		5.40%
Glass	70.73		2.27%
Empty Aerosol Cans	25.81		0.83%
Medical Waste	15.98		0.51%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	3,121.19		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the two transfer facilities in Montgomery County. Table 13.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 13.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume -- during both seasons and in total. The most prominent single category – by weight – is food; the most prominent single category – by volume – is paperboard. In addition to food, the other predominant single categories – by weight – are yard waste, mixed paper, and paperboard; and by volume, the other predominant single categories are yard waste and HDPE #2.

The outcome of the waste sort may have been impacted by the large number of residential loads sampled. With a greater number of residential loads sampled, the high amounts of food, yard waste, and mixed paper are not surprising. In turn, the lower corrugated paper and office paper numbers could reflect the limited number of commercial loads sampled. The predominance of food could also be the result of the mix of residential loads and commercial loads with apartments and restaurants.

Visual Inspection Analysis

A total of 39 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items included loose wood, carpet, and C & D debris. Table 13.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items include C & D debris, plastic barrels/bins, and furniture.

Table 13.11 provides a breakdown of the types of waste selected for sampling. At both the North Transfer Facility and the South Transfer Facility, access to commercial loads was very limited. This limitation is reflected in the sample loads and their types of waste.

Comparing the data in Table 13.11 to the information provided in Table 13.10, the large number of residential loads indicates the potential influence these loads may have had in the amount of computer equipment, electronic equipment, and car parts observed in the loads sampled. In turn, the amount of C & D debris, plastic barrels/bins, and furniture indicates the mobility of the population represented in both the residential loads and commercial loads.

TABLE 13.8
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY WEIGHT

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 41.77%	Paper – 40.81%	Paper – 41.32%
2	Food – 14.53%	Plastics – 15.21%	Plastics – 14.73%
3	Yard Waste – 11.19%	Food – 14.77%	Food – 14.64%
TOP MATERIAL CATEGORIES			
1	Food – 14.53%	Food – 14.77%	Food – 14.64%
2	Yard Waste – 11.19%	Yard Waste – 10.42%	Yard Waste – 10.83%
3	Mixed Paper – 9.68%	Paperboard – 8.49%	Mixed Paper – 8.84%
BOTTOM MATERIAL CATEGORIES			
1	Air Filters	Paint	Air Filters
2	Wax	Paint Brushes	Cell Phones
3	Other Non-Ferrous Metals	Cell Phones	Paints & Brushes

TABLE 13.9
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
ANALYSIS RESULTS BY VOLUME

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 43.08%	Paper – 45.98%	Paper – 44.47%
2	Plastics – 23.78%	Plastics – 23.73%	Plastics – 23.76%
3	Yard Waste – 10.4%	Yard Waste – 9.16%	Yard Waste – 9.81%
TOP MATERIAL CATEGORIES			
1	Paperboard – 13.62%	Paperboard – 20.80%	Paperboard – 17.05%
2	Yard Waste – 10.40%	HDPE #2 – 9.40%	HDPE #3 – 9.85%
3	Office Paper – 10.39%	Yard Waste – 9.16%	Yard Waste – 9.81%
BOTTOM MATERIAL CATEGORIES			
1	Aluminum Foil/Food Trays	Med Waste	Med Waste
2	Other Aluminum	Other Tin Cans	Other Tin Cans
3	PVC #3	Empty Aerosol Cans	Aluminum Foil/Food Trays

TABLE 13.10
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
VISUAL INSPECTION ANALYSIS RESULTS

	Spring Sort Total Loads Sampled = 33	**Fall Sort** Total Loads Sampled = 31	**District** Total Loads Sampled = 64
Percent of sampled loads in which the following were noted:			
Computer Equipment	12	23	17
Electronic Equipment	15	10	13
Car Parts	12	13	13
Furniture	21	26	23
Plastic Barrels/Bins	12	61	36
Metal Containers	6	16	11
C & D Debris	39	52	45

TABLE 13.11
MONTGOMERY COUNTY SOLID WASTE MANAGEMENT DISTRICT
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
Residential	21	21	42
Residential + Commercial	1	2	3
Residential + Apartments	1	0	1
Residential + Commercial + Apartments	2	0	2
Commercial + Apartments	5	5	10
Commercial	2	3	5
Apartments	1	0	1
TOTAL NUMBER OF LOADS SAMPLED	33	31	64

14. OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT

The Ottawa-Sandusky-Seneca Joint Solid Waste Management District is located in the northwest portion of Ohio. Lake Erie borders Ottawa County to the north. Wood County borders Ottawa County and Sandusky County to the west. Hancock County and Wood County border Seneca County to the west. Wyandot County and Crawford County border Seneca County to the south. Huron County borders Seneca County to the east; Erie County borders Sandusky County to the east (see Map 14.1). The district encompasses Seneca County, Sandusky County, and Ottawa County with a combined three-county population of 161,460 as recorded in 2000. The combined three-county land area covers 1,214.9 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).

MAP 14.1
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT

The waste sorts in this district were undertaken at the Ottawa County Landfill, which is located west of Port Clinton, Ohio, and approximately 2.5 miles south of Lake Erie. The landfill is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in June 2003 (Spring Sort) and September 2003 (Fall Sort). During the Spring Sort, the waste sort area was located within 100 feet of the landfill's working face. During the Fall Sort, the waste sort area was located a further distance from the working face. The sorting and categorization processes were conducted within a three-tent complex during the Spring Sort and the Fall Sort.

Spring Sort Conditions

The Spring Waste Sort at the Ottawa County Landfill occurred on Monday, June 23, 2003, and Tuesday, June 24, 2003. It was clear, hot and humid both days. The waste sort was performed within 100 feet of the working face of the landfill, which allowed for easy access to loads brought to the site. The waste sort was conducted within a three-tent complex.

Fall Sort Conditions

The Fall Waste Sort was conducted on Thursday September 25, 2003, and Friday, September 26, 2003. The weather on both days was clear and cool. On Thursday it was breezy and on Friday it was calm. The sort site was located within 150 feet of the working face. Access to the loads for sample selection was somewhat limited because of the terrain between the working face and the sort site. Additionally, the working face was very constricted and limited the number of loads that could be selected for sampling at any one time. The facility's tipper was located adjacent to the working face. When the tipper operated, access to the working face was further reduced.

Observations

During the waste sort at the Ottawa County Landfill, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. A large amount of food waste was delivered to this facility during the two-day Spring Sort. Much of the food waste was in the form of various fish parts. The area hosts a number of tourist and recreational activities during the warmer months of the year. Because of this, there are several restaurants and other food vendors active within the service area of the landfill during these times;

2. Landfill operators are very concerned about safety and the need to move vehicles in and out as quickly as possible;

3. During the Spring Sort, many of the loads were collected at harbor sites, campgrounds, or public areas. These loads contained increased amounts of mixed paper, plastics, and aluminum;

4. There is a significant inflow of commercial waste to this landfill;

5. Both commercial and residential waste streams include large amounts of food;

6. The majority of the solid waste is delivered to this facility via private haulers;

7. Most commercial loads are delivered in front loaders. These loads are sometimes mixed with apartments;

8. The residential collection vehicles are mostly rear packers. These vehicles can carry a large amount of solid waste; the solid waste appears to be placed at the curb in plastic bags or containers. It appears the drivers collect anything placed at the curb;

9. During the Fall Waste Sort, fewer loads were sampled than during the Spring Waste Sort. The tourist season in this area directly impacts waste flow to the landfill.

Waste Sort Results and Analysis

A total of 26 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 14.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 14.1
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT -- SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Monday	June 23, 2003	0623D1.01 through 0623D1.06
Tuesday	June 24, 2003	0624D2.01 through 0624D2.09
	FALL SORT	
Thursday	September 25, 2003	0925D3.01 through 0925D3.04
Friday	September 26, 2003	0926D4.01 through 0926D4.07

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 14.2 and Table 14.3) and the Fall Sort (see Table 14.4 and Table 14.5). Additionally, weight and volume summary data for both waste sorts conducted at the Ottawa County Landfill in the Ottawa-Sandusky-Seneca Joint Solid Waste Management District are presented in Table 14.6 and Table 14.7. Chart 14.1 and Chart 14.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

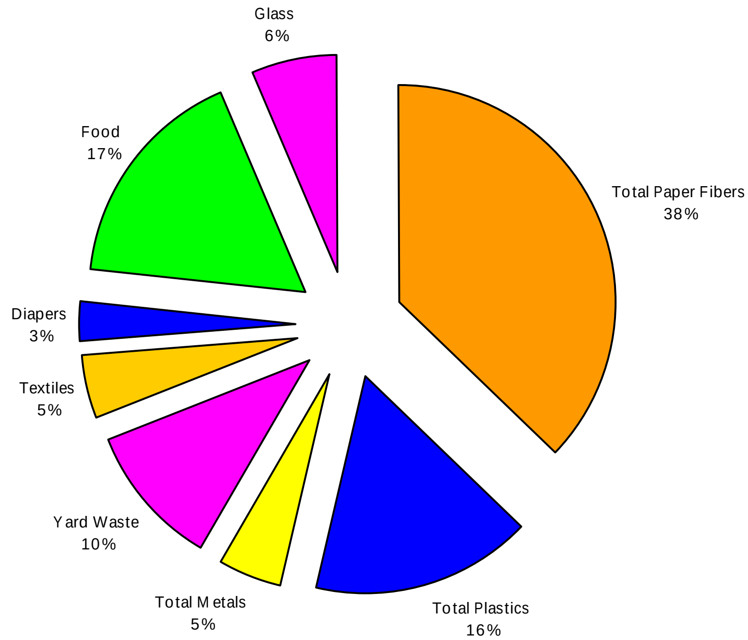


CHART 14.1
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT -- MAJOR COMPONENT WEIGHT DISTRIBUTION

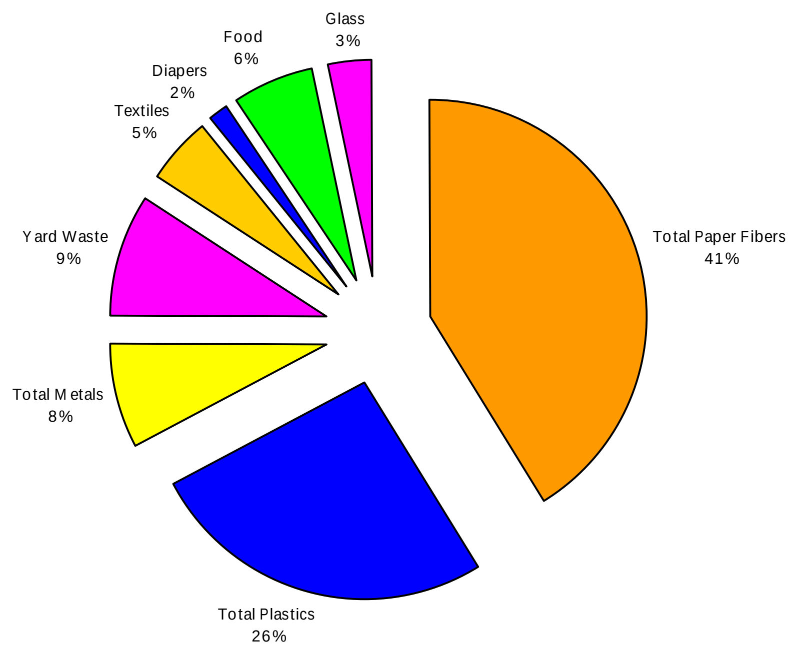


CHART 14.2
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT -- MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 14.2
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	163.61	13.35%	4.86%
Office Paper	241.18	19.68%	7.16%
Mixed Paper	279.42	22.80%	8.29%
Newsprint	173.44	14.15%	5.15%
Magazines	114.27	9.32%	3.39%
Paperboard	253.76	20.70%	7.53%
TOTAL PAPER FIBERS	1225.68		36.38%
LDPE #4	52.81	9.25%	1.57%
PET #1	110.06	19.27%	3.27%
HDPE #2	216.39	37.90%	6.42%
PVC #3	6.23	1.09%	0.18%
PP #5	25.98	4.55%	0.77%
PS #6	78.27	13.71%	2.32%
Other Plastics	81.27	14.23%	2.41%
TOTAL PLASTICS	571.01		16.95%
Aluminum Beverage Cans	71.19	42.23%	2.11%
Aluminum Foil/Food Trays	16.43	9.75%	0.49%
Other Aluminum	9.49	5.63%	0.28%
Tin Food Cans	61.11	36.25%	1.81%
Other Tin Cans	10.36	6.15%	0.31%
TOTAL METALS	168.58		5.00%
Yard Waste	365.47		10.85%
Textiles	142.01		4.21%
Diapers	78.43		2.33%
Food	495.59		14.71%
Glass	243.29		7.22%
Empty Aerosol Cans	7.82		0.23%
Medical Waste	17.57		0.52%
Fines and Superfines	5.55		0.16%
Batteries	4.26		0.13%
Mixed Metals	10.12		0.30%
Wood	10.44		0.31%
Telephone Books	10.78		0.32%
Wax	0.23		0.01%
Cell Phones	0.28		0.01%
Small Propane Tanks	4.51		0.13%
Computer Parts	4.43		0.13%
Paints	3.35		0.10%
NET WEIGHT OF SORTED SAMPLE	3,369.40		100.00%

TABLE 14.3
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	40.09	13.23%	5.39%
Office Paper	59.10	19.50%	7.94%
Mixed Paper	29.06	9.59%	3.90%
Newsprint	18.51	6.11%	2.49%
Magazines	20.66	6.82%	2.78%
Paperboard	135.68	44.76%	18.23%
TOTAL PAPER FIBERS	303.10		40.72%
LDPE #4	14.61	7.39%	1.96%
PET #1	32.37	16.37%	4.35%
HDPE #2	75.68	38.26%	10.17%
PVC #3	3.12	1.57%	0.42%
PP #5	11.81	5.97%	1.59%
PS #6	35.58	17.99%	4.78%
Other Plastics	24.63	12.45%	3.31%
TOTAL PLASTICS	197.78		26.57%
Aluminum Beverage Cans	25.43	41.77%	3.42%
Aluminum Foil/Food Trays	7.82	12.85%	1.05%
Other Aluminum	5.93	9.74%	0.80%
Tin Food Cans	16.52	27.13%	2.22%
Other Tin Cans	5.18	8.51%	0.70%
TOTAL METALS	60.88		8.18%
Yard Waste	70.06		9.41%
Textiles	30.37		4.08%
Diapers	8.81		1.18%
Food	38.72		5.20%
Glass	26.44		3.55%
Empty Aerosol Cans	4.34		0.58%
Medical Waste	3.90		0.52%
Fines and Superfines			
Batteries			
Mixed Metals			
Wood			
Telephone Books			
Wax			
Cell Phones			
Small Propane Tanks			
Computer Parts			
Paints			
NET VOLUME OF SORTED SAMPLE	744.42		100.00%

TABLE 14.4
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	119.97	12.44%	4.54%
Office Paper	165.18	17.13%	6.26%
Mixed Paper	208.61	21.63%	7.90%
Newsprint	181.97	18.87%	6.89%
Magazines	133.94	13.89%	5.07%
Paperboard	154.64	16.04%	5.86%
TOTAL PAPER FIBERS	964.31		36.52%
LDPE #4	82.05	20.69%	3.11%
PET #1	50.87	12.83%	1.93%
HDPE #2	137.39	34.65%	5.20%
PVC #3	2.38	0.60%	0.09%
PP #5	7.31	1.84%	0.28%
PS #6	48.47	12.22%	1.84%
Other Plastics	68.03	17.16%	2.58%
TOTAL PLASTICS	396.50		15.02%
Aluminum Beverage Cans	38.41	37.84%	1.45%
Aluminum Foil/Food Trays	12.00	11.82%	0.45%
Other Aluminum	3.49	3.44%	0.13%
Tin Food Cans	39.49	38.91%	1.50%
Other Tin Cans	8.11	7.99%	0.31%
TOTAL METALS	101.50		3.84%
Yard Waste	250.05		9.47%
Textiles	143.26		5.43%
Diapers	100.04		3.79%
Food	496.90		18.82%
Glass	132.79		5.03%
Empty Aerosol Cans	6.11		0.23%
Medical Waste	15.55		0.59%
Fines and Superfines	2.92		0.11%
Batteries	2.71		0.10%
Mixed Metals	6.62		0.25%
Wood	0.93		0.04%
Telephone Books	1.11		0.04%
Wax			0.00%
Cell Phones			0.00%
Small Propane Tanks			0.00%
Computer Parts			0.00%
Paints			0.00%
Hard Cover Books	3.46		0.13%
Electronics	3.39		0.13%
Electric Switch	3.74		0.14%
Oil Filters	2.15		0.08%
Air Filters	0.73		0.03%
Spark Plug Wires	1.18		0.04%
Other Ferrous Metals	4.63		0.18%
NET WEIGHT OF SORTED SAMPLE	2,640.58		100.00%

TABLE 14.5
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	29.40	13.49%	5.47%
Office Paper	40.47	18.58%	7.54%
Mixed Paper	21.70	9.96%	4.04%
Newsprint	19.42	8.91%	3.62%
Magazines	24.22	11.12%	4.51%
Paperboard	82.68	37.95%	15.40%
TOTAL PAPER FIBERS	217.89		40.57%
LDPE #4	22.69	17.08%	4.23%
PET #1	14.96	11.26%	2.79%
HDPE #2	48.05	36.16%	8.95%
PVC #3	1.19	0.90%	0.22%
PP #5	3.32	2.50%	0.62%
PS #6	22.03	16.58%	4.10%
Other Plastics	20.62	15.52%	3.84%
TOTAL PLASTICS	132.86		24.74%
Aluminum Beverage Cans	13.72	37.75%	2.55%
Aluminum Foil/Food Trays	5.71	15.72%	1.06%
Other Aluminum	2.18	6.00%	0.41%
Tin Food Cans	10.67	29.37%	1.99%
Other Tin Cans	4.06	11.16%	0.76%
TOTAL METALS	36.34		6.77%
Yard Waste	47.94		8.93%
Textiles	30.64		5.71%
Diapers	11.24		2.09%
Food	38.82		7.23%
Glass	14.43		2.69%
Empty Aerosol Cans	3.39		0.63%
Medical Waste	3.46		0.64%
Fines and Superfines			
Batteries			
Mixed Metals			
Wood			
Telephone Books			
Wax			
Cell Phones			
Small Propane Tanks			
Computer Parts			
Paints			
Hard Cover Books			
Electronics			
Electric Switch			
Oil Filters			
Air Filters			
Spark Plug Wires			
Other Ferrous Metals			
NET VOLUME OF SORTED SAMPLE	537.02		100.00%

TABLE 14.6
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	283.58	12.95%	4.72%
Office Paper	406.36	18.56%	6.76%
Mixed Paper	488.03	22.28%	8.12%
Newsprint	355.41	16.23%	5.91%
Magazines	248.21	11.33%	4.13%
Paperboard	408.40	18.65%	6.80%
TOTAL PAPER FIBERS	2,189.99		36.44%
LDPE #4	134.86	13.94%	2.24%
PET #1	160.93	16.63%	2.68%
HDPE #2	353.78	36.57%	5.89%
PVC #3	8.61	0.89%	0.14%
PP #5	33.29	3.44%	0.55%
PS #6	126.74	13.10%	2.11%
Other Plastics	149.30	15.43%	2.48%
TOTAL PLASTICS	967.51		16.10%
Aluminum Beverage Cans	109.60	40.58%	1.82%
Aluminum Foil/Food Trays	28.43	10.53%	0.47%
Other Aluminum	12.98	4.81%	0.22%
Tin Food Cans	100.60	37.25%	1.67%
Other Tin Cans	18.47	6.84%	0.31%
TOTAL METALS	270.08		4.49%
Yard Waste	615.52		10.24%
Textiles	285.27		4.75%
Diapers	178.47		2.97%
Food	992.49		16.51%
Glass	376.08		6.26%
Empty Aerosol Cans	13.93		0.23%
Medical Waste	33.12		0.55%
Fines and Superfines	8.47		0.14%
Batteries	6.97		0.12%
Mixed Metals	16.74		0.28%
Wood	11.37		0.19%
Telephone Books	11.89		0.20%
Wax	0.23		0.00%
Cell Phones	0.28		0.00%
Small Propane Tanks	4.51		0.08%
Computer Parts	4.43		0.07%
Paints	3.35		0.06%
Hard Cover Books	3.46		0.06%
Electronics	3.39		0.06%
Electric Switch	3.74		0.06%
Oil Filters	2.15		0.04%
Air Filters	0.73		0.01%
Spark Plug Wires	1.18		0.02%
Other Ferrous Metals	4.63		0.08%
NET WEIGHT OF SORTED SAMPLE	6,009.98		100.00%

TABLE 14.7
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	69.49	13.34%	5.42%
Office Paper	99.57	19.11%	7.77%
Mixed Paper	50.76	9.74%	3.96%
Newsprint	37.93	7.28%	2.96%
Magazines	44.88	8.62%	3.50%
Paperboard	218.36	41.91%	17.04%
TOTAL PAPER FIBERS	520.99		40.66%
LDPE #4	37.30	11.28%	2.91%
PET #1	47.33	14.32%	3.69%
HDPE #2	123.72	37.42%	9.66%
PVC #3	4.31	1.30%	0.34%
PP #5	15.13	4.58%	1.18%
PS #6	57.61	17.42%	4.50%
Other Plastics	45.24	13.68%	3.53%
TOTAL PLASTICS	330.65		25.80%
Aluminum Beverage Cans	39.14	40.26%	3.05%
Aluminum Foil/Food Trays	13.54	13.93%	1.06%
Other Aluminum	8.11	8.34%	0.63%
Tin Food Cans	27.19	27.97%	2.12%
Other Tin Cans	9.24	9.50%	0.72%
TOTAL METALS	97.22		7.59%
Yard Waste	118.00		9.21%
Textiles	61.01		4.76%
Diapers	20.05		1.56%
Food	77.54		6.05%
Glass	40.88		3.19%
Empty Aerosol Cans	7.74		0.60%
Medical Waste	7.36		0.57%
Fines and Superfines			
Batteries			
Mixed Metals			
Wood			
Telephone Books			
Wax			
Cell Phones			
Small Propane Tanks			
Computer Parts			
Paints			
Hard Cover Books			
Electronics			
Electric Switch			
Oil Filters			
Air Filters			
Spark Plug Wires			
Other Ferrous Metals			
NET VOLUME OF SORTED SAMPLE	1,281.44		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Ottawa County Landfill. Table 14.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 14.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The other major components of the waste stream – by weight – are food and plastics. The most prominent single category – by weight – is food; yard waste and mixed paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Paperboard was the most dominant single category – by volume – with HDPE #2 placing second and yard waste placing third.

The large amount of food, paperboard, and mixed paper is a reflection of the transient nature of the area. With a large restaurant and tourist base, food waste and other wastes typically associated with food were anticipated to be, and proved to be, high at this site.

TABLE 14.8
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT -- ANALYSIS RESULTS BY WEIGHT

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 36.38%	Paper – 36.52%	Paper – 36.44%
2	Plastics – 16.95%	Food – 18.82%	Food – 16.51%
3	Food – 14.71%	Plastics – 15.02%	Plastics – 16.10%
TOP MATERIAL CATEGORIES			
1	Food – 14.71%	Food – 18.82%	Food – 16.51%
2	Yard Waste – 10.85%	Yard Waste – 9.47%	Yard Waste – 10.24%
3	Mixed Paper – 8.29%	Mixed Paper – 7.90%	Mixed Paper – 8.12%
BOTTOM MATERIAL CATEGORIES			
1	Wax	Air Filters	Wax
2	Cell Phones	Wood	Cell Phones
3	Paints	Telephone Books	Air Filters

TABLE 14.9
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT -- ANALYSIS RESULTS BY VOLUME

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
TOP COMPONENTS			
1	Paper – 40.72%	Paper – 40.57%	Paper – 40.66%
2	Plastics – 26.57%	Plastics – 24.74%	Plastics – 25.80%
3	Yard Waste – 9.41%	Yard Waste – 8.93%	Yard Waste – 9.21%
TOP MATERIAL CATEGORIES			
1	Paperboard – 18.23%	Paperboard – 15.40%	Paperboard – 17.04%
2	HDPE #2 – 1017%	HDPE #2 – 8.95%	HDPE #2 – 9.66%
3	Yard Waste – 9.41%	Yard Waste – 8.93%	Yard Waste – 9.21%
BOTTOM MATERIAL CATEGORIES			
1	PVC #3	PVC #3	PVC #3
2	Med Waste	Other Aluminum	Med Waste
3	Empty Aerosol Cans	PP #5	Empty Aerosol Cans

Visual Inspection Analysis

A total of 35 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. Table 14.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, plastic barrels/bins, and furniture.

Table 14.11 provides a breakdown of the types of waste selected for sampling. The data indicates that the majority of sampled loads during both the Spring Sort and the Fall Sort were commercial and residential/commercial mixed loads. Comparing this data to the information provided in Table 14.10, the impact of the commercial loads is evident in the percentage of computers and electronic equipment present in the loads. This could also reflect the variation in waste due to the impact of the tourist season.

TABLE 14.10
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT -- VISUAL INSPECTION ANALYSIS RESULTS

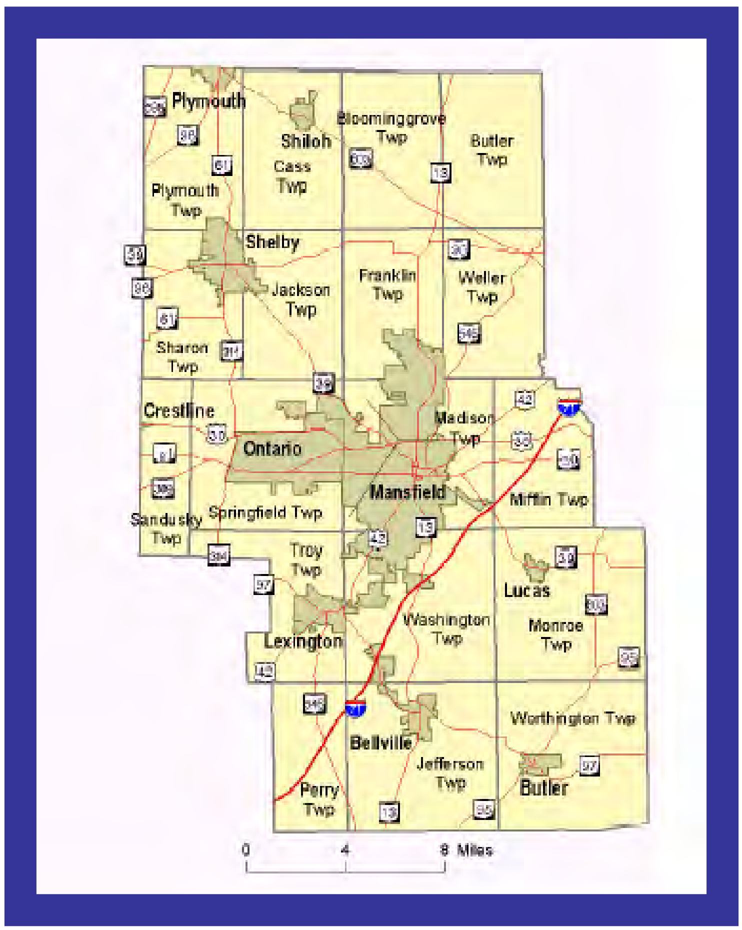
	Spring Sort Total Loads Sampled = 15	**Fall Sort** Total Loads Sampled = 11	**District** Total Loads Sampled = 26
Percent of sampled loads in which the following were noted:			
Computer Equipment	20	36	27
Electronic Equipment	13	18	15
Car Parts	7	9	8
Furniture	33	27	31
Plastic Barrels/Bins	33	73	50
Metal Containers	7	18	12
C & D Debris	67	55	62

TABLE 14.11
OTTAWA-SANDUSKY-SENECA JOINT SOLID WASTE MANAGEMENT DISTRICT -- TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort June 2003	**Fall Sort** September 2003	**District**
Residential	4	2	6
Residential + Commercial	1	4	5
Residential + Apartments	0	0	0
Residential + Commercial + Apartments	1	1	2
Commercial + Apartments	2	1	3
Commercial	5	3	8
Apartments	2	0	2
TOTAL NUMBER OF LOADS SAMPLED	15	11	26

15. RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY

The Richland County Regional Solid Waste Management Authority is located in the north-central portion of Ohio. Ashland County borders Richland County to the east; Huron County borders Richland County to the north; Crawford County borders Richland County to the west; Knox County borders Richland County to the south; Morrow County borders Richland County to the southwest (see Map 15.1). The district encompasses Richland County with a population of 128,852 as recorded in 2000, and a land area of 497.0 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).



Source: <http://www.odod.state.oh.us/research>

MAP 15.1
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY

The waste sorts in this district were undertaken at the Richland County Transfer Station, which is located within Mansfield, Ohio, in the central portion of Richland County. The transfer station is a privately-owned and privately-operated facility. Field sorting events were conducted at this facility in May 2003 (Spring Sort) and October 2003 (Fall Sort).

Spring Sort Conditions

The Spring Waste Sort occurred on Tuesday, May 6, 2003, and Wednesday, May 7, 2003. The weather was cloudy and cool both days with strong thunderstorms occurring on Wednesday. The waste sort was performed inside the transfer station which reduced the impact of the inclement weather. The waste sort area was located adjacent to the tipping floor and allowed for easy access to loads brought to the transfer station.

Fall Sort Conditions

The Fall Waste Sort was conducted on Thursday, October 16, 2003, and Friday, October 17, 2003. The weather was cool and cloudy both days with rain showers on Thursday. As with the Spring Sort, the waste sort area was located adjacent to the tipping floor inside the transfer station building. This eliminated any impact from the weather.

Observations

During the waste sort at the Richland County Transfer Station, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. The collection vehicles that deliver waste to this facility are privately owned;

2. Landfill operators are very concerned about safety and the need to move vehicles in and out as quickly as possible;

3. The transfer station includes a recycling center that collects a large variety of items;

4. There are a number of very small private haulers that bring solid waste to the transfer station. These companies utilize small vehicles such as pickup trucks, slat trucks, or dump trucks. The waste these companies collect is typically residential or apartments. The majority of waste is in plastic bags;

5. The commercial waste stream includes large amounts of corrugated paper;

6. Commercial loads are delivered to this facility via front loading vehicles. Residential loads are delivered to the facility via either front loading vehicles or rear packers;

7. The transfer station has an active education program. Groups of school children visited the transfer station during both the Spring Sort and the Fall Sort;

8. Residential waste is placed at the curb in plastic bags or containers and then collected. The collection vehicle drivers collect anything placed at the curb.

Waste Sort Results and Analysis

A total of 36 loads of solid waste were selected for sampling at this facility. Data for each individual sample can be found in Appendix A (see Table 15.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 15.1
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
SAMPLE NUMBERS

Day of Week	Date	Sample Numbers
	SPRING SORT	
Tuesday	May 6, 2003	0506D1.01 through 0506D1.04
Wednesday	May 7, 2003	0507D2.01 through 0507D2.10
	FALL SORT	
Thursday	October 16, 2003	1016D3.01 through 1016D3.10
Friday	October 17, 2003	1017D4.01 through 1017D4.12

Weight and volume tables were compiled that summarize the data collected at this facility during the Spring Sort (see Table 15.2 and Table 15.3) and the Fall Sort (see Table 15.4 and Table 15.5). Additionally, weight and volume summary data for both waste sorts conducted at the Richland County Transfer Station located within the Richland County Regional Solid Waste Management Authority are presented in Table 15.6 and Table 15.7. Chart 15.1 and Chart 15.2 provide a graphic summary of the major components of the waste stream as sampled at this facility.

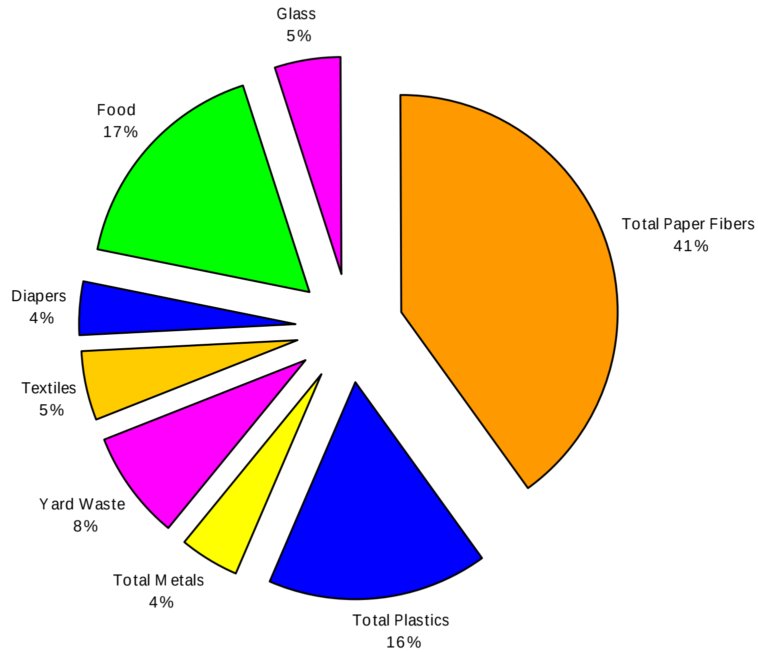


CHART 15.1
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
MAJOR COMPONENT WEIGHT DISTRIBUTION

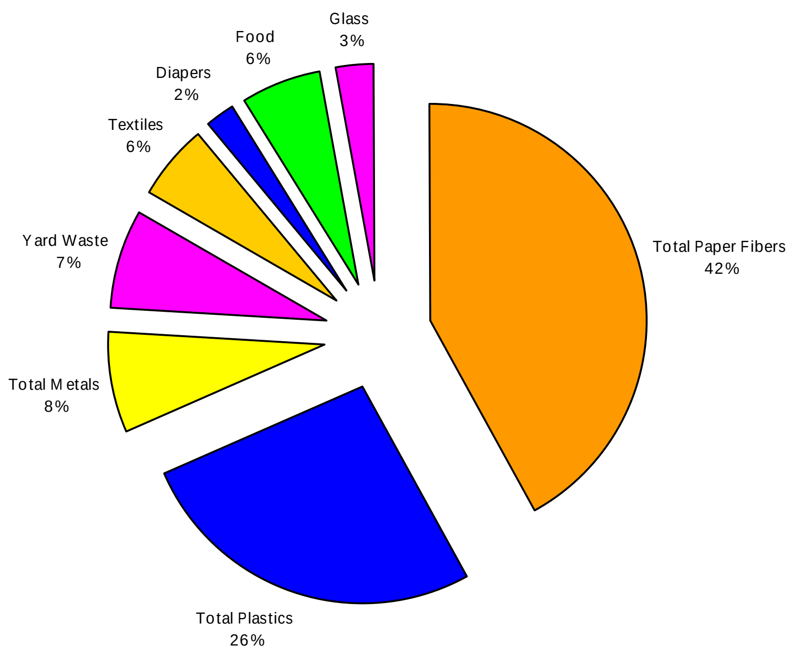


CHART 15.2
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 15.2
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	493.10	40.22%	13.88%
Office Paper	127.29	10.38%	3.58%
Mixed Paper	191.52	15.62%	5.39%
Newsprint	246.42	20.10%	6.94%
Magazines	122.53	9.99%	3.45%
Paperboard	45.17	3.68%	1.27%
TOTAL PAPER FIBERS	1,226.03		34.52%
LDPE #4	215.33	40.03%	6.06%
PET #1	82.98	15.43%	2.34%
HDPE #2	73.12	13.59%	2.06%
PVC #3	21.37	3.97%	0.60%
PP #5	19.23	3.57%	0.54%
PS #6	54.00	10.04%	1.52%
Other Plastics	71.89	13.36%	2.02%
TOTAL PLASTICS	537.92		15.15%
Aluminum Beverage Cans	41.86	28.61%	1.18%
Aluminum Foil/Food Trays	13.87	9.48%	0.39%
Other Aluminum	16.42	11.22%	0.46%
Tin Food Cans	48.76	33.32%	1.37%
Other Tin Cans	25.41	17.37%	0.72%
TOTAL METALS	146.32		4.12%
Yard Waste	395.58		11.14%
Textiles	269.76		7.60%
Diapers	132.02		3.72%
Food	525.04		14.78%
Glass	205.29		5.78%
Empty Aerosol Cans	8.04		0.23%
Medical Waste	23.84		0.67%
Fines and Superfines	10.20		0.29%
Cell Phones	0.19		0.01%
Other Non-Ferrous Metals	25.87		0.73%
Batteries	2.74		0.08%
Paints	10.40		0.29%
Oil Filters	1.51		0.04%
Mixed Metals	17.42		0.49%
Air Filters	1.89		0.05%
Rubber	6.12		0.17%
Aseptic Containers	0.21		0.01%
Other Ferrous Metals	0.19		0.01%
Hard Cover Books	4.79		0.13%
NET WEIGHT OF SORTED SAMPLE	3,551.37		100.00%

TABLE 15.3
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	120.83	49.41%	17.29%
Office Paper	31.19	12.75%	4.46%
Mixed Paper	19.92	8.15%	2.85%
Newsprint	26.30	10.75%	3.76%
Magazines	22.16	9.06%	3.17%
Paperboard	24.15	9.88%	3.46%
TOTAL PAPER FIBERS	244.54		34.98%
LDPE #4	59.56	33.98%	8.52%
PET #1	24.41	13.92%	3.49%
HDPE #2	25.57	14.59%	3.66%
PVC #3	10.69	6.10%	1.53%
PP #5	8.74	4.99%	1.25%
PS #6	24.55	14.00%	3.51%
Other Plastics	21.78	12.43%	3.12%
TOTAL PLASTICS	175.29		25.08%
Aluminum Beverage Cans	14.95	25.91%	2.14%
Aluminum Foil/Food Trays	6.60	11.45%	0.94%
Other Aluminum	10.26	17.79%	1.47%
Tin Food Cans	13.18	22.84%	1.89%
Other Tin Cans	12.71	22.02%	1.82%
TOTAL METALS	57.70		8.25%
Yard Waste	75.84		10.85%
Textiles	57.69		8.25%
Diapers	14.83		2.12%
Food	41.02		5.87%
Glass	22.31		3.19%
Empty Aerosol Cans	4.47		0.64%
Medical Waste	5.30		0.76%
Fines and Superfines			
Cell Phones			
Other Non-Ferrous Metals			
Batteries			
Paints			
Oil Filters			
Mixed Metals			
Air Filters			
Rubber			
Aseptic Containers			
Other Ferrous Metals			
Hard Cover Books			
NET VOLUME OF SORTED SAMPLE	699.00		100.00%

TABLE 15.4
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	209.55	8.84%	3.72%
Office Paper	537.78	22.69%	9.54%
Mixed Paper	636.82	26.87%	11.30%
Newsprint	371.71	15.68%	6.60%
Magazines	214.80	9.06%	3.81%
Paperboard	399.61	16.86%	7.09%
TOTAL PAPER FIBERS	2,370.27		42.06%
LDPE #4	139.63	15.04%	2.48%
PET #1	169.86	18.29%	3.01%
HDPE #2	345.34	37.19%	6.13%
PVC #3	17.03	1.83%	0.30%
PP #5	24.05	2.59%	0.43%
PS #6	103.83	11.18%	1.84%
Other Plastics	128.79	13.87%	2.29%
TOTAL PLASTICS	928.53		16.48%
Aluminum Beverage Cans	80.48	34.44%	1.43%
Aluminum Foil/Food Trays	25.69	10.99%	0.46%
Other Aluminum	16.20	6.93%	0.29%
Tin Food Cans	90.26	38.63%	1.60%
Other Tin Cans	21.04	9.00%	0.37%
TOTAL METALS	233.67		4.15%
Yard Waste	323.77		5.74%
Textiles	222.08		3.94%
Diapers	214.83		3.81%
Food	978.44		17.36%
Glass	250.54		4.45%
Empty Aerosol Cans	11.65		0.21%
Medical Waste	2.49		0.04%
Fines and Superfines	3.70		0.07%
Other Minor Categories	95.97		1.70%
NET WEIGHT OF SORTED SAMPLE	5,635.94		100.00%

TABLE 15.5
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	51.35	9.48%	4.33%
Office Paper	131.77	24.33%	11.10%
Mixed Paper	66.23	12.23%	5.58%
Newsprint	39.67	7.33%	3.34%
Magazines	38.84	7.17%	3.27%
Paperboard	213.66	39.46%	18.00%
TOTAL PAPER FIBERS	541.53		45.62%
LDPE #4	38.62	12.26%	3.25%
PET #1	49.96	15.86%	4.21%
HDPE #2	120.77	38.34%	10.17%
PVC #3	8.52	2.70%	0.72%
PP #5	10.93	3.47%	0.92%
PS #6	47.20	14.98%	3.98%
Other Plastics	39.03	12.39%	3.29%
TOTAL PLASTICS	315.02		26.54%
Aluminum Beverage Cans	28.74	33.42%	2.42%
Aluminum Foil/Food Trays	12.23	14.22%	1.03%
Other Aluminum	10.13	11.77%	0.85%
Tin Food Cans	24.39	28.36%	2.06%
Other Tin Cans	10.52	12.23%	0.89%
TOTAL METALS	86.02		7.25%
Yard Waste	62.07		5.23%
Textiles	47.50		4.00%
Diapers	24.14		2.03%
Food	76.44		6.44%
Glass	27.23		2.29%
Empty Aerosol Cans	6.47		0.55%
Medical Waste	0.55		0.05%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	1,186.97		100.00%

TABLE 15.6
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	702.65	19.54%	7.65%
Office Paper	665.07	18.49%	7.24%
Mixed Paper	828.34	23.03%	9.02%
Newsprint	618.13	17.19%	6.73%
Magazines	337.33	9.38%	3.67%
Paperboard	444.78	12.37%	4.84%
TOTAL PAPER FIBERS	3,596.30		39.14%
LDPE #4	354.96	24.21%	3.86%
PET #1	252.84	17.24%	2.75%
HDPE #2	418.46	28.54%	4.55%
PVC #3	38.40	2.62%	0.42%
PP #5	43.28	2.95%	0.47%
PS #6	157.83	10.76%	1.72%
Other Plastics	200.68	13.68%	2.18%
TOTAL PLASTICS	1,466.45		15.96%
Aluminum Beverage Cans	122.34	32.20%	1.33%
Aluminum Foil/Food Trays	39.56	10.41%	0.43%
Other Aluminum	32.62	8.58%	0.36%
Tin Food Cans	139.02	36.59%	1.51%
Other Tin Cans	46.45	12.22%	0.51%
TOTAL METALS	379.99		4.14%
Yard Waste	719.35		7.83%
Textiles	491.84		5.35%
Diapers	346.85		3.78%
Food	1,503.48		16.36%
Glass	455.83		4.96%
Empty Aerosol Cans	19.69		0.21%
Medical Waste	26.33		0.29%
Fines and Superfines	13.90		0.15%
Other Minor Categories	167.30		1.82%
NET WEIGHT OF SORTED SAMPLE	9,187.31		100.00%

TABLE 15.7
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	172.17	21.90%	9.13%
Office Paper	162.96	20.73%	8.64%
Mixed Paper	86.15	10.96%	4.57%
Newsprint	65.97	8.39%	3.50%
Magazines	61.00	7.76%	3.23%
Paperboard	237.82	30.25%	12.61%
TOTAL PAPER FIBERS	786.07		41.68%
LDPE #4	98.18	20.02%	5.21%
PET #1	74.36	15.17%	3.94%
HDPE #2	146.34	29.85%	7.76%
PVC #3	19.20	3.92%	1.02%
PP #5	19.67	4.01%	1.04%
PS #6	71.74	14.63%	3.80%
Other Plastics	60.81	12.40%	3.22%
TOTAL PLASTICS	490.31		26.00%
Aluminum Beverage Cans	43.69	30.40%	2.32%
Aluminum Foil/Food Trays	18.84	13.11%	1.00%
Other Aluminum	20.39	14.19%	1.08%
Tin Food Cans	37.57	26.14%	1.99%
Other Tin Cans	23.23	16.16%	1.23%
TOTAL METALS	143.72		7.62%
Yard Waste	137.91		7.31%
Textiles	105.19		5.58%
Diapers	38.97		2.07%
Food	117.46		6.23%
Glass	49.55		2.63%
Empty Aerosol Cans	10.94		0.58%
Medical Waste	5.85		0.31%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	1,885.96		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sort conducted at the Richland County Transfer Station. Table 15.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 15.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; yard waste, corrugated paper, mixed paper, and office paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Corrugated paper and paperboard were the most dominant single categories – by volume – with yard waste and office paper placing second and LDPE #4 and HDPE #2 placing third.

The majority of loads sampled during the Spring Sort were residential. In addition, only 14 loads were sampled during the Spring Sort compared to the 22 loads that were sampled during the Fall Sort. When the Spring Sort and the Fall Sort are compared, an increase in the commercial/apartment loads that were sampled becomes evident. This variance in loads sampled and the number of samples may explain the variance in the paperboard and mixed paper components.

TABLE 15.8
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
ANALYSIS RESULTS BY WEIGHT

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 34.50%	Paper – 42.06%	Paper – 39.14%
2	Plastics – 15.15%	Food – 17.36%	Food – 16.36%
3	Food – 14.78%	Plastics – 16.48%	Plastics – 15.96%
TOP MATERIAL CATEGORIES			
1	Food – 14.78%	Food – 17.36%	Food – 16.36%
2	Corrugated Paper – 13.88%	Mixed Paper – 11.30%	Mixed Paper – 9.02%
3	Yard Waste – 11.14%	Office Paper – 9.54%	Yard Waste – 7.83%
BOTTOM MATERIAL CATEGORIES			
1	Cell Phones	Oil Filters	Aseptic Containers
2	Other Ferrous Metals	Car Parts	Car Parts
3	Aseptic Containers	Other Ferrous Metals	Other Ferrous Metals

TABLE 15.9
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
ANALYSIS RESULTS BY VOLUME

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
TOP COMPONENTS			
1	Paper – 34.98%	Paper – 45.62%	Paper – 41.68%
2	Plastics – 25.08%	Plastics – 26.54%	Plastics – 26.00%
3	Yard Waste – 10.85%	Metals – 7.25%	Metals – 7.62%
TOP MATERIAL CATEGORIES			
1	Corrugated Paper – 17.39%	Paperboard – 18.00%	Paperboard – 12.61%
2	Yard Waste – 10.85%	Office Paper – 11.10%	Corrugated Paper – 9.13%
3	LDPE #4 – 8.52%	HDPE #2 – 10.17%	Office Paper -8.64%
BOTTOM MATERIAL CATEGORIES			
1	Empty Aerosol Cans	Med Waste	Med Waste
2	Med Waste	Empty Aerosol Cans	Empty Aerosol Cans
3	Aluminum Foil/Food Trays	PVC #3	Aluminum Foil/Food Trays

Visual Inspection Analysis

A total of 33 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and plastic barrels/bins. Table 15.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were plastic barrels/bins, C & D debris, and furniture.

Table 15.11 provides a breakdown of the types of waste selected for sampling. The data indicates a consistency in the number of residential loads sampled. Only the commercial and commercial/apartment loads varied between the two waste sorts. Comparing this data to the information provided in Table 15.10, the possible impact of the consistency of residential waste between the two sorts and the increase in apartment waste during the Fall Sort may have contributed to the large amount of plastic items present in the loads.

TABLE 15.10
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
VISUAL INSPECTION ANALYSIS RESULTS

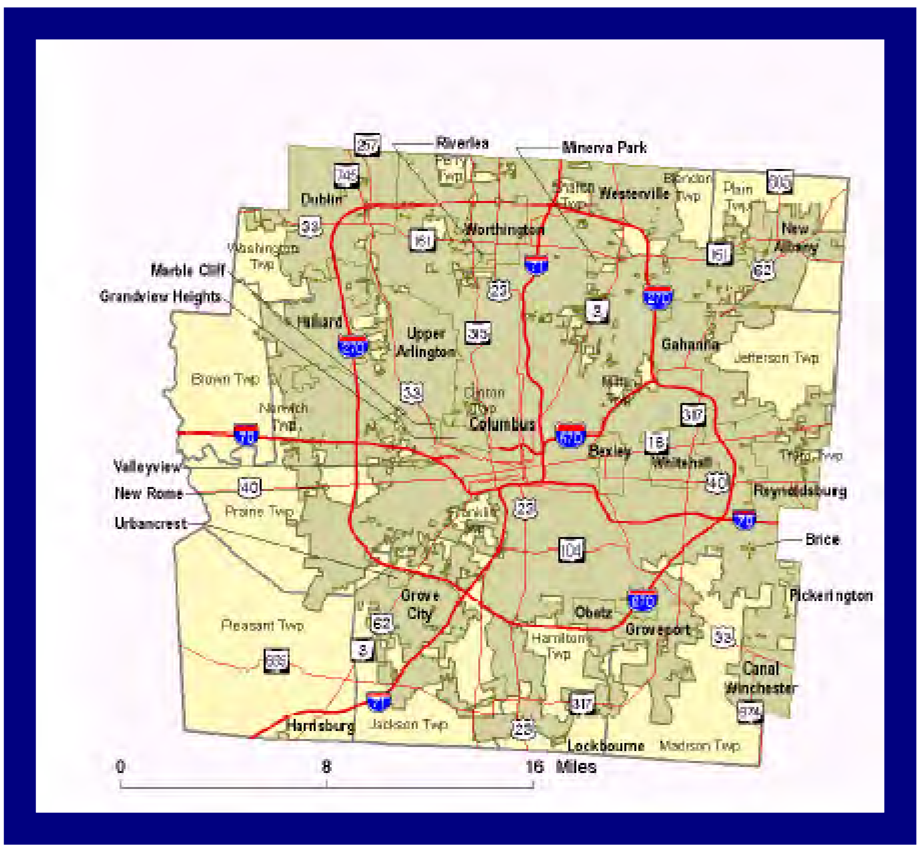
	Spring Sort Total Loads Sampled = 14	**Fall Sort** Total Loads Sampled = 22	**District** Total Loads Sampled = 36
Percent of sampled loads in which the following were noted:			
Computer Equipment	7	14	11
Electronic Equipment	7	14	11
Car Parts	0	18	11
Furniture	14	32	22
Plastic Barrels/Bins	29	32	31
Metal Containers	14	18	17
C & D Debris	21	32	28

TABLE 15.11
RICHLAND COUNTY REGIONAL SOLID WASTE MANAGEMENT AUTHORITY
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort May 2003	**Fall Sort** October 2003	**District**
Residential	9	8	17
Residential + Commercial	1	2	3
Residential + Apartments	0	1	1
Residential + Commercial + Apartments	1	1	2
Commercial + Apartments	0	8	8
Commercial	3	1	4
Apartments	0	1	1
TOTAL NUMBER OF LOADS SAMPLED	14	22	36

16. SOLID WASTE AUTHORITY OF CENTRAL OHIO

The Solid Waste Authority of Central Ohio encompasses Franklin County which is located in the central portion of Ohio. Franklin County is bordered by Fairfield County to the southeast, Licking County to the northeast, Delaware County to the north, Union County to the northwest, Madison County to the west, and Pickaway County to the south. The Columbus metropolitan area lies within the district (see Map 16.1). The Solid Waste Authority of Central Ohio (SWACO) district encompasses Franklin County with a population of 1,068,978 as recorded in 2000, and a land area of 540.0 square miles (*Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).



Source: <http://www.odod.state.oh.us/research>

MAP 16.1
SOLID WASTE AUTHORITY OF CENTRAL OHIO

The waste sorts in this district were conducted at the Jackson Pike Transfer Station which is located in the southern portion of Columbus, Ohio; the Morse Road Transfer Station which is located in the northeastern portion of Columbus, Ohio; and the Franklin County Landfill which is located in the southern portion of the district near Grove City, Ohio. All three of these facilities are publicly-owned and publicly-operated. Field sorting events were undertaken in this district in May 2003 (Spring Sort) and September/October 2003 (Fall Sort).

Spring Sort Conditions

On Monday, May 12, 2003, the waste sort was conducted at the Jackson Pike Transfer Station. The weather was rainy and cool. Because the sort was performed within the transfer station, the wet weather did not affect the waste sort.

On Tuesday, May 13, 2003, and Wednesday, May 14, 2003, the waste sort was undertaken at the Franklin County Landfill. It was partly cloudy and cool on Tuesday and partly cloudy with gusting winds on Wednesday. The waste sort was performed within 100 feet of the landfill's working face in a three-tent complex. Although the gusting winds did pose some difficulty, the waste sort was able to proceed unaffected.

On Thursday, May 15, 2003, the waste sort was conducted at the Morse Road Transfer Station. It was partly cloudy to cloudy and humid. The sorting process was performed within a three-tent complex outside the transfer facility. Loads for sampling were selected at the transfer station entrance. Once the load was deposited onto the transfer station floor, the walk around was performed and the sample selected. The sample was then taken to the tent complex for sorting and categorization. Discards were placed into the bucket of a front-end loader and returned to the transfer station floor for disposal.

Fall Sort Conditions

As with the Spring Waste Sort, the Fall Waste Sort was conducted at the two transfer stations and the landfill. On Tuesday, September 30, 2003, the waste sort was performed at the Morse Road Transfer Station; on Wednesday, October 1, 2003, the waste sort was conducted at the Jackson Pike Transfer Station; on Thursday, October 2, 2003, and Friday, October 3, 2003, the waste sort was undertaken at the Franklin County Landfill. The sorting arrangements were identical to those established during the Spring Sort. All four days were clear to partly cloudy. Each day was slightly breezy with the wind increasing in speed during the week. The winds peaked on Friday at 30 miles per hour. Working conditions at each site were favorable for sorting and weather conditions did not impact any of the sorts.

Observations

During the waste sorts at the Jackson Pike Transfer Station, Morse Road Transfer Station, and Franklin County Landfill, the project team observed some unique activities that may affect the characteristics of the solid waste collected and disposed at this facility. For example:

1. The City of Columbus collects solid waste placed in 300-gallon barrels from locations in alleys in certain parts of the city. These large barrels often attract a variety of wastes including tires and furniture;

2. The transfer stations are located within structures that were not built to function as transfer facilities. The lighting is poor and the tipping floors are small, particularly at the Morse Road facility. These conditions minimize the opportunity for operators to inspect loads;

3. The landfill operation is relatively hectic. With both tipper and collection vehicles' unloading in the same area, the working face becomes very congested. This can result in limited opportunities to inspect loads;

4. Safety is a major concern of the operators given the congestion at each site. The operators are sensitive to this issue;

5. Because the solid waste is collected utilizing automated trucks, it is very difficult for City of Columbus drivers to note what is in each container unloaded into the collection vehicle;

6. All commercial waste is brought to the landfill by private companies. The commercial waste is typically collected in front load waste collection vehicles. These vehicles collect dumpsters ranging in size from four to six yards. The drivers indicated that most of the dumpsters had lids which reduced the possibility of the driver knowing what was in each dumpster;

7. For those residential loads that were sampled and were delivered to either the landfill or the Morse Road Transfer Station by a private company, the method of collection was toters or bags and cans along the curb. The collection vehicle drivers indicated that anything left at the curb was collected.

Waste Sort Results and Analysis

A total of 93 loads of solid waste were selected for sampling at these facilities. Data for each individual sample can be found in Appendix A (see Table 16.1 for sample numbers for this district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 16.1
SOLID WASTE AUTHORITY OF CENTRAL OHIO
SAMPLE NUMBERS

Day of Week	Date	Facility	Sample Numbers
		SPRING SORT	
Monday	May 12, 2003	Jackson Pike Transfer Station	0512D1.01 through 0512D1.10
Tuesday	May 13, 2003	Franklin County Landfill	0513D2.01 through 0513D2.10
Wednesday	May 14, 2003	Franklin County Landfill	0514D3.01 through 0514D3.14
Thursday	May 15, 2003	Morse Road Transfer Station	0515D4.01 through 0515D4.12
		FALL SORT	
Tuesday	September 30, 2003	Morse Road Transfer Station	0930D5.01 through 0930D5.11
Wednesday	October 1, 2003	Jackson Pike Transfer Station	1001D6.01 through 1001D6.11
Thursday	October 2, 2003	Franklin County Landfill	1002D7.01 through 1002D7.13
Friday	October 3, 2003	Franklin County Landfill	1003D8.01 through 1003D8.12

Weight and volume tables were compiled that summarize the data collected at these facilities during the Spring Sort (see Table 16.2 and Table 16.3) and the Fall Sort (see Table 16.4 and Table 16.5). Additionally, weight and volume summary data for both waste sorts conducted at the Jackson Pike Transfer Station, Morse Road Transfer Station, and the Franklin County Landfill — all located within the Solid Waste Authority of Central Ohio's district — are presented in Table 16.6 and Table 16.7. Chart 16.1 and Chart 16.2 provide a graphic summary of the major components of the waste stream as sampled at these facilities.

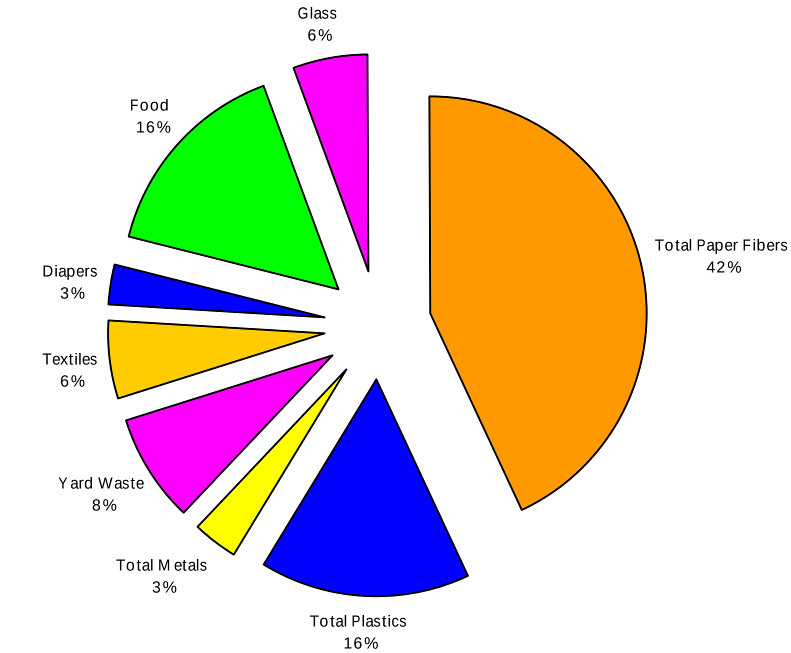


CHART 16.1
SOLID WASTE AUTHORITY OF CENTRAL OHIO
MAJOR COMPONENT WEIGHT DISTRIBUTION

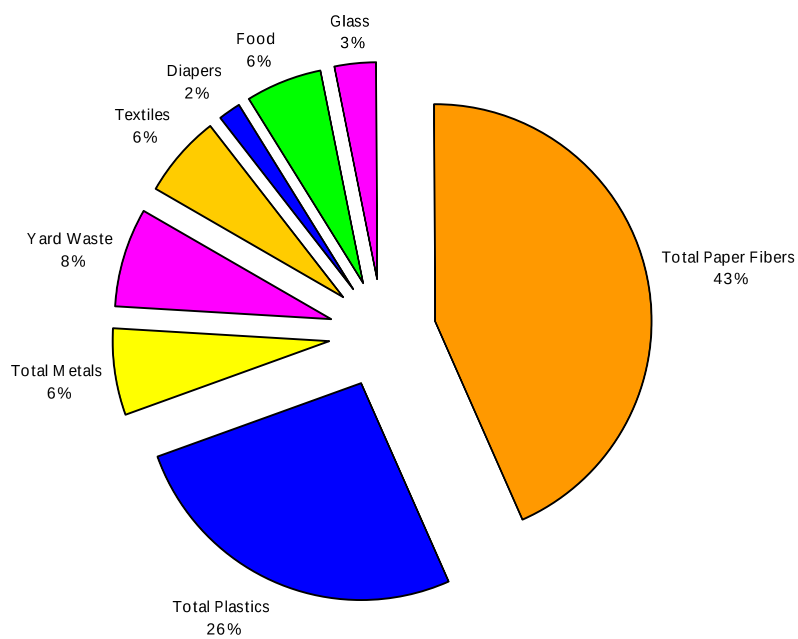


CHART 16.2
SOLID WASTE AUTHORITY OF CENTRAL OHIO
MAJOR COMPONENT VOLUME DISTRIBUTION

TABLE 16.2
SOLID WASTE AUTHORITY OF CENTRAL OHIO
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,008.66	24.04%	9.16%
Office Paper	904.78	21.56%	8.22%
Mixed Paper	777.31	18.52%	7.06%
Newsprint	1,114.54	26.56%	10.13%
Magazines	367.85	8.77%	3.34%
Paperboard	23.48	0.56%	0.21%
TOTAL PAPER FIBERS	4,196.62		38.12%
LDPE #4	182.67	10.70%	1.66%
PET #1	249.29	14.60%	2.26%
HDPE #2	808.40	47.34%	7.34%
PVC #3	40.84	2.39%	0.37%
PP #5	61.62	3.61%	0.56%
PS #6	158.36	9.27%	1.44%
Other Plastics	206.31	12.08%	1.87%
TOTAL PLASTICS	1,707.49		15.51%
Aluminum Beverage Cans	128.08	36.23%	1.16%
Aluminum Foil/Food Trays	63.48	17.96%	0.58%
Other Aluminum	24.47	6.92%	0.22%
Tin Food Cans	122.03	34.52%	1.11%
Other Tin Cans	15.48	4.38%	0.14%
TOTAL METALS	353.54		3.21%
Yard Waste	1,208.79		10.98%
Textiles	788.10		7.16%
Diapers	291.82		2.65%
Food	1,434.81		13.03%
Glass	638.62		5.80%
Empty Aerosol Cans	22.36		0.20%
Medical Waste	29.51		0.27%
Fines and Superfines	14.10		0.13%
Other Ferrous Metals	24.15		0.22%
Batteries	7.08		0.06%
Mixed Metals	103.32		0.94%
Cell Phones	2.42		0.02%
Rubber	2.97		0.03%
Hard Cover Books	56.66		0.51%
Wax	2.07		0.02%
Other Non-Ferrous Metals	3.24		0.03%
Drywall	56.90		0.52%
Paints	2.15		0.02%
Concrete	23.88		0.22%
Air Filters	22.21		0.20%
Computer Parts	5.44		0.05%
Telephone Books	9.52		0.09%
NET WEIGHT OF SORTED SAMPLE	11,007.77		100.00%

TABLE 16.3
SOLID WASTE AUTHORITY OF CENTRAL OHIO
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	247.16	33.05%	11.75%
Office Paper	221.70	29.65%	10.54%
Mixed Paper	80.84	10.81%	3.84%
Newsprint	118.95	15.91%	5.66%
Magazines	66.52	8.90%	3.16%
Paperboard	12.55	1.68%	0.60%
TOTAL PAPER FIBERS	747.72		35.56%
LDPE #4	50.53	8.57%	2.40%
PET #1	73.32	12.44%	3.49%
HDPE #2	282.71	47.96%	13.44%
PVC #3	20.42	3.46%	0.97%
PP #5	28.01	4.75%	1.33%
PS #6	71.98	12.21%	3.42%
Other Plastics	62.52	10.61%	2.97%
TOTAL PLASTICS	589.49		28.03%
Aluminum Beverage Cans	45.74	34.66%	2.18%
Aluminum Foil/Food Trays	30.23	22.90%	1.44%
Other Aluminum	15.29	11.59%	0.73%
Tin Food Cans	32.98	24.99%	1.57%
Other Tin Cans	7.74	5.86%	0.37%
TOTAL METALS	131.99		6.28%
Yard Waste	231.74		11.02%
Textiles	168.55		8.02%
Diapers	32.79		1.56%
Food	112.09		5.33%
Glass	69.42		3.30%
Empty Aerosol Cans	12.42		0.59%
Medical Waste	6.56		0.31%
Fines and Superfines			
Other Ferrous Metals			
Batteries			
Mixed Metals			
Cell Phones			
Rubber			
Hard Cover Books			
Wax			
Other Non-Ferrous Metals			
Drywall			
Paints			
Concrete			
Air Filters			
Computer Parts			
Telephone Books			
NET VOLUME OF SORTED SAMPLE	2,102.76		100.00%

TABLE 16.4
SOLID WASTE AUTHORITY OF CENTRAL OHIO
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	489.64	10.48%	4.78%
Office Paper	1,068.29	22.86%	10.44%
Mixed Paper	1,110.79	23.77%	10.85%
Newsprint	831.74	17.80%	8.13%
Magazines	395.89	8.47%	3.87%
Paperboard	777.54	16.64%	7.60%
TOTAL PAPER FIBERS	4,673.89		45.67%
LDPE #4	330.97	22.13%	3.23%
PET #1	222.26	14.86%	2.17%
HDPE #2	451.71	30.20%	4.41%
PVC #3	14.15	0.95%	0.14%
PP #5	55.82	3.73%	0.55%
PS #6	161.93	10.83%	1.58%
Other Plastics	258.98	17.31%	2.53%
TOTAL PLASTICS	1,495.82		14.62%
Aluminum Beverage Cans	128.12	35.27%	1.25%
Aluminum Foil/Food Trays	49.54	13.64%	0.48%
Other Aluminum	25.63	7.06%	0.25%
Tin Food Cans	146.40	40.30%	1.43%
Other Tin Cans	13.55	3.73%	0.13%
TOTAL METALS	363.24		3.55%
Yard Waste	448.15		4.38%
Textiles	388.00		3.79%
Diapers	339.07		3.31%
Food	1,759.86		17.20%
Glass	517.91		5.06%
Empty Aerosol Cans	18.25		0.18%
Medical Waste	19.39		0.19%
Fines and Superfines	7.18		0.07%
Batteries	4.68		0.05%
Mixed Metals	38.63		0.38%
Rubber	2.28		0.02%
Hard Cover Books	12.07		0.12%
Wax	0.89		0.01%
Paints	1.82		0.02%
Air Filters	0.53		0.01%
Telephone Books	124.72		1.22%
Wood	8.69		0.08%
Flourescent Lighting	0.31		0.00%
Small Appliances	3.69		0.04%
Oil Filters	1.02		0.01%
Paint Rollers	0.64		0.01%
Spark Plugs	0.42		0.00%
Paint Brushes	0.21		0.00%
Computer Parts	1.84		0.02%
NET WEIGHT OF SORTED SAMPLE	10,233.20		100.00%

TABLE 16.5
SOLID WASTE AUTHORITY OF CENTRAL OHIO
FALL SORT SUMMARY – VOLUME DATA

Material Category	**Volume (cubic feet)**	**% of Material Category**	**% of Sorted Sample**
Corrugated Paper	119.98	11.18%	5.66%
Office Paper	261.77	24.39%	12.35%
Mixed Paper	115.52	10.76%	5.45%
Newsprint	88.77	8.27%	4.19%
Magazines	71.59	6.67%	3.38%
Paperboard	415.74	38.73%	19.61%
TOTAL PAPER FIBERS	1,073.36		50.64%
LDPE #4	91.54	18.33%	4.32%
PET #1	65.37	13.09%	3.08%
HDPE #2	157.97	31.63%	7.45%
PVC #3	7.08	1.42%	0.33%
PP #5	25.37	5.08%	1.20%
PS #6	73.60	14.74%	3.47%
Other Plastics	78.48	15.71%	3.70%
TOTAL PLASTICS	499.42		23.56%
Aluminum Beverage Cans	45.76	34.74%	2.16%
Aluminum Foil/Food Trays	23.59	17.91%	1.11%
Other Aluminum	16.02	12.16%	0.76%
Tin Food Cans	39.57	30.04%	1.87%
Other Tin Cans	6.78	5.14%	0.32%
TOTAL METALS	131.71		6.21%
Yard Waste	85.91		4.05%
Textiles	82.98		3.91%
Diapers	38.10		1.80%
Food	137.49		6.49%
Glass	56.29		2.66%
Empty Aerosol Cans	10.14		0.48%
Medical Waste	4.31		0.20%
Fines and Superfines			
Batteries			
Mixed Metals			
Rubber			
Hard Cover Books			
Wax			
Paints			
Air Filters			
Telephone Books			
Wood			
Flourescent Lighting			
Small Appliances			
Oil Filters			
Paint Rollers			
Spark Plugs			
Paint Brushes			
Computer Parts			
NET VOLUME OF SORTED SAMPLE	2,119.71		100.00%

TABLE 16.6
SOLID WASTE AUTHORITY OF CENTRAL OHIO
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,498.30	16.89%	7.05%
Office Paper	1,973.07	22.24%	9.29%
Mixed Paper	1,888.10	21.29%	8.89%
Newsprint	1,946.28	21.94%	9.16%
Magazines	763.74	8.61%	3.60%
Paperboard	801.02	9.03%	3.77%
TOTAL PAPER FIBERS	8,870.51		41.76%
LDPE #4	513.64	16.03%	2.42%
PET #1	471.55	14.72%	2.22%
HDPE #2	1,260.11	39.34%	5.93%
PVC #3	54.99	1.72%	0.26%
PP #5	117.44	3.67%	0.55%
PS #6	320.29	10.00%	1.51%
Other Plastics	465.29	14.53%	2.19%
TOTAL PLASTICS	3,203.31		15.08%
Aluminum Beverage Cans	256.20	35.74%	1.21%
Aluminum Foil/Food Trays	113.02	15.77%	0.53%
Other Aluminum	50.10	6.99%	0.24%
Tin Food Cans	268.43	37.45%	1.26%
Other Tin Cans	29.03	4.05%	0.14%
TOTAL METALS	716.78		3.37%
Yard Waste	1,656.94		7.80%
Textiles	1,176.10		5.54%
Diapers	630.89		2.97%
Food	3,194.67		15.04%
Glass	1,156.53		5.44%
Empty Aerosol Cans	40.61		0.19%
Medical Waste	48.90		0.23%
Fines and Superfines	21.28		0.10%
Other Minor Categories	524.45		2.47%
NET WEIGHT OF SORTED SAMPLE	21,240.97		100.00%

TABLE 16.7
SOLID WASTE AUTHORITY OF CENTRAL OHIO
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	367.13	20.16%	8.69%
Office Paper	483.47	26.55%	11.45%
Mixed Paper	196.36	10.78%	4.65%
Newsprint	207.71	11.41%	4.92%
Magazines	138.11	7.58%	3.27%
Paperboard	428.29	23.52%	10.14%
TOTAL PAPER FIBERS	1,821.08		43.13%
LDPE #4	142.07	13.05%	3.36%
PET #1	138.69	12.74%	3.28%
HDPE #2	440.68	40.47%	10.44%
PVC #3	27.50	2.53%	0.65%
PP #5	53.38	4.90%	1.26%
PS #6	145.59	13.37%	3.45%
Other Plastics	141.00	12.95%	3.34%
TOTAL PLASTICS	1,088.90		25.79%
Aluminum Beverage Cans	91.50	34.70%	2.17%
Aluminum Foil/Food Trays	53.82	20.41%	1.27%
Other Aluminum	31.31	11.87%	0.74%
Tin Food Cans	72.55	27.51%	1.72%
Other Tin Cans	14.52	5.50%	0.34%
TOTAL METALS	263.70		6.25%
Yard Waste	317.65		7.52%
Textiles	251.54		5.96%
Diapers	70.89		1.68%
Food	249.58		5.91%
Glass	125.71		2.98%
Empty Aerosol Cans	22.56		0.53%
Medical Waste	10.87		0.26%
Fines and Superfines			
Other Minor Categories			
NET VOLUME OF SORTED SAMPLE	4,222.47		100.00%

Weight and Volume Analysis

To further analyze the data, tables were compiled that identify unique results of the waste sorts conducted at the Jackson Pike Transfer Station, Morse Road Transfer Station, and Franklin County Landfill. Table 16.8 identifies significant components and material categories of the waste stream utilizing the weight data. Table 16.9 presents significant components and material categories of the waste stream utilizing the volume data.

The paper component comprises the largest part of the waste stream – by weight and by volume — during both seasons and in total. The other major components of the waste stream – by weight – are plastics and food. The most prominent single category – by weight – is food; yard waste, newsprint, mixed paper, and office paper are also prominent single categories – by weight.

The single dominant major component – by volume – was paper for both seasons and in total. Office paper and HDPE #2 were the most dominant single categories – by volume – with paperboard placing third.

The three facilities within the SWACO district where samples were gathered for this study had the largest number of pure residential and pure commercial loads. When the Spring Sort and the Fall Sort are compared, an increase in the commercial/apartment loads that were sampled becomes evident. This variance, coupled with the fact that the Fall Sort was undertaken at the beginning of the month, may explain the variance in the yard waste and mixed paper components.

TABLE 16.8
SOLID WASTE AUTHORITY OF CENTRAL OHIO
ANALYSIS RESULTS BY WEIGHT

	Spring Sort May 2003	**Fall Sort** September/October 2003	**District**
TOP COMPONENTS			
1	Paper – 38.12%	Paper - 45.67%	Paper – 41.76%
2	Plastics – 15.51%	Food – 17.20%	Plastics – 15.08%
3	Food – 13.03%	Plastics – 14.62%	Food – 15.04%
TOP MATERIAL CATEGORIES			
1	Food – 13.03%	Food – 17.20%	Food – 15.04%
2	Yard Waste – 10.98%	Mixed Paper – 10.85%	Office Paper – 9.29%
3	Newsprint – 10.13%	Office Paper – 10.44%	Mixed Paper – 9.16%
BOTTOM MATERIAL CATEGORIES			
1	Wax	Paint Brushes	Paint Brushes
2	Paints	Fluorescent Lighting	Fluorescent Lighting
3	Cell Phones	Spark Plugs	Spark Plugs

TABLE 16.9
SOLID WASTE AUTHORITY OF CENTRAL OHIO
ANALYSIS RESULTS BY VOLUME

	Spring Sort May 2003	**Fall Sort** September/October 2003	**District**
TOP COMPONENTS			
1	Paper – 35.56%	Paper – 50.64%	Paper – 43.13%
2	Plastics – 28.03%	Plastics – 23.56%	Plastics – 25.79%
3	Yard Waste – 11.02%	Food – 6.49%	Yard Waste – 7.52%
TOP MATERIAL CATEGORIES			
1	HDPE #2 – 13.44%	Paperboard – 19.61%	Office Paper – 11.45%
2	Corrugated Paper – 11.75%	Office Paper – 12.35%	HDPE #2 – 10.44%
3	Yard Waste – 11.02%	HDPE #2 – 7.45%	Paperboard – 10.14%
BOTTOM MATERIAL CATEGORIES			
1	Med Waste	Med Waste	Med Waste
2	Other Tin Cans	Other Tin Cans	Other Tin Cans
3	Empty Aerosol Cans	PVC #3	Empty Aerosol Cans

Visual Inspection Analysis

A total of 37 different large items were identified during the Spring Waste Sort and the Fall Waste Sort. Of these specific items, the three most frequently identified large items were loose wood, carpet, and C & D debris. Table 16.10 presents the frequency of sighting the seven major categories of large items. When the analysis is narrowed to the seven major categories of large items, the three most frequently observed large items were C & D debris, furniture and plastic barrels/bins.

Table 16.11 provides a breakdown of the types of waste selected for sampling. The data indicates a unique consistency in the types of waste for the sampled loads during both the Spring Sort and the Fall Sort. Only the commercial and commercial/apartment loads varied between the two waste sorts. Comparing this data to the information provided in Table 16.10, the possible impact of this variance in waste is evident in the variance in the number of computer items and the large amount of furniture and plastic items present in the loads.

TABLE 16.10
SOLID WASTE AUTHORITY OF CENTRAL OHIO
VISUAL INSPECTION ANALYSIS RESULTS

	Spring Sort Total Loads Sampled = 46	**Fall Sort** Total Loads Sampled = 47	**District** Total Loads Sampled = 93
Percent of sampled loads in which the following were noted:			
Computer Equipment	28	9	16
Electronic Equipment	11	23	13
Car Parts	9	6	5
Furniture	37	49	43
Plastic Barrels/Bins	37	38	38
Metal Containers	7	6	6
C & D Debris	39	60	49

TABLE 16.11
SOLID WASTE AUTHORITY OF CENTRAL OHIO
TYPE OF WASTE IN SAMPLE LOADS

	Spring Sort May 2003	**Fall Sort** September/October 2003	**District**
Residential	19	19	38
Residential + Commercial	0	0	0
Residential + Apartments	2	1	3
Residential + Commercial + Apartments	0	0	0
Commercial + Apartments	5	14	19
Commercial	16	10	26
Apartments	4	3	7
TOTAL NUMBER OF LOADS SAMPLED	46	47	93

17. STATEWIDE WASTE STREAM PROFILE

The State of Ohio is located in the east-central portion of the contiguous United States. Pennsylvania lies directly east of Ohio and Indiana lies directly west of Ohio. Lake Erie and the United States-Canada international line delineate Ohio’s northern border. Michigan borders the northwestern portion of Ohio. Kentucky lies south of Ohio and West Virginia borders the southeastern portion of Ohio. The Ohio River delineates the Ohio-Kentucky state border and the Ohio-West Virginia state border (for a general map of Ohio, see Map 17.1).

Source: <http://www.odod.state.oh.us/research>

MAP 17.1
STATE OF OHIO

Many major interstate freeway systems traverse Ohio. From north to south, I-90 and I-80 traverse the state from its eastern border with Pennsylvania to its western border with Indiana. I-70 crosses the state from its border with West Virginia to its western border with Indiana. I-76 also traverses the eastern one-third of Ohio.

From east to west, I-77 traverses eastern Ohio from its southern border with West Virginia to Cleveland. I-71 traverses central Ohio from Kentucky to Lake Erie. Its route passes through Cincinnati in the southwestern portion of Ohio and ends in Cleveland in the northeastern portion of Ohio. I-75 traverses western Ohio from its southern border with Kentucky to its northwestern border with Michigan.

Several major cities lie within Ohio's borders. Columbus is located in central Ohio and serves as the State Capitol. Cincinnati and Dayton are located in southwest Ohio. Toledo and Cleveland are located in the far northern portion of Ohio. Akron, Canton, and Youngstown are all located in northeast Ohio.

In 2000, Ohio's population totaled 11,353,140. Its population is projected to be over 12,000,000 by 2020. Cuyahoga County (which encompasses the Cleveland metropolitan area) is the most populous Ohio county with a population of 1,393,978 in 2000. Franklin County is the second most populous Ohio County, with Hamilton County and Montgomery County as third and fourth. The Columbus metropolitan area lies within Franklin County; the Cincinnati metropolitan area lies within Hamilton County; the Dayton metropolitan area lies within Montgomery County. Ohio's total land area is 40,952.6 square miles. (Population and land area numbers derived from *Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).

The waste sorts were undertaken throughout Ohio (see Section 1 and Section 3 for specific locations) in May and June 2003 (Spring Sort) and September and October 2003 (Fall Sort). Both publicly- and privately-owned and operated landfills and transfer stations hosted the field gathering events associated with the Spring Sort and the Fall Sort. A total of 460 samples were collected during the 52 days of sorting.

Spring Conditions

The Spring Sort began at the Richland County Transfer Station in Mansfield, Ohio, on Tuesday, May 5, 2003. This facility is located within the Richland County Regional Solid Waste Management Authority's district. On Thursday, June 26, 2003, the last waste sort conducted during the Spring Sort was undertaken at the Cherokee Run Landfill near Bellefontaine, Ohio, located within the Logan County Solid Waste Management District.

Very difficult weather conditions were encountered during the Spring Sort. Rain events occurred while conducting the waste sorts at every facility in every district. Some of these events were minor and did not affect the sorting process while others caused significant difficulties. Although the spring conditions were not ideal, only one day of sorting was completely abandoned. During the 25 days of sorting undertaken during the Spring Sort, the project team captured and categorized 208 samples.

Fall Conditions

The Fall Sort began with field sorting events at the Geneva Landfill near Ashtabula, Ohio, on Tuesday, September 9, 2003. This facility is located in the Ashtabula County Solid Waste Management District. On Tuesday, October 28, 2003, the last field sorting event was concluded at the Athens Reclamation Center near Nelsonville, Ohio, in the Athens-Hocking Joint Solid Waste Management District.

Much more favorable conditions were encountered throughout the Fall Sort. Although some rain events did occur, fewer windy conditions were encountered. All planned days of sorting were conducted. During the 27 days of sorting undertaken during the Fall Sort, the project team selected and categorized 252 samples.

Statewide Data

A total of 460 loads of solid waste were selected for sampling during the 2003 Waste Sort. Weight and volume data for each individual sample can be found in Appendix A (see Table 17.1 for a chronological, numerical listing of sample numbers and Table 17.2 for a listing of sample numbers for each specific district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 17.1
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
		SPRING SORT		
0506D1.01 through 0506D1.04	Tuesday	May 6, 2003	Richland County Transfer Station	Richland County Regional Solid Waste Management Authority
0507D2.01 through 0507D2.10	Wednesday	May 7, 2003		
0508D1.01 through 0508D1.07	Thursday	May 8, 2003	Athens Reclamation Center	Athens-Hocking Joint SWMD
0509D2.01 through 0509D2.04	Friday	May 9, 2003		
0512D1.01 through 0512D1.10	Monday	May 12,2003	Jackson Pike Transfer Station	Solid Waste Authority of Central Ohio
0513D2.01 through 0513D2.10	Tuesday	May 13, 2003	Franklin County Landfill	
0514D3.01 through 0514D3.14	Wednesday	May 14, 2003	Franklin County Landfill	
0515D4.01 through 0515D4.12	Thursday	May 15, 2003	Morse Road Transfer Station	
0519D1.01 through 0519D1.08	Monday	May 19, 2003	Rumpke Landfill	Hamilton County SWMD
0520D2.01 through 0520D2.11	Tuesday	May 20, 2003		
0605D1.01 through 0605D1.06	Thursday	June 5, 2003	Defiance County Landfill	Defiance-Fulton-Paulding-Williams Joint SWMD
0606D2.01 through 0606D2.09	Friday	June 6, 2003		

TABLE 17.1 (continued)
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
0609D1.01 through 0609D1.06	Monday	June 9, 2003	Brown County Landfill	Brown County Solid Waste Authority
0610D2.01 through 0610D2.08	Tuesday	June 10, 2003		
0612D1.01 through 0612D1.07	Thursday	June 12, 2003	Geneva Landfill	Ashtabula County SWMD
0613D2.01 through 0613D2.05	Friday	June 13, 2003		
0616D1.01 through 0616D1.08	Monday	June 16, 2003	Hoffman Road Landfill	Lucas County SWMD
0617D2.01 through 0617D2.10	Tuesday	June 17, 2003		
0618D1.01 through 0618D1.12	Wednesday	June 18, 2003	South Transfer Facility	Montgomery County SWMD
0619D2.01 through 0619D2.09	Thursday	June 19, 2003	North Transfer Facility	
0620D3.01 through 0620D3.12	Friday	June 20, 2003	South Transfer Facility	
0623D1.01 through 0623D1.06	Monday	June 23, 2003	Ottawa County Landfill	Ottawa-Sandusky-Seneca Joint SWMD
0624D2.01 through 0624D2.09	Tuesday	June 24, 2003		
0625D1.01 through 0625D1.07	Wednesday	June 25, 2003	Cherokee Run Landfill	Logan County SWMD
0626D2.01 through 0626D2.04	Thursday	June 26, 2003		
FALL SORT				
0909D3.01 through 0909D3.08	Tuesday	September 9, 2003	Geneva Landfill	Ashtabula County SWMD
0910D4.01 through 0910D4.08	Wednesday	September 10, 2003		
0911D3.01 through 0911D3.06	Thursday	September 11, 2003	Hoffman Road Landfill	Lucas County SWMD
0912D4.01 through 0912D4.07	Friday	September 12, 2003		

TABLE 17.1 (continued)
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
0915D4.01 through 0915D4.12	Monday	September 15, 2003	South Transfer Facility	Montgomery County SWMD
0916D5.01 through 0915D5.12	Tuesday	September 16, 2003	South Transfer Facility	
0917D6.01 through 0917D6.07	Wednesday	September 17, 2003	North Transfer Facility	
0918D3.01 through 0918D3.10	Thursday	September 18, 2003	Brown County Landfill	Brown County Solid Waste Authority
0919D4.01 through 0919D4.10	Friday	September 19, 2003		
0922D3.01 through 0922D3.05	Monday	September 22, 2003	Cherokee Run Landfill	Logan County SWMD
0923D4.01 through 0923D4.03	Tuesday	September 23, 2003		
0925D3.01 through 0925D.04	Thursday	September 25, 2003	Ottawa County Landfill	Ottawa-Sandusky-Seneca Joint SWMD
0926D4.01 through 0926D4.07	Friday	September 26, 2003		
0930D5.01 through 0930D5.11	Tuesday	September 30, 2003	Morse Road Transfer Station	Solid Waste Authority of Central Ohio
1001D6.01 through 1001D6.11	Wednesday	October 1, 2003	Jackson Pike Transfer Station	
1002D7.01 through 1002D7.13	Thursday	October 2, 2003	Franklin County Landfill	
1003D8.01 through 1003D8.12	Friday	October 3, 2003	Franklin County Landfill	
1007D3.01 through 1007D3.16	Tuesday	October 7, 2003	Rumpke Landfill	Hamilton County SWMD
1008D4.01 through 1008D4.14	Wednesday	October 8, 2003		
1009D5.01 through 1009D5.14	Thursday	October 9, 2003		
1010D6.01 through 1010D6.06	Friday	October 10, 2003		

TABLE 17.1 (continued)
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
1016D3.01 through 1016D3.10	Thursday	October 16, 2003	Richland County Transfer Station	Richland County Regional Solid Waste Management Authority
1017D4.01 through 1017D4.12	Friday	October 17, 2003		
1020D3.01 through 1020D3.08	Monday	October 20, 2003	Defiance County Landfill	Defiance-Fulton-Paulding-Williams Joint SWMD
1021D4.01 through 1021D4.10	Tuesday	October 21, 2003		
1027D3.01 through 1027D3.08	Monday	October 27, 2003	Athens Reclamation Center	Athens-Hocking Joint SWMD
1028D4.01 through 1028D4.08	Tuesday	October 28, 2003		

TABLE 17.2
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
SPRING SORT				
Ashtabula County SWMD	Geneva Landfill	June 12, 2003	Thursday	0612D1.01 through 0612D1.07
		June 13, 2003	Friday	0613D2.01 through 0613D2.05
Athens-Hocking Joint SWMD	Athens Reclamation Center	May 7, 2003	Thursday	0508D1.01 through 0508D1.07
		May 9, 2003	Friday	0509D2.01 through 0509D2.04
Brown County Solid Waste Authority	Brown County Landfill	June 9, 2003	Monday	0609D1.01 through 0609D1.06
		June 10, 2003	Tuesday	0610D2.01 through 0610D2.08

TABLE 17.2 (continued)
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
Defiance-Fulton-Paulding-Williams Joint SWMD	Defiance County Landfill	June 5, 2003	Thursday	0605D1.01 through 0605D1.06
		June 6, 2003	Friday	0606D2.01 through 0606D2.09
Hamilton County SWMD	Rumpke Landfill	May 19, 2003	Monday	0519D1.01 through 0519D1.08
		May 20, 2003	Tuesday	0520D2.01 through 0520D2.11
Logan County SWMD	Cherokee Run Landfill	June 25, 2003	Wednesday	0625D1.01 through 0625D1.07
		June 26, 2003	Thursday	0626D2.01 through 0626D2.04
Lucas County SWMD	Hoffman Road Landfill	June 16, 2003	Monday	0616D1.01 through 0616D1.08
		June 17, 2003	Tuesday	0617D2.01 through 0617D2.10
Montgomery County SWMD	South Transfer Facility	June 18, 2003	Wednesday	0618D1.01 through 0618D1.12
	North Transfer Facility	June 19, 2003	Thursday	0619D2.01 through 0619D2.09
	South Transfer Facility	June 20, 2003	Friday	0620D3.01 through 0620D3.12
Ottawa-Sandusky-Seneca Joint SWMD	Ottawa County Landfill	June 23, 2003	Monday	0623D1.01 through 0623D1.06
		June 24, 2003	Tuesday	0624D2.01 through 0624D2.09
Richland County Regional Solid Waste Management Authority	Richland County Transfer Station	May 6, 2003	Tuesday	0506D1.01 through 0506D1.04
		May 7, 2003	Wednesday	0507D2.01 through 0507D2.10

TABLE 17.2 (continued)
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
Solid Waste Authority of Central Ohio	Jackson Pike Transfer Station	May 12, 2003	Monday	0512D1.01 through 0512D1.10
	Franklin County Landfill	May 13, 2003	Tuesday	0513D2.01 through 0513D2.10
	Franklin County Landfill	May 14, 2003	Wednesday	0514D3.01 through 0514D3.14
	Morse Road Transfer Station	May 15, 2003	Thursday	0515D4.01 through 0515D4.12
FALL SORT				
Ashtabula County SWMD	Geneva Landfill	September 9, 2003	Tuesday	0909D3.01 through 0909D3.08
		September 10, 2003	Wednesday	0910D4.01 through 0910D4.08
Athens-Hocking Joint SWMD	Athens Reclamation Center	October 27, 2003	Monday	1027D3.01 through 1027D3.08
		October 28, 2003	Tuesday	1028D4.01 through 1028D4.08
Brown County Solid Waste Authority	Brown County Landfill	September 18, 2003	Thursday	0918D3.01 through 0918D3.10
		September 19, 2003	Friday	0919D4.01 through 0919D4.10
Defiance-Fulton-Paulding-Williams Joint SWMD	Defiance County Landfill	October 20, 2003	Monday	1020D3.01 through 1020D3.08
		October 21, 2003	Tuesday	1021D4.01 through 1021D4.10
Hamilton County SWMD	Rumpke Landfill	October 7, 2003	Tuesday	1007D3.01 through 1007D3.16
		October 8, 2003	Wednesday	1008D4.01 through 1008D4.14
		October 9, 2003	Thursday	1009D5.01 through 1009D5.14
		October 10, 2003	Friday	1010D6.01 through 1010D6.06

TABLE 17.2 (continued)
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
Logan County SWMD	Cherokee Run Landfill	September 22, 2003	Monday	0922D3.01 through 0922D3.05
		September 23, 2003	Tuesday	0923D4.01 through 0923D4.03
Lucas County SWMD	Hoffman Road Landfill	September 11, 2003	Thursday	0911D3.01 through 0911D3.06
		September 12, 2003	Wednesday	0912D4.01 through 0912D4.07
Montgomery County SWMD	South Transfer Facility	September 15, 2003	Monday	0915D4.01 through 0915D4.12
	South Transfer Facility	September 16, 2003	Tuesday	0916D5.01 through 0915D5.12
	North Transfer Facility	September 17, 2003	Wednesday	0917D6.01 through 0917D6.07
Ottawa-Sandusky-Seneca Joint SWMD	Ottawa County Landfill	September 25, 2003	Thursday	0925D3.01 through 0925D.04
		September 26, 2003	Friday	0926D4.01 through 0926D4.07
Richland County Regional Solid Waste Management Authority	Richland County Transfer Station	October 16, 2003	Thursday	1016D3.01 through 1016D3.10
		October 17, 2003	Friday	1017D4.01 through 1017D4.12
Solid Waste Authority of Central Ohio	Morse Road Transfer Station	September 30, 2003	Tuesday	0930D5.01 through 0930D5.11
	Jackson Pike Transfer Station	October 1, 2003	Wednesday	1001D6.01 through 1001D6.11
	Franklin County Landfill	October 2, 2003	Thursday	1002D7.01 through 1002D7.13
	Franklin County Landfill	October 3, 2003	Friday	1003D8.01 through 1003D8.12

District Contribution

When analyzing the results of the waste characterization study, differences among the 11 districts become apparent. The tables and charts on the following pages present the statewide distribution of the 8 major categories by district. Using these distribution tables and charts, each district's average contribution was calculated. When these averages are further analyzed, a clear distinction between the small, medium, and large districts becomes apparent. Table 17.11 outlines each district's average contribution to the 8 major categories.

The small districts consist of the: (1) Ashtabula County Solid Waste Management District; (2) Athens-Hocking Joint Solid Waste Management District; (3) Logan County Solid Waste Management District; and (4) Ottawa-Sandusky-Seneca Joint Solid Waste Management District.

The medium-sized districts include the: (1) Brown County Solid Waste Authority; (2) Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District; (3) Lucas County Solid Waste Management District; and (4) Richland County Regional Solid Waste Management Authority.

The remaining districts comprise the large districts and they are the: (1) Hamilton County Solid Waste Management District; (2) Montgomery County Solid Waste Management District; and (3) Solid Waste Authority of Central Ohio.

There are a number of reasons this delineation and grouping of districts is important. First, it allows a better correlation among the districts. It also allows an easier focus on districts based on size, types of waste, and waste generators. Further, potential approaches to waste reduction can be more easily applied to comparably-sized districts throughout the state. This size delineation also affords a better focus on issues that are particular to each size of district. This delineation can also assist in identifying the specifics relating to each of these distinct district sizes, which can result in a more effective approach to solid waste management.

TABLE 17.3
STATEWIDE DISTRIBUTION OF TOTAL PAPER FIBERS BY WEIGHT

District	Total Paper Fibers (pounds)
Ashtabula County SWMD	2,948.83
Athens-Hocking Joint SWMD	2,276.63
Brown County Solid Waste Authority	3,286.69
Defiance-Fulton-Paulding-Williams Joint SWMD	3,673.40
Hamilton County SWMD	7,599.40
Logan County SWMD	1,684.34
Lucas County SWMD	2,646.53
Montgomery County SWMD	6,091.55
Ottawa-Sandusky-Seneca Joint SWMD	2,189.99
Richland County Regional Solid Waste Management Authority	3,596.30
Solid Waste Authority of Central Ohio	8,870.51
TOTAL PAPER FIBERS	**44,864.17**

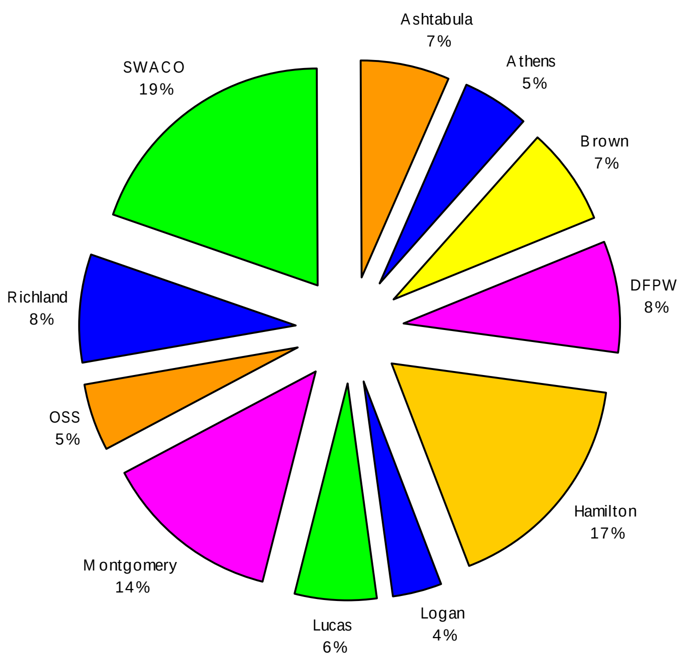


CHART 17.1
DISTRIBUTION OF TOTAL PAPER FIBERS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.4
STATEWIDE DISTRIBUTION OF TOTAL PLASTICS BY WEIGHT

District	Total Plastics (pounds)
Ashtabula County SWMD	1,167.54
Athens-Hocking Joint SWMD	1,018.23
Brown County Solid Waste Authority	1,277.96
Defiance-Fulton-Paulding-Williams Joint SWMD	1,408.23
Hamilton County SWMD	2,492.04
Logan County SWMD	607.12
Lucas County SWMD	1,077.67
Montgomery County SWMD	2,171.50
Ottawa-Sandusky-Seneca Joint SWMD	967.51
Richland County Regional Solid Waste Management Authority	1,466.45
Solid Waste Authority of Central Ohio	3,203.31
TOTAL PLASTICS	**16,857.56**

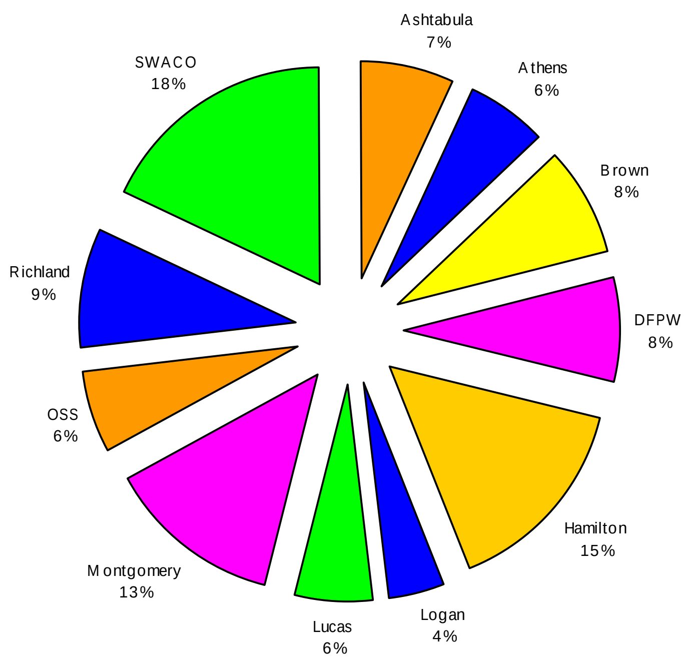


CHART 17.2
DISTRIBUTION OF TOTAL PLASTICS AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.5
STATEWIDE DISTRIBUTION OF TOTAL METALS BY WEIGHT

District	Total Metals (pounds)
Ashtabula County SWMD	254.68
Athens-Hocking Joint SWMD	284.83
Brown County Solid Waste Authority	386.52
Defiance-Fulton-Paulding-Williams Joint SWMD	371.90
Hamilton County SWMD	600.89
Logan County SWMD	157.60
Lucas County SWMD	236.84
Montgomery County SWMD	508.39
Ottawa-Sandusky-Seneca Joint SWMD	270.08
Richland County Regional Solid Waste Management Authority	379.99
Solid Waste Authority of Central Ohio	716.78
TOTAL METALS	**4,168.50**

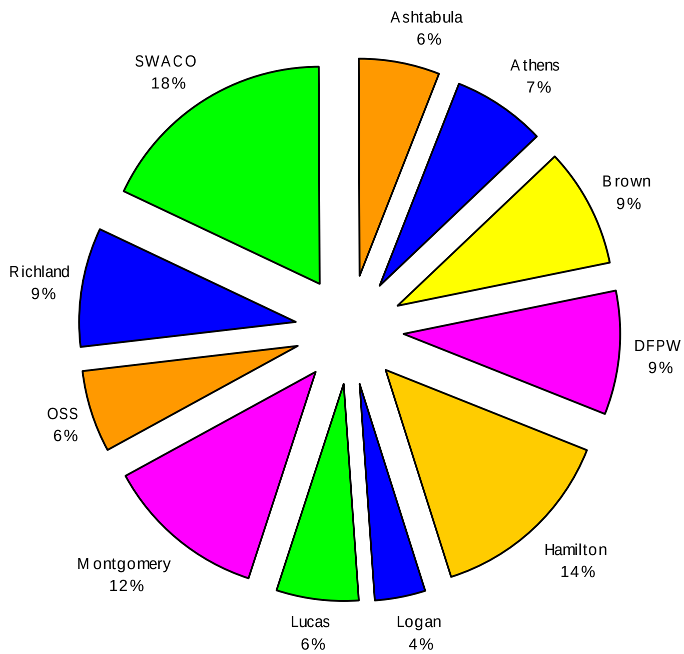


CHART 17.3
DISTRIBUTION OF TOTAL METALS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.6
STATEWIDE DISTRIBUTION OF TOTAL YARD WASTE BY WEIGHT

District	Total Yard Waste (pounds)
Ashtabula County SWMD	282.21
Athens-Hocking Joint SWMD	616.41
Brown County Solid Waste Authority	458.62
Defiance-Fulton-Paulding-Williams Joint SWMD	642.90
Hamilton County SWMD	1,476.02
Logan County SWMD	331.37
Lucas County SWMD	1,429.24
Montgomery County SWMD	1,596.75
Ottawa-Sandusky-Seneca Joint SWMD	615.52
Richland County Regional Solid Waste Management Authority	719.35
Solid Waste Authority of Central Ohio	1,656.94
TOTAL YARD WASTE	**9,825.33**

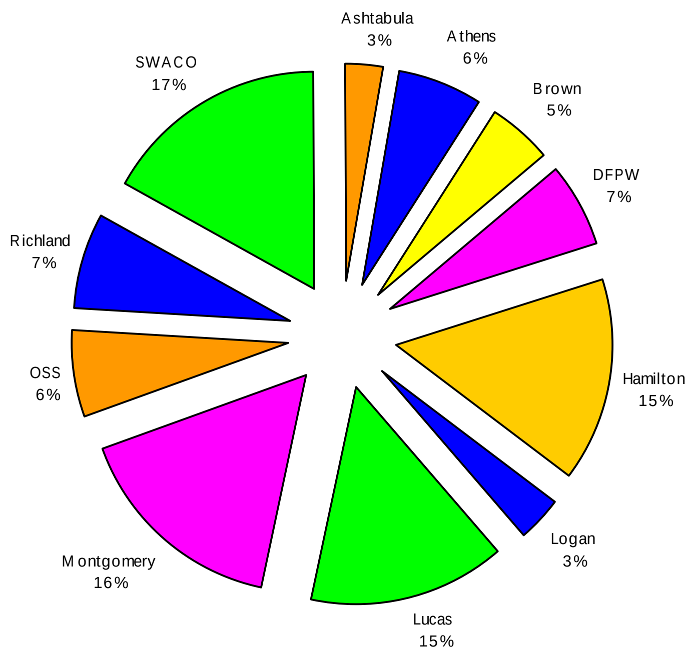


CHART 17.4
DISTRIBUTION OF TOTAL YARD WASTE
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.7
STATEWIDE DISTRIBUTION OF TOTAL TEXTILES BY WEIGHT

District	Total Textiles (pounds)
Ashtabula County SWMD	411.90
Athens-Hocking Joint SWMD	429.21
Brown County Solid Waste Authority	374.30
Defiance-Fulton-Paulding-Williams Joint SWMD	508.49
Hamilton County SWMD	925.08
Logan County SWMD	240.67
Lucas County SWMD	540.21
Montgomery County SWMD	752.67
Ottawa-Sandusky-Seneca Joint SWMD	285.27
Richland County Regional Solid Waste Management Authority	491.84
Solid Waste Authority of Central Ohio	1,176.10
TOTAL TEXTILES	**6,135.74**

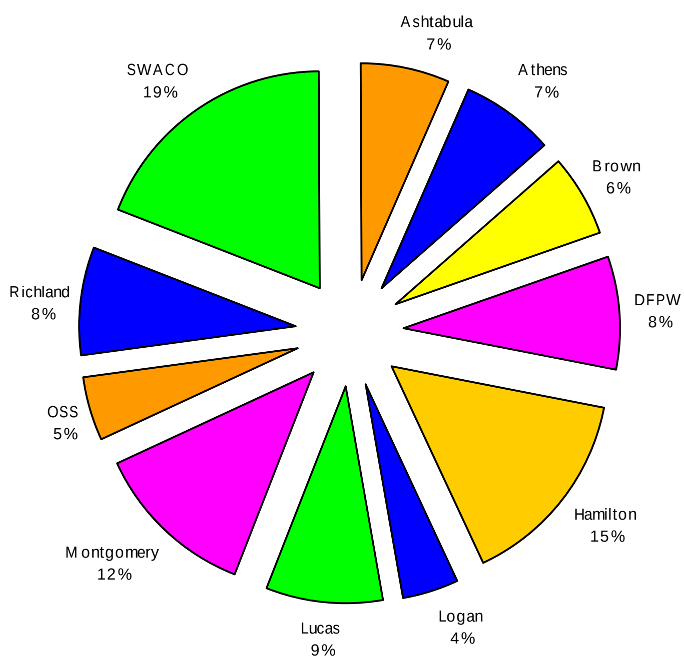


CHART 17.5
DISTRIBUTION OF TOTAL TEXTILES AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.8
STATEWIDE DISTRIBUTION OF TOTAL DIAPERS BY WEIGHT

District	Total Diapers (pounds)
Ashtabula County SWMD	172.26
Athens-Hocking Joint SWMD	258.87
Brown County Solid Waste Authority	452.02
Defiance-Fulton-Paulding-Williams Joint SWMD	332.49
Hamilton County SWMD	757.03
Logan County SWMD	144.89
Lucas County SWMD	197.86
Montgomery County SWMD	496.57
Ottawa-Sandusky-Seneca Joint SWMD	178.47
Richland County Regional Solid Waste Management Authority	346.85
Solid Waste Authority of Central Ohio	630.89
TOTAL DIAPERS	**3,968.20**

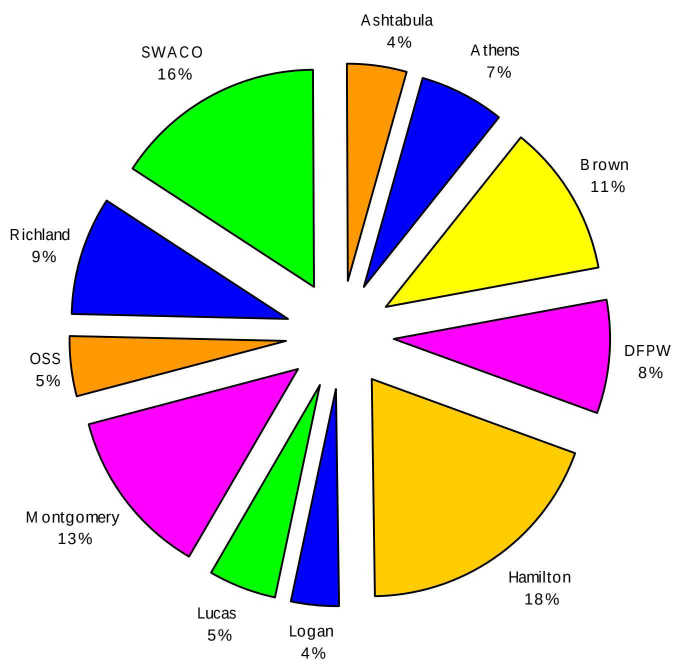


CHART 17.6
DISTRIBUTION OF TOTAL DIAPERS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.9
STATEWIDE DISTRIBUTION OF TOTAL FOOD BY WEIGHT

District	Total Food (pounds)
Ashtabula County SWMD	899.34
Athens-Hocking Joint SWMD	1,151.63
Brown County Solid Waste Authority	1,192.03
Defiance-Fulton-Paulding-Williams Joint SWMD	1,204.98
Hamilton County SWMD	2,274.61
Logan County SWMD	651.47
Lucas County SWMD	1,030.36
Montgomery County SWMD	2,158.87
Ottawa-Sandusky-Seneca Joint SWMD	992.49
Richland County Regional Solid Waste Management Authority	1,503.48
Solid Waste Authority of Central Ohio	3,194.67
TOTAL FOOD	**16,253.93**

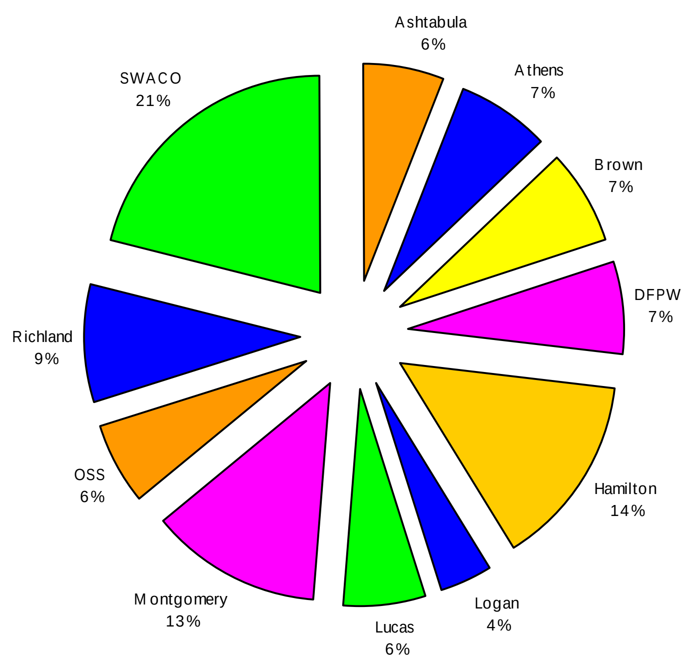


CHART 17.7
DISTRIBUTION OF TOTAL FOOD
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.10
STATEWIDE DISTRIBUTION OF TOTAL GLASS BY WEIGHT

District	Total Glass (pounds)
Ashtabula County SWMD	259.81
Athens-Hocking Joint SWMD	304.10
Brown County Solid Waste Authority	302.25
Defiance-Fulton-Paulding-Williams Joint SWMD	371.59
Hamilton County SWMD	672.45
Logan County SWMD	285.77
Lucas County SWMD	239.06
Montgomery County SWMD	650.70
Ottawa-Sandusky-Seneca Joint SWMD	376.08
Richland County Regional Solid Waste Management Authority	455.83
Solid Waste Authority of Central Ohio	1,156.53
TOTAL GLASS	**5,074.17**

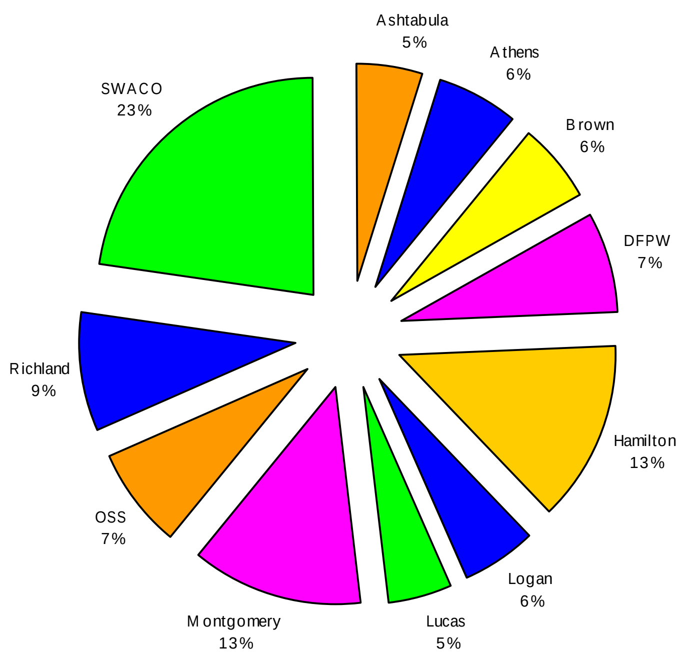


CHART 17.8
DISTRIBUTION OF TOTAL GLASS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.11
AVERAGE CONTRIBUTION OF EACH DISTRICT

District	Paper (%)	Plastics (%)	Metals (%)	Yard Waste (%)	Textiles (%)	Diapers (%)	Food (%)	Glass (%)	Average (%)
Ashtabula County SWMD	7	7	6	3	7	4	6	5	6
Athens-Hocking Joint SWMD	5	6	7	6	7	7	7	6	6
Brown County Solid Waste Authority	7	8	9	5	6	11	7	6	7
Defiance-Fulton-Paulding-Williams Joint SWMD	8	8	9	7	8	8	7	7	8
Hamilton County SWMD	17	15	14	15	15	18	14	13	15
Logan County SWMD	4	4	4	3	4	4	4	6	4
Lucas County SWMD	6	6	6	15	9	5	6	5	7
Montgomery County SWMD	14	13	12	16	12	13	13	13	13
Ottawa-Sandusky-Seneca Joint SWMD	5	6	6	6	5	5	6	7	6
Richland County Regional Solid Waste Management Authority	8	9	9	7	8	9	9	9	9
Solid Waste Authority of Central Ohio	19	18	18	17	19	16	21	23	19

Statewide Distribution of Major Components

The three major components of the Ohio waste stream are paper fibers, plastics, and metals. These three components comprise more than 60% of the total waste stream. The following tables and charts present the distribution of the categories that comprise each of these major components.

The paper fibers component is divided into six categories. The largest category in this component is mixed paper, with newsprint and office paper second and third. The two categories most associated with cardboard – paperboard and corrugated paper – comprise approximately 14% and 17% of this component, respectively. Combined, these two categories comprise more than 30% of the paper fiber component.

The plastics component is divided into seven categories. The dominant category in this component is HDPE #2, with LDPE #4 second and other plastics and PET #1 tied for third. The amount of HDPE #2 is reflective of the multiple uses of this product. The LDPE #4 portion of this component is likely due to an increase in its use in bags and packaging.

The metals component of the waste stream is relatively small; it comprises less than 4% of the total waste stream. Tin food cans and aluminum beverage cans comprise almost 80% of this component. The total amount of aluminum in this component is more than 50% of its total.

TABLE 17.12
STATEWIDE DISTRIBUTION OF PAPER FIBER COMPONENTS BY WEIGHT

Material Category	Net Weight (pounds)
Corrugated Paper	7,543.49
Office Paper	8,542.77
Mixed Paper	9,440.02
Newsprint	8,949.37
Magazines	4,208.71
Paperboard	6,179.81
STATEWIDE TOTAL PAPER FIBERS	**44,864.17**

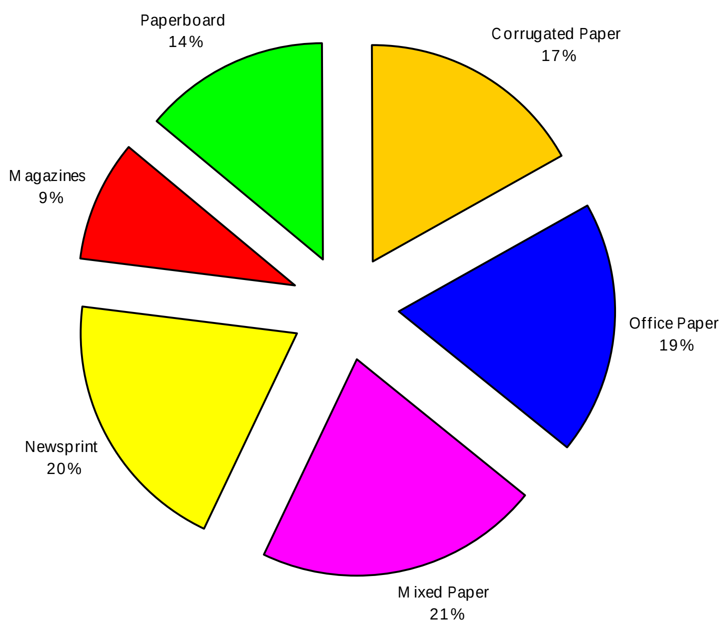


CHART 17.9
STATEWIDE DISTRIBUTION OF PAPER FIBER COMPONENTS

TABLE 17.13
STATEWIDE DISTRIBUTION OF PLASTICS COMPONENTS BY WEIGHT

Material Category	Net Weight (pounds)
LDPE #4	2,696.62
PET #1	2,549.69
HDPE #2	6,482.60
PVC #3	407.94
PP #5	547.84
PS #6	1,677.59
Other Plastics	2,495.28
STATEWIDE TOTAL PLASTICS	**16,857.56**

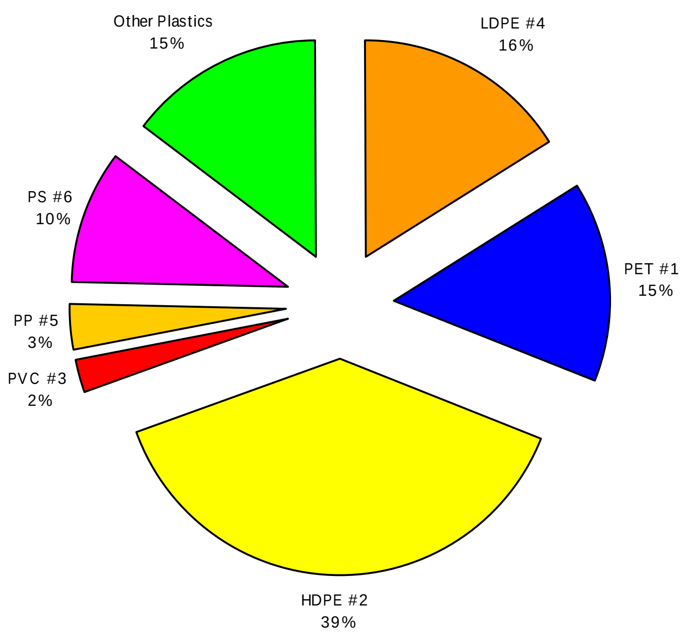


CHART 17.10
STATEWIDE DISTRIBUTION OF PLASTICS COMPONENTS

TABLE 17.14
STATEWIDE DISTRIBUTION OF METALS COMPONENTS BY WEIGHT

Material Category	Net Weight (pounds)
Aluminum Beverage Cans	1,502.51
Aluminum Foil/Food Trays	438.63
Other Aluminum	270.57
Tin Food Cans	1,704.62
Other Tin Cans	252.17
STATEWIDE TOTAL METALS	**4,168.50**

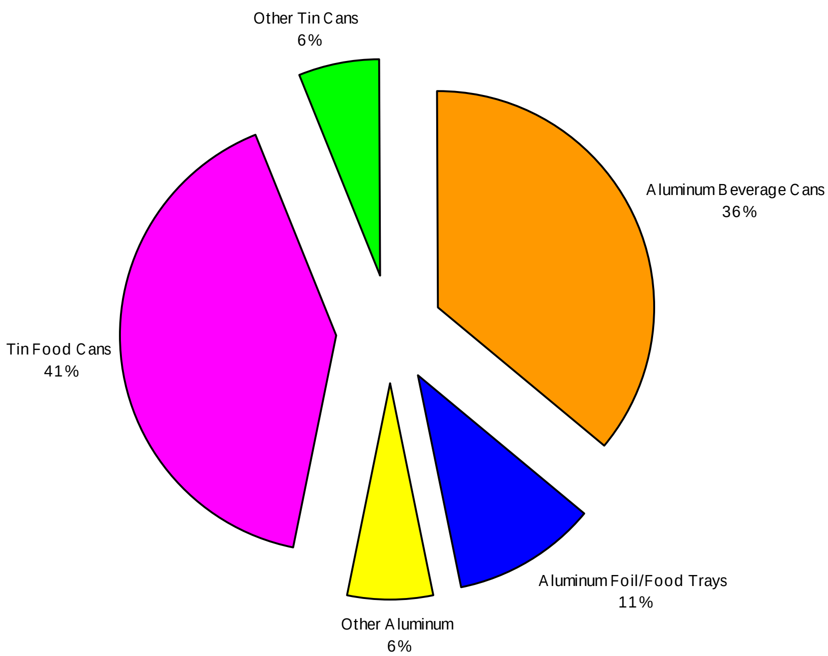


CHART 17.11
STATEWIDE DISTRIBUTION OF METALS COMPONENTS

Statewide Weight and Volume Summary

Weight and volume tables were compiled that summarize the data collected during the Spring Sort and the Fall Sort. Additionally, weight and volume summary data for both waste sorts conducted at the 14 facilities in the 11 selected solid waste management districts located throughout Ohio were also compiled. The tables on the following pages present the statewide weight and volume data for the Spring Sort, the Fall Sort, and both sorts combined. Additionally, Chart 17.12 and Chart 17.13 provide a graphic summary of the 8 major components of the statewide waste stream.

TABLE 17.15
STATEWIDE OHIO PROFILE
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	4,342.18	21.69%	8.75%
Office Paper	3,703.98	18.51%	7.47%
Mixed Paper	4,118.65	20.58%	8.30%
Newsprint	4,404.61	22.01%	8.88%
Magazines	1,813.70	9.06%	3.66%
Paperboard	1,631.56	8.15%	3.29%
TOTAL PAPER FIBERS	20,014.68		40.35%
LDPE #4	1,127.03	13.90%	2.27%
PET #1	1,191.52	14.70%	2.40%
HDPE #2	3,237.34	39.94%	6.53%
PVC #3	242.90	3.00%	0.49%
PP #5	302.95	3.74%	0.61%
PS #6	808.46	9.97%	1.63%
Other Plastics	1,196.12	14.76%	2.41%
TOTAL PLASTICS	8,106.32		16.34%
Aluminum Beverage Cans	665.47	34.61%	1.34%
Aluminum Foil/Food Trays	221.23	11.50%	0.45%
Other Aluminum	125.28	6.51%	0.25%
Tin Food Cans	773.02	40.20%	1.56%
Other Tin Cans	138.02	7.18%	0.28%
TOTAL METALS	1,923.02		3.88%
Yard Waste	5,323.09		10.73%
Textiles	3,302.55		6.66%
Diapers	1,626.73		3.28%
Food	6,461.49		13.03%
Glass	2,368.52		4.77%
Empty Aerosol Cans	139.10		0.28%
Medical Waste	223.67		0.45%
Fines and Superfines	113.86		0.23%
NET WEIGHT	49,603.03		100.00%

TABLE 17.16
STATEWIDE OHIO PROFILE
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,063.98	26.14%	10.28%
Office Paper	907.60	22.30%	8.77%
Mixed Paper	428.34	10.52%	4.14%
Newsprint	470.08	11.55%	4.54%
Magazines	327.97	8.06%	3.17%
Paperboard	872.37	21.43%	8.43%
TOTAL PAPER FIBERS	4,070.33		39.32%
LDPE #4	311.73	11.20%	3.01%
PET #1	350.45	12.59%	3.39%
HDPE #2	1,132.15	40.67%	10.94%
PVC #3	121.45	4.36%	1.17%
PP #5	137.70	4.95%	1.33%
PS #6	367.48	13.20%	3.55%
Other Plastics	362.46	13.02%	3.50%
TOTAL PLASTICS	2,783.43		26.89%
Aluminum Beverage Cans	237.67	33.99%	2.30%
Aluminum Foil/Food Trays	105.35	15.07%	1.02%
Other Aluminum	78.30	11.20%	0.76%
Tin Food Cans	208.92	29.88%	2.02%
Other Tin Cans	69.01	9.87%	0.67%
TOTAL METALS	699.25		6.75%
Yard Waste	1,020.49		9.86%
Textiles	706.33		6.82%
Diapers	182.78		1.77%
Food	504.80		4.88%
Glass	257.45		2.49%
Empty Aerosol Cans	77.28		0.75%
Medical Waste	49.70		0.48%
Fines and Superfines			
NET VOLUME	10,351.84		100.00%

TABLE 17.17
STATEWIDE OHIO PROFILE
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	3,201.31	12.88%	5.49%
Office Paper	4,838.79	19.47%	8.30%
Mixed Paper	5,321.37	21.41%	9.13%
Newsprint	4,544.76	18.29%	7.79%
Magazines	2,395.01	9.64%	4.11%
Paperboard	4,548.25	18.30%	7.80%
TOTAL PAPER FIBERS	24,849.49		42.61%
LDPE #4	1,569.59	17.94%	2.69%
PET #1	1,358.17	15.52%	2.33%
HDPE #2	3,245.26	37.08%	5.57%
PVC #3	165.04	1.89%	0.28%
PP #5	244.89	2.80%	0.42%
PS #6	869.13	9.93%	1.49%
Other Plastics	1,299.16	14.85%	2.23%
TOTAL PLASTICS	8,751.24		15.01%
Aluminum Beverage Cans	837.04	37.28%	1.44%
Aluminum Foil/Food Trays	217.40	9.68%	0.37%
Other Aluminum	145.29	6.47%	0.25%
Tin Food Cans	931.60	41.49%	1.60%
Other Tin Cans	114.15	5.08%	0.20%
TOTAL METALS	2,245.48		3.85%
Yard Waste	4,502.24		7.72%
Textiles	2,833.19		4.86%
Diapers	2,341.47		4.02%
Food	9,792.44		16.79%
Glass	2,705.65		4.64%
Empty Aerosol Cans	150.48		0.26%
Medical Waste	63.10		0.11%
Fines and Superfines	78.49		0.13%
NET WEIGHT	58,313.27		100.00%

TABLE 17.18
STATEWIDE OHIO PROFILE
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	784.43	13.36%	6.27%
Office Paper	1,185.66	20.19%	9.47%
Mixed Paper	553.42	9.42%	4.42%
Newsprint	485.03	8.26%	3.88%
Magazines	433.09	7.37%	3.46%
Paperboard	2,431.87	41.40%	19.43%
TOTAL PAPER FIBERS	5,873.51		46.93%
LDPE #4	434.14	14.71%	3.47%
PET #1	399.46	13.54%	3.19%
HDPE #2	1,134.92	38.46%	9.07%
PVC #3	82.52	2.80%	0.66%
PP #5	111.31	3.77%	0.89%
PS #6	395.06	13.39%	3.16%
Other Plastics	393.68	13.34%	3.15%
TOTAL PLASTICS	2,951.10		23.58%
Aluminum Beverage Cans	298.94	37.27%	2.39%
Aluminum Foil/Food Trays	103.52	12.91%	0.83%
Other Aluminum	90.81	11.32%	0.73%
Tin Food Cans	251.78	31.39%	2.01%
Other Tin Cans	57.08	7.12%	0.46%
TOTAL METALS	802.13		6.41%
Yard Waste	863.12		6.90%
Textiles	605.94		4.84%
Diapers	263.09		2.10%
Food	765.03		6.11%
Glass	294.09		2.35%
Empty Aerosol Cans	83.60		0.67%
Medical Waste	14.02		0.11%
Fines and Superfines			
NET VOLUME	12,515.64		100.00%

TABLE 17.19
STATEWIDE OHIO PROFILE
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	7,543.49	16.81%	6.99%
Office Paper	8,542.77	19.04%	7.92%
Mixed Paper	9,440.02	21.04%	8.75%
Newsprint	8,949.37	19.95%	8.29%
Magazines	4,208.71	9.38%	3.90%
Paperboard	6,179.81	13.77%	5.73%
TOTAL PAPER FIBERS	44,864.17		41.57%
LDPE #4	2,696.62	16.00%	2.50%
PET #1	2,549.69	15.12%	2.36%
HDPE #2	6,482.60	38.46%	6.01%
PVC #3	407.94	2.42%	0.38%
PP #5	547.84	3.25%	0.51%
PS #6	1,677.59	9.95%	1.55%
Other Plastics	2,495.28	14.80%	2.31%
TOTAL PLASTICS	16,857.56		15.62%
Aluminum Beverage Cans	1,502.51	36.04%	1.39%
Aluminum Foil/Food Trays	438.63	10.52%	0.41%
Other Aluminum	270.57	6.49%	0.25%
Tin Food Cans	1,704.62	40.89%	1.58%
Other Tin Cans	252.17	6.05%	0.23%
TOTAL METALS	4,168.50		3.86%
Yard Waste	9,825.33		9.10%
Textiles	6,135.74		5.69%
Diapers	3,968.20		3.68%
Food	16,253.93		15.06%
Glass	5,074.17		4.70%
Empty Aerosol Cans	289.58		0.27%
Medical Waste	286.77		0.27%
Fines and Superfines	192.35		0.18%
NET WEIGHT	107,916.30		100.00%

TABLE 17.20
STATEWIDE OHIO PROFILE
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,848.40	18.59%	8.08%
Office Paper	2,093.26	21.05%	9.15%
Mixed Paper	981.76	9.87%	4.29%
Newsprint	955.11	9.61%	4.18%
Magazines	761.07	7.65%	3.33%
Paperboard	3,304.23	33.23%	14.45%
TOTAL PAPER FIBERS	9,943.84		43.48%
LDPE #4	745.87	13.01%	3.26%
PET #1	749.91	13.08%	3.28%
HDPE #2	2,267.07	39.53%	9.91%
PVC #3	203.97	3.56%	0.89%
PP #5	249.02	4.34%	1.09%
PS #6	762.54	13.30%	3.33%
Other Plastics	756.15	13.19%	3.31%
TOTAL PLASTICS	5,734.53		25.08%
Aluminum Beverage Cans	536.61	35.74%	2.35%
Aluminum Foil/Food Trays	208.87	13.91%	0.91%
Other Aluminum	169.11	11.26%	0.74%
Tin Food Cans	460.71	30.69%	2.01%
Other Tin Cans	126.09	8.40%	0.55%
TOTAL METALS	1,501.38		6.57%
Yard Waste	1,883.61		8.24%
Textiles	1,312.27		5.74%
Diapers	445.87		1.95%
Food	1,269.84		5.55%
Glass	551.54		2.41%
Empty Aerosol Cans	160.88		0.70%
Medical Waste	63.73		0.28%
Fines and Superfines			
NET VOLUME	22,867.48		100.00%

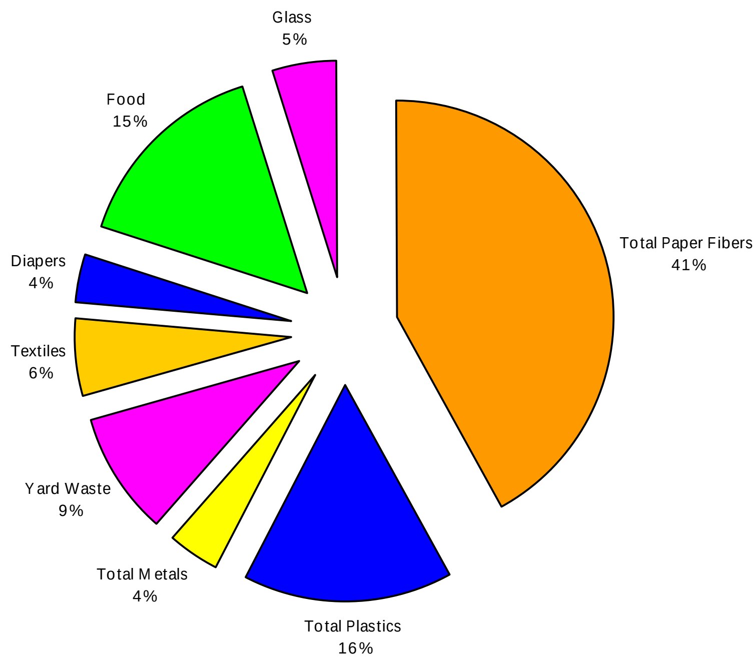


CHART 17.12
STATEWIDE DISTRIBUTION OF MAJOR COMPONENTS BY WEIGHT

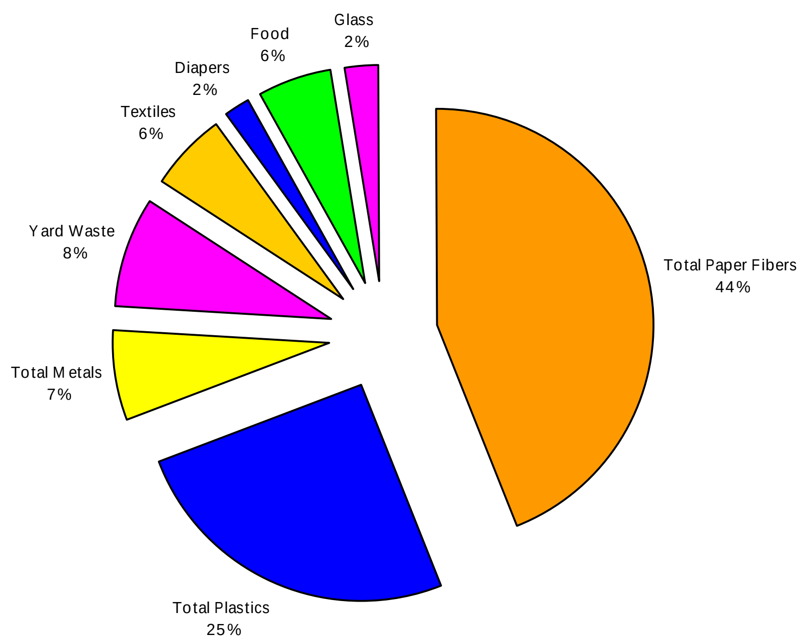


CHART 17.13
STATEWIDE DISTRIBUTION OF MAJOR COMPONENTS BY VOLUME

17. STATEWIDE WASTE STREAM PROFILE

The State of Ohio is located in the east-central portion of the contiguous United States. Pennsylvania lies directly east of Ohio and Indiana lies directly west of Ohio. Lake Erie and the United States-Canada international line delineate Ohio's northern border. Michigan borders the northwestern portion of Ohio. Kentucky lies south of Ohio and West Virginia borders the southeastern portion of Ohio. The Ohio River delineates the Ohio-Kentucky state border and the Ohio-West Virginia state border (for a general map of Ohio, see Map 17.1).

Source: <http://www.odod.state.oh.us/research>

MAP 17.1
STATE OF OHIO

Many major interstate freeway systems traverse Ohio. From north to south, I-90 and I-80 traverse the state from its eastern border with Pennsylvania to its western border with Indiana. I-70 crosses the state from its border with West Virginia to its western border with Indiana. I-76 also traverses the eastern one-third of Ohio.

From east to west, I-77 traverses eastern Ohio from its southern border with West Virginia to Cleveland. I-71 traverses central Ohio from Kentucky to Lake Erie. Its route passes through Cincinnati in the southwestern portion of Ohio and ends in Cleveland in the northeastern portion of Ohio. I-75 traverses western Ohio from its southern border with Kentucky to its northwestern border with Michigan.

Several major cities lie within Ohio's borders. Columbus is located in central Ohio and serves as the State Capitol. Cincinnati and Dayton are located in southwest Ohio. Toledo and Cleveland are located in the far northern portion of Ohio. Akron, Canton, and Youngstown are all located in northeast Ohio.

In 2000, Ohio's population totaled 11,353,140. Its population is projected to be over 12,000,000 by 2020. Cuyahoga County (which encompasses the Cleveland metropolitan area) is the most populous Ohio county with a population of 1,393,978 in 2000. Franklin County is the second most populous Ohio County, with Hamilton County and Montgomery County as third and fourth. The Columbus metropolitan area lies within Franklin County; the Cincinnati metropolitan area lies within Hamilton County; the Dayton metropolitan area lies within Montgomery County. Ohio's total land area is 40,952.6 square miles. (Population and land area numbers derived from *Ohio County Profiles,* September 2003, Ohio Department of Development, Office of Strategic Research – A State Affiliate of the U.S. Census Bureau).

The waste sorts were undertaken throughout Ohio (see Section 1 and Section 3 for specific locations) in May and June 2003 (Spring Sort) and September and October 2003 (Fall Sort). Both publicly- and privately-owned and operated landfills and transfer stations hosted the field gathering events associated with the Spring Sort and the Fall Sort. A total of 460 samples were collected during the 52 days of sorting.

Spring Conditions

The Spring Sort began at the Richland County Transfer Station in Mansfield, Ohio, on Tuesday, May 5, 2003. This facility is located within the Richland County Regional Solid Waste Management Authority's district. On Thursday, June 26, 2003, the last waste sort conducted during the Spring Sort was undertaken at the Cherokee Run Landfill near Bellefontaine, Ohio, located within the Logan County Solid Waste Management District.

Very difficult weather conditions were encountered during the Spring Sort. Rain events occurred while conducting the waste sorts at every facility in every district. Some of these events were minor and did not affect the sorting process while others caused significant difficulties. Although the spring conditions were not ideal, only one day of sorting was completely abandoned. During the 25 days of sorting undertaken during the Spring Sort, the project team captured and categorized 208 samples.

Fall Conditions

The Fall Sort began with field sorting events at the Geneva Landfill near Ashtabula, Ohio, on Tuesday, September 9, 2003. This facility is located in the Ashtabula County Solid Waste Management District. On Tuesday, October 28, 2003, the last field sorting event was concluded at the Athens Reclamation Center near Nelsonville, Ohio, in the Athens-Hocking Joint Solid Waste Management District.

Much more favorable conditions were encountered throughout the Fall Sort. Although some rain events did occur, fewer windy conditions were encountered. All planned days of sorting were conducted. During the 27 days of sorting undertaken during the Fall Sort, the project team selected and categorized 252 samples.

Statewide Data

A total of 460 loads of solid waste were selected for sampling during the 2003 Waste Sort. Weight and volume data for each individual sample can be found in Appendix A (see Table 17.1 for a chronological, numerical listing of sample numbers and Table 17.2 for a listing of sample numbers for each specific district). Visual inspection data for each sample can be found in Appendix B and additional load details (type of collection vehicle, how the waste was collected, specific service area information, etc.) for each sample can be found in Appendix C.

TABLE 17.1
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
		SPRING SORT		
0506D1.01 through 0506D1.04	Tuesday	May 6, 2003	Richland County Transfer Station	Richland County Regional Solid Waste Management Authority
0507D2.01 through 0507D2.10	Wednesday	May 7, 2003		
0508D1.01 through 0508D1.07	Thursday	May 8, 2003	Athens Reclamation Center	Athens-Hocking Joint SWMD
0509D2.01 through 0509D2.04	Friday	May 9, 2003		
0512D1.01 through 0512D1.10	Monday	May 12,2003	Jackson Pike Transfer Station	Solid Waste Authority of Central Ohio
0513D2.01 through 0513D2.10	Tuesday	May 13, 2003	Franklin County Landfill	
0514D3.01 through 0514D3.14	Wednesday	May 14, 2003	Franklin County Landfill	
0515D4.01 through 0515D4.12	Thursday	May 15, 2003	Morse Road Transfer Station	
0519D1.01 through 0519D1.08	Monday	May 19, 2003	Rumpke Landfill	Hamilton County SWMD
0520D2.01 through 0520D2.11	Tuesday	May 20, 2003		
0605D1.01 through 0605D1.06	Thursday	June 5, 2003	Defiance County Landfill	Defiance-Fulton-Paulding-Williams Joint SWMD
0606D2.01 through 0606D2.09	Friday	June 6, 2003		

TABLE 17.1 (continued)
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
0609D1.01 through 0609D1.06	Monday	June 9, 2003	Brown County Landfill	Brown County Solid Waste Authority
0610D2.01 through 0610D2.08	Tuesday	June 10, 2003		
0612D1.01 through 0612D1.07	Thursday	June 12, 2003	Geneva Landfill	Ashtabula County SWMD
0613D2.01 through 0613D2.05	Friday	June 13, 2003		
0616D1.01 through 0616D1.08	Monday	June 16, 2003	Hoffman Road Landfill	Lucas County SWMD
0617D2.01 through 0617D2.10	Tuesday	June 17, 2003		
0618D1.01 through 0618D1.12	Wednesday	June 18, 2003	South Transfer Facility	Montgomery County SWMD
0619D2.01 through 0619D2.09	Thursday	June 19, 2003	North Transfer Facility	
0620D3.01 through 0620D3.12	Friday	June 20, 2003	South Transfer Facility	
0623D1.01 through 0623D1.06	Monday	June 23, 2003	Ottawa County Landfill	Ottawa-Sandusky-Seneca Joint SWMD
0624D2.01 through 0624D2.09	Tuesday	June 24, 2003		
0625D1.01 through 0625D1.07	Wednesday	June 25, 2003	Cherokee Run Landfill	Logan County SWMD
0626D2.01 through 0626D2.04	Thursday	June 26, 2003		
FALL SORT				
0909D3.01 through 0909D3.08	Tuesday	September 9, 2003	Geneva Landfill	Ashtabula County SWMD
0910D4.01 through 0910D4.08	Wednesday	September 10, 2003		
0911D3.01 through 0911D3.06	Thursday	September 11, 2003	Hoffman Road Landfill	Lucas County SWMD
0912D4.01 through 0912D4.07	Friday	September 12, 2003		

TABLE 17.1 (continued)
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
0915D4.01 through 0915D4.12	Monday	September 15, 2003	South Transfer Facility	Montgomery County SWMD
0916D5.01 through 0915D5.12	Tuesday	September 16, 2003	South Transfer Facility	
0917D6.01 through 0917D6.07	Wednesday	September 17, 2003	North Transfer Facility	
0918D3.01 through 0918D3.10	Thursday	September 18, 2003	Brown County Landfill	Brown County Solid Waste Authority
0919D4.01 through 0919D4.10	Friday	September 19, 2003		
0922D3.01 through 0922D3.05	Monday	September 22, 2003	Cherokee Run Landfill	Logan County SWMD
0923D4.01 through 0923D4.03	Tuesday	September 23, 2003		
0925D3.01 through 0925D.04	Thursday	September 25, 2003	Ottawa County Landfill	Ottawa-Sandusky-Seneca Joint SWMD
0926D4.01 through 0926D4.07	Friday	September 26, 2003		
0930D5.01 through 0930D5.11	Tuesday	September 30, 2003	Morse Road Transfer Station	Solid Waste Authority of Central Ohio
1001D6.01 through 1001D6.11	Wednesday	October 1, 2003	Jackson Pike Transfer Station	
1002D7.01 through 1002D7.13	Thursday	October 2, 2003	Franklin County Landfill	
1003D8.01 through 1003D8.12	Friday	October 3, 2003	Franklin County Landfill	
1007D3.01 through 1007D3.16	Tuesday	October 7, 2003	Rumpke Landfill	Hamilton County SWMD
1008D4.01 through 1008D4.14	Wednesday	October 8, 2003		
1009D5.01 through 1009D5.14	Thursday	October 9, 2003		
1010D6.01 through 1010D6.06	Friday	October 10, 2003		

TABLE 17.1 (continued)
SAMPLE NUMBERS LISTED NUMERICALLY

Sample Numbers	Day of Week	Date	Facility	District
1016D3.01 through 1016D3.10	Thursday	October 16, 2003	Richland County Transfer Station	Richland County Regional Solid Waste Management Authority
1017D4.01 through 1017D4.12	Friday	October 17, 2003		
1020D3.01 through 1020D3.08	Monday	October 20, 2003	Defiance County Landfill	Defiance-Fulton-Paulding-Williams Joint SWMD
1021D4.01 through 1021D4.10	Tuesday	October 21, 2003		
1027D3.01 through 1027D3.08	Monday	October 27, 2003	Athens Reclamation Center	Athens-Hocking Joint SWMD
1028D4.01 through 1028D4.08	Tuesday	October 28, 2003		

TABLE 17.2
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
		SPRING SORT		
Ashtabula County SWMD	Geneva Landfill	June 12, 2003	Thursday	0612D1.01 through 0612D1.07
		June 13, 2003	Friday	0613D2.01 through 0613D2.05
Athens-Hocking Joint SWMD	Athens Reclamation Center	May 7, 2003	Thursday	0508D1.01 through 0508D1.07
		May 9, 2003	Friday	0509D2.01 through 0509D2.04
Brown County Solid Waste Authority	Brown County Landfill	June 9, 2003	Monday	0609D1.01 through 0609D1.06
		June 10, 2003	Tuesday	0610D2.01 through 0610D2.08

TABLE 17.2 (continued)
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
Defiance-Fulton-Paulding-Williams Joint SWMD	Defiance County Landfill	June 5, 2003	Thursday	0605D1.01 through 0605D1.06
		June 6, 2003	Friday	0606D2.01 through 0606D2.09
Hamilton County SWMD	Rumpke Landfill	May 19, 2003	Monday	0519D1.01 through 0519D1.08
		May 20, 2003	Tuesday	0520D2.01 through 0520D2.11
Logan County SWMD	Cherokee Run Landfill	June 25, 2003	Wednesday	0625D1.01 through 0625D1.07
		June 26, 2003	Thursday	0626D2.01 through 0626D2.04
Lucas County SWMD	Hoffman Road Landfill	June 16, 2003	Monday	0616D1.01 through 0616D1.08
		June 17, 2003	Tuesday	0617D2.01 through 0617D2.10
Montgomery County SWMD	South Transfer Facility	June 18, 2003	Wednesday	0618D1.01 through 0618D1.12
	North Transfer Facility	June 19, 2003	Thursday	0619D2.01 through 0619D2.09
	South Transfer Facility	June 20, 2003	Friday	0620D3.01 through 0620D3.12
Ottawa-Sandusky-Seneca Joint SWMD	Ottawa County Landfill	June 23, 2003	Monday	0623D1.01 through 0623D1.06
		June 24, 2003	Tuesday	0624D2.01 through 0624D2.09
Richland County Regional Solid Waste Management Authority	Richland County Transfer Station	May 6, 2003	Tuesday	0506D1.01 through 0506D1.04
		May 7, 2003	Wednesday	0507D2.01 through 0507D2.10

TABLE 17.2 (continued)
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
Solid Waste Authority of Central Ohio	Jackson Pike Transfer Station	May 12, 2003	Monday	0512D1.01 through 0512D1.10
	Franklin County Landfill	May 13, 2003	Tuesday	0513D2.01 through 0513D2.10
	Franklin County Landfill	May 14, 2003	Wednesday	0514D3.01 through 0514D3.14
	Morse Road Transfer Station	May 15, 2003	Thursday	0515D4.01 through 0515D4.12
FALL SORT				
Ashtabula County SWMD	Geneva Landfill	September 9, 2003	Tuesday	0909D3.01 through 0909D3.08
		September 10, 2003	Wednesday	0910D4.01 through 0910D4.08
Athens-Hocking Joint SWMD	Athens Reclamation Center	October 27, 2003	Monday	1027D3.01 through 1027D3.08
		October 28, 2003	Tuesday	1028D4.01 through 1028D4.08
Brown County Solid Waste Authority	Brown County Landfill	September 18, 2003	Thursday	0918D3.01 through 0918D3.10
		September 19, 2003	Friday	0919D4.01 through 0919D4.10
Defiance-Fulton-Paulding-Williams Joint SWMD	Defiance County Landfill	October 20, 2003	Monday	1020D3.01 through 1020D3.08
		October 21, 2003	Tuesday	1021D4.01 through 1021D4.10
Hamilton County SWMD	Rumpke Landfill	October 7, 2003	Tuesday	1007D3.01 through 1007D3.16
		October 8, 2003	Wednesday	1008D4.01 through 1008D4.14
		October 9, 2003	Thursday	1009D5.01 through 1009D5.14
		October 10, 2003	Friday	1010D6.01 through 1010D6.06

TABLE 17.2 (continued)
SAMPLE NUMBERS LISTED BY DISTRICT

District	Facility	Date	Day of Week	Sample Numbers
Logan County SWMD	Cherokee Run Landfill	September 22, 2003	Monday	0922D3.01 through 0922D3.05
		September 23, 2003	Tuesday	0923D4.01 through 0923D4.03
Lucas County SWMD	Hoffman Road Landfill	September 11, 2003	Thursday	0911D3.01 through 0911D3.06
		September 12, 2003	Wednesday	0912D4.01 through 0912D4.07
Montgomery County SWMD	South Transfer Facility	September 15, 2003	Monday	0915D4.01 through 0915D4.12
	South Transfer Facility	September 16, 2003	Tuesday	0916D5.01 through 0915D5.12
	North Transfer Facility	September 17, 2003	Wednesday	0917D6.01 through 0917D6.07
Ottawa-Sandusky-Seneca Joint SWMD	Ottawa County Landfill	September 25, 2003	Thursday	0925D3.01 through 0925D.04
		September 26, 2003	Friday	0926D4.01 through 0926D4.07
Richland County Regional Solid Waste Management Authority	Richland County Transfer Station	October 16, 2003	Thursday	1016D3.01 through 1016D3.10
		October 17, 2003	Friday	1017D4.01 through 1017D4.12
Solid Waste Authority of Central Ohio	Morse Road Transfer Station	September 30, 2003	Tuesday	0930D5.01 through 0930D5.11
	Jackson Pike Transfer Station	October 1, 2003	Wednesday	1001D6.01 through 1001D6.11
	Franklin County Landfill	October 2, 2003	Thursday	1002D7.01 through 1002D7.13
	Franklin County Landfill	October 3, 2003	Friday	1003D8.01 through 1003D8.12

District Contribution

When analyzing the results of the waste characterization study, differences among the 11 districts become apparent. The tables and charts on the following pages present the statewide distribution of the 8 major categories by district. Using these distribution tables and charts, each district's average contribution was calculated. When these averages are further analyzed, a clear distinction between the small, medium, and large districts becomes apparent. Table 17.11 outlines each district's average contribution to the 8 major categories.

The small districts consist of the: (1) Ashtabula County Solid Waste Management District; (2) Athens-Hocking Joint Solid Waste Management District; (3) Logan County Solid Waste Management District; and (4) Ottawa-Sandusky-Seneca Joint Solid Waste Management District.

The medium-sized districts include the: (1) Brown County Solid Waste Authority; (2) Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District; (3) Lucas County Solid Waste Management District; and (4) Richland County Regional Solid Waste Management Authority.

The remaining districts comprise the large districts and they are the: (1) Hamilton County Solid Waste Management District; (2) Montgomery County Solid Waste Management District; and (3) Solid Waste Authority of Central Ohio.

There are a number of reasons this delineation and grouping of districts is important. First, it allows a better correlation among the districts. It also allows an easier focus on districts based on size, types of waste, and waste generators. Further, potential approaches to waste reduction can be more easily applied to comparably-sized districts throughout the state. This size delineation also affords a better focus on issues that are particular to each size of district. This delineation can also assist in identifying the specifics relating to each of these distinct district sizes, which can result in a more effective approach to solid waste management.

TABLE 17.3
STATEWIDE DISTRIBUTION OF TOTAL PAPER FIBERS BY WEIGHT

District	Total Paper Fibers (pounds)
Ashtabula County SWMD	2,948.83
Athens-Hocking Joint SWMD	2,276.63
Brown County Solid Waste Authority	3,286.69
Defiance-Fulton-Paulding-Williams Joint SWMD	3,673.40
Hamilton County SWMD	7,599.40
Logan County SWMD	1,684.34
Lucas County SWMD	2,646.53
Montgomery County SWMD	6,091.55
Ottawa-Sandusky-Seneca Joint SWMD	2,189.99
Richland County Regional Solid Waste Management Authority	3,596.30
Solid Waste Authority of Central Ohio	8,870.51
TOTAL PAPER FIBERS	**44,864.17**

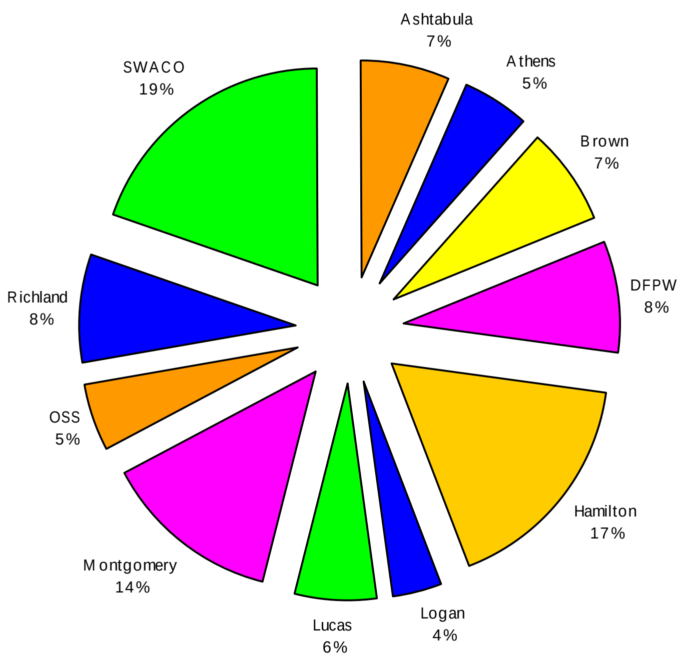


CHART 17.1
DISTRIBUTION OF TOTAL PAPER FIBERS AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.4
STATEWIDE DISTRIBUTION OF TOTAL PLASTICS BY WEIGHT

District	Total Plastics (pounds)
Ashtabula County SWMD	1,167.54
Athens-Hocking Joint SWMD	1,018.23
Brown County Solid Waste Authority	1,277.96
Defiance-Fulton-Paulding-Williams Joint SWMD	1,408.23
Hamilton County SWMD	2,492.04
Logan County SWMD	607.12
Lucas County SWMD	1,077.67
Montgomery County SWMD	2,171.50
Ottawa-Sandusky-Seneca Joint SWMD	967.51
Richland County Regional Solid Waste Management Authority	1,466.45
Solid Waste Authority of Central Ohio	3,203.31
TOTAL PLASTICS	**16,857.56**

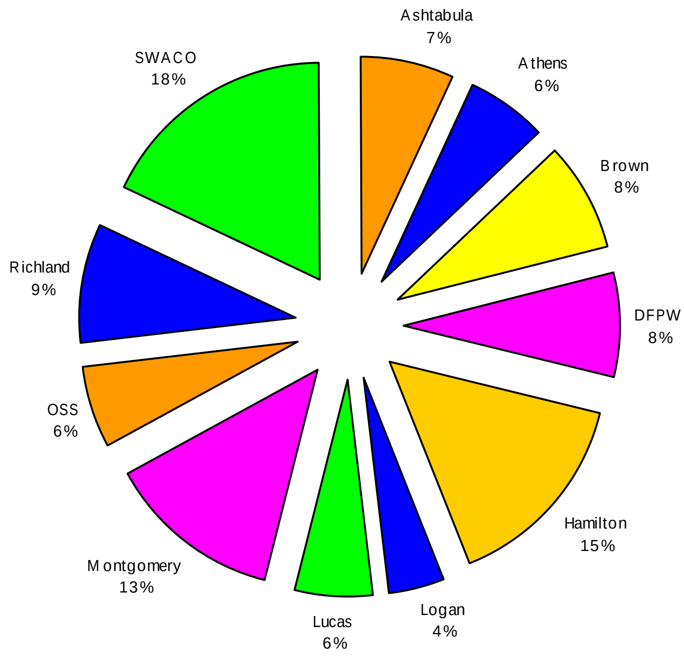


CHART 17.2
DISTRIBUTION OF TOTAL PLASTICS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.5
STATEWIDE DISTRIBUTION OF TOTAL METALS BY WEIGHT

District	Total Metals (pounds)
Ashtabula County SWMD	254.68
Athens-Hocking Joint SWMD	284.83
Brown County Solid Waste Authority	386.52
Defiance-Fulton-Paulding-Williams Joint SWMD	371.90
Hamilton County SWMD	600.89
Logan County SWMD	157.60
Lucas County SWMD	236.84
Montgomery County SWMD	508.39
Ottawa-Sandusky-Seneca Joint SWMD	270.08
Richland County Regional Solid Waste Management Authority	379.99
Solid Waste Authority of Central Ohio	716.78
TOTAL METALS	**4,168.50**

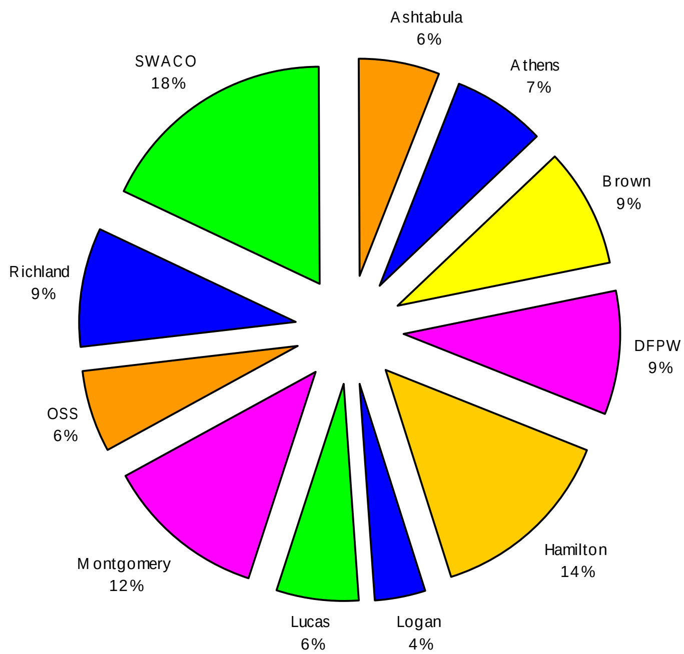


CHART 17.3
DISTRIBUTION OF TOTAL METALS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.6
STATEWIDE DISTRIBUTION OF TOTAL YARD WASTE BY WEIGHT

District	Total Yard Waste (pounds)
Ashtabula County SWMD	282.21
Athens-Hocking Joint SWMD	616.41
Brown County Solid Waste Authority	458.62
Defiance-Fulton-Paulding-Williams Joint SWMD	642.90
Hamilton County SWMD	1,476.02
Logan County SWMD	331.37
Lucas County SWMD	1,429.24
Montgomery County SWMD	1,596.75
Ottawa-Sandusky-Seneca Joint SWMD	615.52
Richland County Regional Solid Waste Management Authority	719.35
Solid Waste Authority of Central Ohio	1,656.94
TOTAL YARD WASTE	**9,825.33**

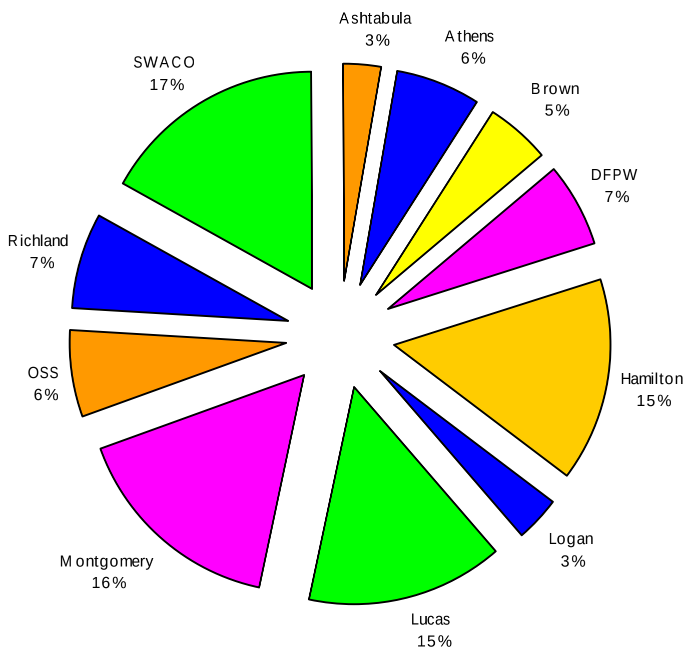


CHART 17.4
DISTRIBUTION OF TOTAL YARD WASTE
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.7
STATEWIDE DISTRIBUTION OF TOTAL TEXTILES BY WEIGHT

District	Total Textiles (pounds)
Ashtabula County SWMD	411.90
Athens-Hocking Joint SWMD	429.21
Brown County Solid Waste Authority	374.30
Defiance-Fulton-Paulding-Williams Joint SWMD	508.49
Hamilton County SWMD	925.08
Logan County SWMD	240.67
Lucas County SWMD	540.21
Montgomery County SWMD	752.67
Ottawa-Sandusky-Seneca Joint SWMD	285.27
Richland County Regional Solid Waste Management Authority	491.84
Solid Waste Authority of Central Ohio	1,176.10
TOTAL TEXTILES	**6,135.74**

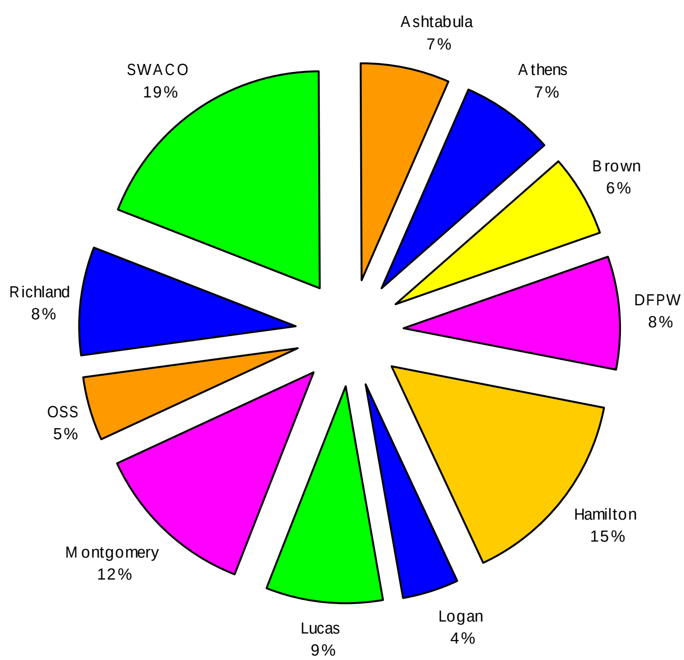


CHART 17.5
DISTRIBUTION OF TOTAL TEXTILES
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.8
STATEWIDE DISTRIBUTION OF TOTAL DIAPERS BY WEIGHT

District	Total Diapers (pounds)
Ashtabula County SWMD	172.26
Athens-Hocking Joint SWMD	258.87
Brown County Solid Waste Authority	452.02
Defiance-Fulton-Paulding-Williams Joint SWMD	332.49
Hamilton County SWMD	757.03
Logan County SWMD	144.89
Lucas County SWMD	197.86
Montgomery County SWMD	496.57
Ottawa-Sandusky-Seneca Joint SWMD	178.47
Richland County Regional Solid Waste Management Authority	346.85
Solid Waste Authority of Central Ohio	630.89
TOTAL DIAPERS	**3,968.20**

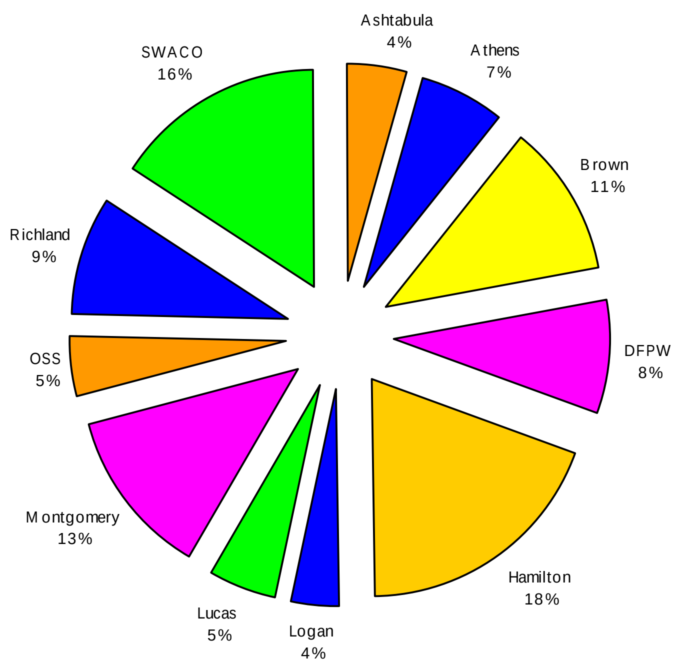


CHART 17.6
DISTRIBUTION OF TOTAL DIAPERS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.9
STATEWIDE DISTRIBUTION OF TOTAL FOOD BY WEIGHT

District	Total Food (pounds)
Ashtabula County SWMD	899.34
Athens-Hocking Joint SWMD	1,151.63
Brown County Solid Waste Authority	1,192.03
Defiance-Fulton-Paulding-Williams Joint SWMD	1,204.98
Hamilton County SWMD	2,274.61
Logan County SWMD	651.47
Lucas County SWMD	1,030.36
Montgomery County SWMD	2,158.87
Ottawa-Sandusky-Seneca Joint SWMD	992.49
Richland County Regional Solid Waste Management Authority	1,503.48
Solid Waste Authority of Central Ohio	3,194.67
TOTAL FOOD	**16,253.93**

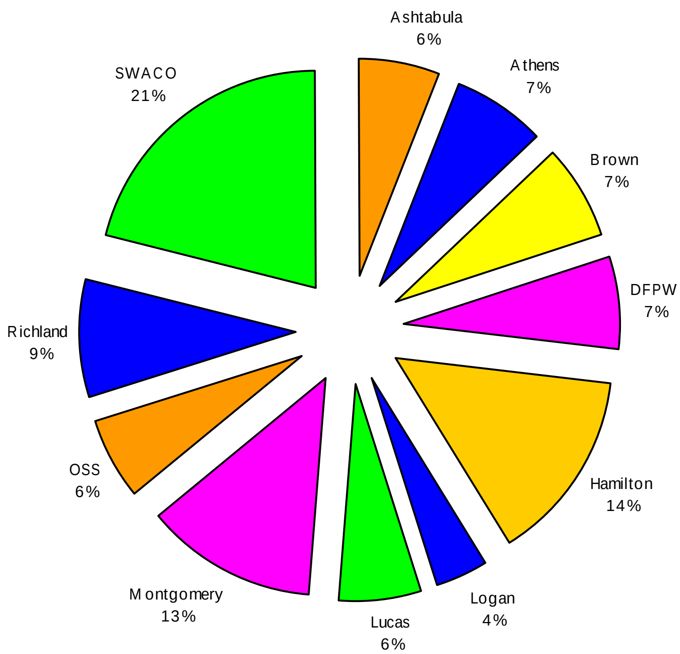


CHART 17.7
DISTRIBUTION OF TOTAL FOOD
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.10
STATEWIDE DISTRIBUTION OF TOTAL GLASS BY WEIGHT

District	Total Glass (pounds)
Ashtabula County SWMD	259.81
Athens-Hocking Joint SWMD	304.10
Brown County Solid Waste Authority	302.25
Defiance-Fulton-Paulding-Williams Joint SWMD	371.59
Hamilton County SWMD	672.45
Logan County SWMD	285.77
Lucas County SWMD	239.06
Montgomery County SWMD	650.70
Ottawa-Sandusky-Seneca Joint SWMD	376.08
Richland County Regional Solid Waste Management Authority	455.83
Solid Waste Authority of Central Ohio	1,156.53
TOTAL GLASS	**5,074.17**

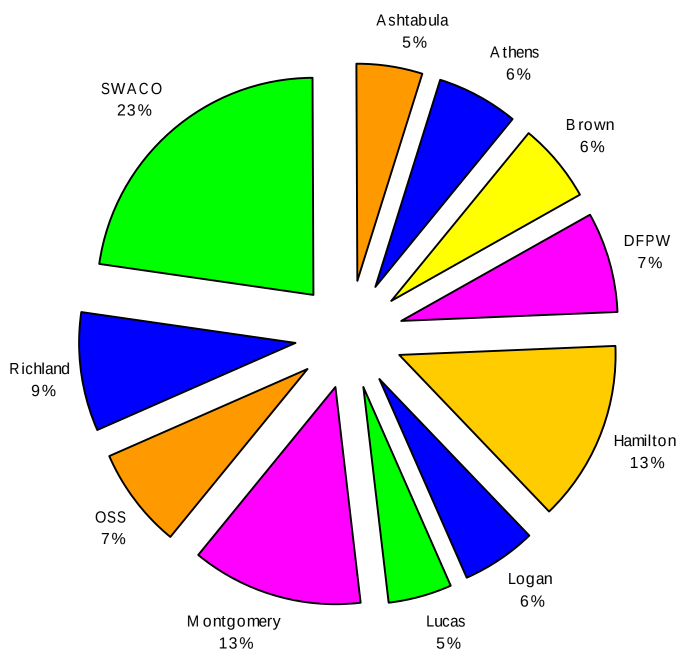


CHART 17.8
DISTRIBUTION OF TOTAL GLASS
AMONG SOLID WASTE MANAGEMENT DISTRICTS

TABLE 17.11
AVERAGE CONTRIBUTION OF EACH DISTRICT

District	Paper (%)	Plastics (%)	Metals (%)	Yard Waste (%)	Textiles (%)	Diapers (%)	Food (%)	Glass (%)	Average (%)
Ashtabula County SWMD	7	7	6	3	7	4	6	5	6
Athens-Hocking Joint SWMD	5	6	7	6	7	7	7	6	6
Brown County Solid Waste Authority	7	8	9	5	6	11	7	6	7
Defiance-Fulton-Paulding-Williams Joint SWMD	8	8	9	7	8	8	7	7	8
Hamilton County SWMD	17	15	14	15	15	18	14	13	15
Logan County SWMD	4	4	4	3	4	4	4	6	4
Lucas County SWMD	6	6	6	15	9	5	6	5	7
Montgomery County SWMD	14	13	12	16	12	13	13	13	13
Ottawa-Sandusky-Seneca Joint SWMD	5	6	6	6	5	5	6	7	6
Richland County Regional Solid Waste Management Authority	8	9	9	7	8	9	9	9	9
Solid Waste Authority of Central Ohio	19	18	18	17	19	16	21	23	19

Statewide Distribution of Major Components

The three major components of the Ohio waste stream are paper fibers, plastics, and metals. These three components comprise more than 60% of the total waste stream. The following tables and charts present the distribution of the categories that comprise each of these major components.

The paper fibers component is divided into six categories. The largest category in this component is mixed paper, with newsprint and office paper second and third. The two categories most associated with cardboard – paperboard and corrugated paper – comprise approximately 14% and 17% of this component, respectively. Combined, these two categories comprise more than 30% of the paper fiber component.

The plastics component is divided into seven categories. The dominant category in this component is HDPE #2, with LDPE #4 second and other plastics and PET #1 tied for third. The amount of HDPE #2 is reflective of the multiple uses of this product. The LDPE #4 portion of this component is likely due to an increase in its use in bags and packaging.

The metals component of the waste stream is relatively small; it comprises less than 4% of the total waste stream. Tin food cans and aluminum beverage cans comprise almost 80% of this component. The total amount of aluminum in this component is more than 50% of its total.

TABLE 17.12
STATEWIDE DISTRIBUTION OF PAPER FIBER COMPONENTS BY WEIGHT

Material Category	Net Weight (pounds)
Corrugated Paper	7,543.49
Office Paper	8,542.77
Mixed Paper	9,440.02
Newsprint	8,949.37
Magazines	4,208.71
Paperboard	6,179.81
STATEWIDE TOTAL PAPER FIBERS	**44,864.17**

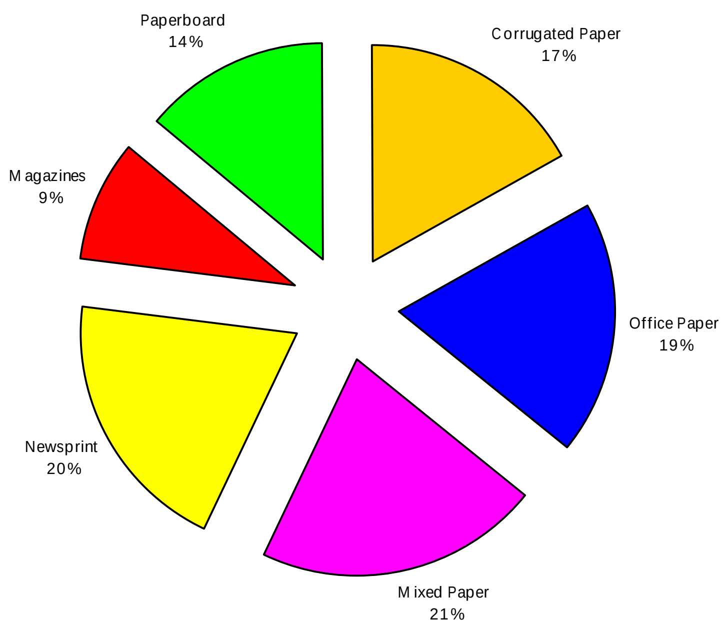


CHART 17.9
STATEWIDE DISTRIBUTION OF PAPER FIBER COMPONENTS

TABLE 17.13
STATEWIDE DISTRIBUTION OF PLASTICS COMPONENTS BY WEIGHT

Material Category	Net Weight (pounds)
LDPE #4	2,696.62
PET #1	2,549.69
HDPE #2	6,482.60
PVC #3	407.94
PP #5	547.84
PS #6	1,677.59
Other Plastics	2,495.28
STATEWIDE TOTAL PLASTICS	**16,857.56**

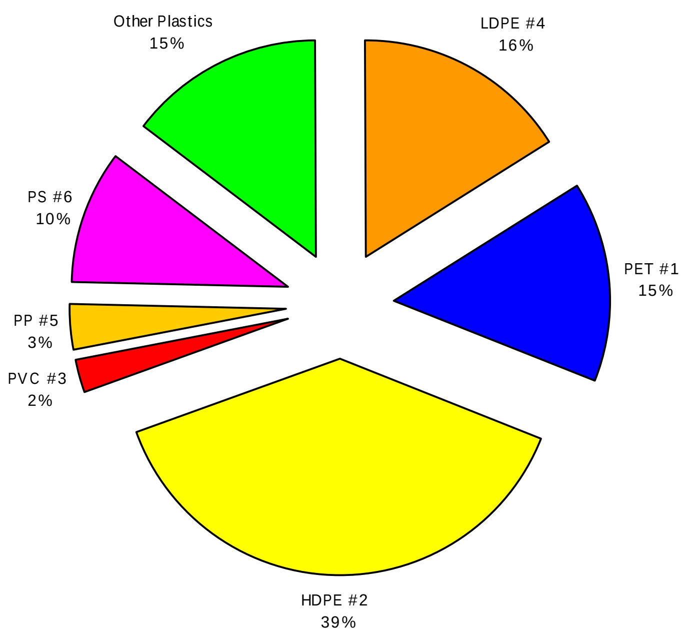


CHART 17.10
STATEWIDE DISTRIBUTION OF PLASTICS COMPONENTS

TABLE 17.14
STATEWIDE DISTRIBUTION OF METALS COMPONENTS BY WEIGHT

Material Category	Net Weight (pounds)
Aluminum Beverage Cans	1,502.51
Aluminum Foil/Food Trays	438.63
Other Aluminum	270.57
Tin Food Cans	1,704.62
Other Tin Cans	252.17
STATEWIDE TOTAL METALS	**4,168.50**

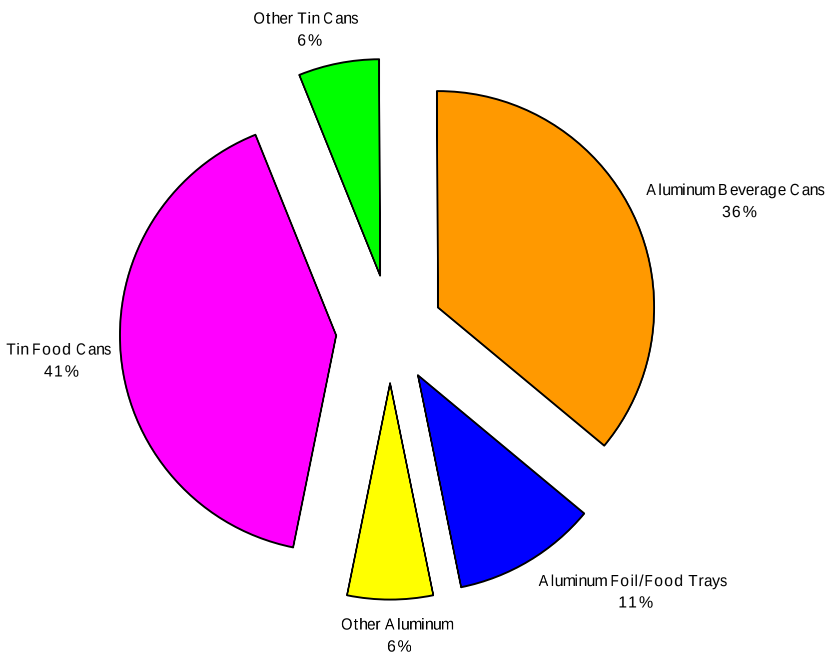


CHART 17.11
STATEWIDE DISTRIBUTION OF METALS COMPONENTS

Statewide Weight and Volume Summary

Weight and volume tables were compiled that summarize the data collected during the Spring Sort and the Fall Sort. Additionally, weight and volume summary data for both waste sorts conducted at the 14 facilities in the 11 selected solid waste management districts located throughout Ohio were also compiled. The tables on the following pages present the statewide weight and volume data for the Spring Sort, the Fall Sort, and both sorts combined. Additionally, Chart 17.12 and Chart 17.13 provide a graphic summary of the 8 major components of the statewide waste stream.

TABLE 17.15
STATEWIDE OHIO PROFILE
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	4,342.18	21.69%	8.75%
Office Paper	3,703.98	18.51%	7.47%
Mixed Paper	4,118.65	20.58%	8.30%
Newsprint	4,404.61	22.01%	8.88%
Magazines	1,813.70	9.06%	3.66%
Paperboard	1,631.56	8.15%	3.29%
TOTAL PAPER FIBERS	20,014.68		40.35%
LDPE #4	1,127.03	13.90%	2.27%
PET #1	1,191.52	14.70%	2.40%
HDPE #2	3,237.34	39.94%	6.53%
PVC #3	242.90	3.00%	0.49%
PP #5	302.95	3.74%	0.61%
PS #6	808.46	9.97%	1.63%
Other Plastics	1,196.12	14.76%	2.41%
TOTAL PLASTICS	8,106.32		16.34%
Aluminum Beverage Cans	665.47	34.61%	1.34%
Aluminum Foil/Food Trays	221.23	11.50%	0.45%
Other Aluminum	125.28	6.51%	0.25%
Tin Food Cans	773.02	40.20%	1.56%
Other Tin Cans	138.02	7.18%	0.28%
TOTAL METALS	1,923.02		3.88%
Yard Waste	5,323.09		10.73%
Textiles	3,302.55		6.66%
Diapers	1,626.73		3.28%
Food	6,461.49		13.03%
Glass	2,368.52		4.77%
Empty Aerosol Cans	139.10		0.28%
Medical Waste	223.67		0.45%
Fines and Superfines	113.86		0.23%
NET WEIGHT	49,603.03		100.00%

TABLE 17.16
STATEWIDE OHIO PROFILE
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,063.98	26.14%	10.28%
Office Paper	907.60	22.30%	8.77%
Mixed Paper	428.34	10.52%	4.14%
Newsprint	470.08	11.55%	4.54%
Magazines	327.97	8.06%	3.17%
Paperboard	872.37	21.43%	8.43%
TOTAL PAPER FIBERS	4,070.33		39.32%
LDPE #4	311.73	11.20%	3.01%
PET #1	350.45	12.59%	3.39%
HDPE #2	1,132.15	40.67%	10.94%
PVC #3	121.45	4.36%	1.17%
PP #5	137.70	4.95%	1.33%
PS #6	367.48	13.20%	3.55%
Other Plastics	362.46	13.02%	3.50%
TOTAL PLASTICS	2,783.43		26.89%
Aluminum Beverage Cans	237.67	33.99%	2.30%
Aluminum Foil/Food Trays	105.35	15.07%	1.02%
Other Aluminum	78.30	11.20%	0.76%
Tin Food Cans	208.92	29.88%	2.02%
Other Tin Cans	69.01	9.87%	0.67%
TOTAL METALS	699.25		6.75%
Yard Waste	1,020.49		9.86%
Textiles	706.33		6.82%
Diapers	182.78		1.77%
Food	504.80		4.88%
Glass	257.45		2.49%
Empty Aerosol Cans	77.28		0.75%
Medical Waste	49.70		0.48%
Fines and Superfines			
NET VOLUME	10,351.84		100.00%

TABLE 17.17
STATEWIDE OHIO PROFILE
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	3,201.31	12.88%	5.49%
Office Paper	4,838.79	19.47%	8.30%
Mixed Paper	5,321.37	21.41%	9.13%
Newsprint	4,544.76	18.29%	7.79%
Magazines	2,395.01	9.64%	4.11%
Paperboard	4,548.25	18.30%	7.80%
TOTAL PAPER FIBERS	24,849.49		42.61%
LDPE #4	1,569.59	17.94%	2.69%
PET #1	1,358.17	15.52%	2.33%
HDPE #2	3,245.26	37.08%	5.57%
PVC #3	165.04	1.89%	0.28%
PP #5	244.89	2.80%	0.42%
PS #6	869.13	9.93%	1.49%
Other Plastics	1,299.16	14.85%	2.23%
TOTAL PLASTICS	8,751.24		15.01%
Aluminum Beverage Cans	837.04	37.28%	1.44%
Aluminum Foil/Food Trays	217.40	9.68%	0.37%
Other Aluminum	145.29	6.47%	0.25%
Tin Food Cans	931.60	41.49%	1.60%
Other Tin Cans	114.15	5.08%	0.20%
TOTAL METALS	2,245.48		3.85%
Yard Waste	4,502.24		7.72%
Textiles	2,833.19		4.86%
Diapers	2,341.47		4.02%
Food	9,792.44		16.79%
Glass	2,705.65		4.64%
Empty Aerosol Cans	150.48		0.26%
Medical Waste	63.10		0.11%
Fines and Superfines	78.49		0.13%
NET WEIGHT	58,313.27		100.00%

TABLE 17.18
STATEWIDE OHIO PROFILE
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	784.43	13.36%	6.27%
Office Paper	1,185.66	20.19%	9.47%
Mixed Paper	553.42	9.42%	4.42%
Newsprint	485.03	8.26%	3.88%
Magazines	433.09	7.37%	3.46%
Paperboard	2,431.87	41.40%	19.43%
TOTAL PAPER FIBERS	5,873.51		46.93%
LDPE #4	434.14	14.71%	3.47%
PET #1	399.46	13.54%	3.19%
HDPE #2	1,134.92	38.46%	9.07%
PVC #3	82.52	2.80%	0.66%
PP #5	111.31	3.77%	0.89%
PS #6	395.06	13.39%	3.16%
Other Plastics	393.68	13.34%	3.15%
TOTAL PLASTICS	2,951.10		23.58%
Aluminum Beverage Cans	298.94	37.27%	2.39%
Aluminum Foil/Food Trays	103.52	12.91%	0.83%
Other Aluminum	90.81	11.32%	0.73%
Tin Food Cans	251.78	31.39%	2.01%
Other Tin Cans	57.08	7.12%	0.46%
TOTAL METALS	802.13		6.41%
Yard Waste	863.12		6.90%
Textiles	605.94		4.84%
Diapers	263.09		2.10%
Food	765.03		6.11%
Glass	294.09		2.35%
Empty Aerosol Cans	83.60		0.67%
Medical Waste	14.02		0.11%
Fines and Superfines			
NET VOLUME	12,515.64		100.00%

TABLE 17.19
STATEWIDE OHIO PROFILE
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	7,543.49	16.81%	6.99%
Office Paper	8,542.77	19.04%	7.92%
Mixed Paper	9,440.02	21.04%	8.75%
Newsprint	8,949.37	19.95%	8.29%
Magazines	4,208.71	9.38%	3.90%
Paperboard	6,179.81	13.77%	5.73%
TOTAL PAPER FIBERS	44,864.17		41.57%
LDPE #4	2,696.62	16.00%	2.50%
PET #1	2,549.69	15.12%	2.36%
HDPE #2	6,482.60	38.46%	6.01%
PVC #3	407.94	2.42%	0.38%
PP #5	547.84	3.25%	0.51%
PS #6	1,677.59	9.95%	1.55%
Other Plastics	2,495.28	14.80%	2.31%
TOTAL PLASTICS	16,857.56		15.62%
Aluminum Beverage Cans	1,502.51	36.04%	1.39%
Aluminum Foil/Food Trays	438.63	10.52%	0.41%
Other Aluminum	270.57	6.49%	0.25%
Tin Food Cans	1,704.62	40.89%	1.58%
Other Tin Cans	252.17	6.05%	0.23%
TOTAL METALS	4,168.50		3.86%
Yard Waste	9,825.33		9.10%
Textiles	6,135.74		5.69%
Diapers	3,968.20		3.68%
Food	16,253.93		15.06%
Glass	5,074.17		4.70%
Empty Aerosol Cans	289.58		0.27%
Medical Waste	286.77		0.27%
Fines and Superfines	192.35		0.18%
NET WEIGHT	107,916.30		100.00%

TABLE 17.20
STATEWIDE OHIO PROFILE
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,848.40	18.59%	8.08%
Office Paper	2,093.26	21.05%	9.15%
Mixed Paper	981.76	9.87%	4.29%
Newsprint	955.11	9.61%	4.18%
Magazines	761.07	7.65%	3.33%
Paperboard	3,304.23	33.23%	14.45%
TOTAL PAPER FIBERS	9,943.84		43.48%
LDPE #4	745.87	13.01%	3.26%
PET #1	749.91	13.08%	3.28%
HDPE #2	2,267.07	39.53%	9.91%
PVC #3	203.97	3.56%	0.89%
PP #5	249.02	4.34%	1.09%
PS #6	762.54	13.30%	3.33%
Other Plastics	756.15	13.19%	3.31%
TOTAL PLASTICS	5,734.53		25.08%
Aluminum Beverage Cans	536.61	35.74%	2.35%
Aluminum Foil/Food Trays	208.87	13.91%	0.91%
Other Aluminum	169.11	11.26%	0.74%
Tin Food Cans	460.71	30.69%	2.01%
Other Tin Cans	126.09	8.40%	0.55%
TOTAL METALS	1,501.38		6.57%
Yard Waste	1,883.61		8.24%
Textiles	1,312.27		5.74%
Diapers	445.87		1.95%
Food	1,269.84		5.55%
Glass	551.54		2.41%
Empty Aerosol Cans	160.88		0.70%
Medical Waste	63.73		0.28%
Fines and Superfines			
NET VOLUME	22,867.48		100.00%

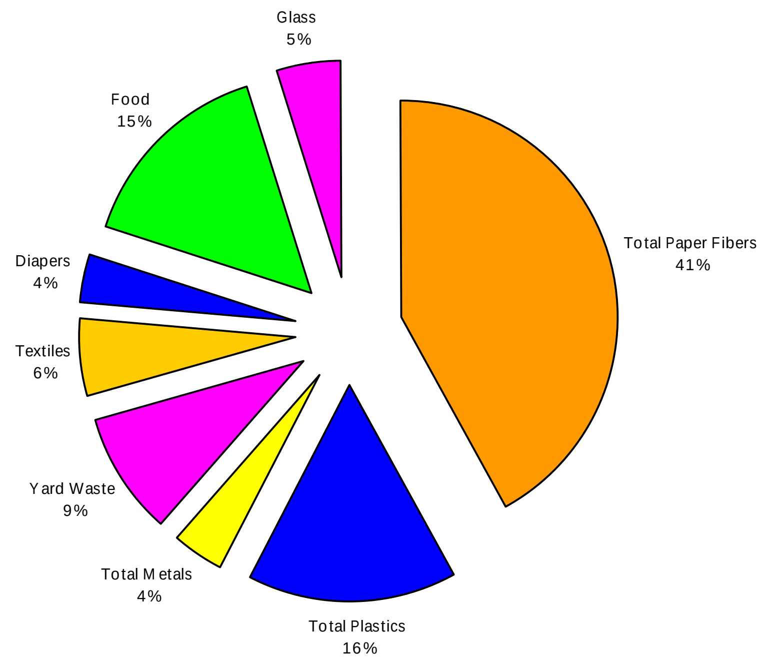


CHART 17.12
STATEWIDE DISTRIBUTION OF MAJOR COMPONENTS BY WEIGHT

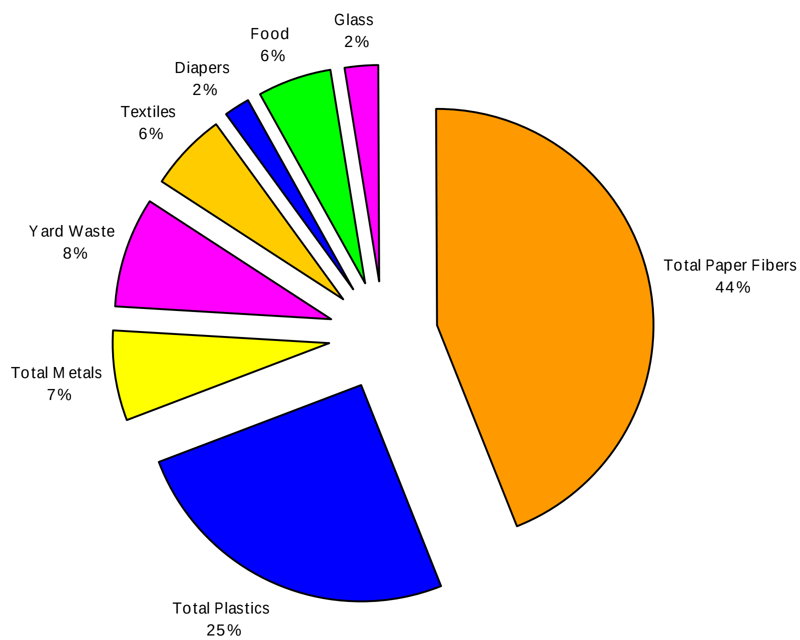


CHART 17.13
STATEWIDE DISTRIBUTION OF MAJOR COMPONENTS BY VOLUME

18. RESULTS ANALYSIS

The data collected from the waste sorts conducted at the 11 selected solid waste districts located throughout Ohio has been analyzed to identify a variety of waste stream aspects and attributes. These analyses were selected to address specific issues identified by the Ohio Department of Natural Resources, Department of Recycling and Litter Prevention. The analyses that have been conducted are only a limited amount of analyses that could be performed on this data. It is anticipated that as the data is evaluated and reviewed, additional analyses will be conducted. The value of the data for efforts relating to waste reduction, recycling, collection, disposal, and overall solid waste management is significant. There are six analyses that were conducted as a part of this study. A brief description of each analysis is provided in the following paragraphs.

Detailed Sample Analysis (pages 18-3 to 18-8): As a part of the sample collection process, additional independent samples were taken from selected loads. These independent samples were captured in order to determine the impact of moisture on the solid waste. A total of 25 independent samples were gathered. These samples were dried and categorized to determine moisture content and to identify materials most susceptible to moisture contamination. This analysis identified food, diapers, and water as the major contributors to the added moisture in the solid waste.

Commercial Loads Analysis (pages 18-9 to 18-20): This analysis identified 58 pure commercial loads that were sampled during the combined two-season waste sort. These 58 loads were analyzed based on the characteristics of the waste and how these characteristics compared to the total sample database. The analysis identified a significant amount of paper and plastics in the pure commercial load samples and a marked decrease in yard waste and textiles.

Visual Inspection Analysis (pages 18-20 to 18-23): In addition to collecting samples from loads at each of the 14 facilities located within the 11 solid waste management districts, each of the sampled loads was also visually inspected. This inspection involved walking around the load in two directions noting any large items that could be observed in the load. A total of 47 different large items were noted. The largest single item noted was loose wood. Carpeting was the second most frequently noted item and C & D debris was third. More than half of the large items noted were identified in less than 10% of the loads. Also, items such as oil filters, lead-acid batteries, and dead animals were seldom found in the loads.

Ohio Statewide Profile Compared to National Profile (pages 18-24 to 18-27): One of the important aspects of this waste characterization study was how the data developed throughout this study compared to the most recent U.S. Environmental Protection Agency (USEPA) waste characterization data. This analysis addresses how the 460 samples collected in Ohio compare to the numbers calculated for the USEPA. It also considers a number of issues regarding the impact a variety of aspects of the waste stream has on the characteristics of the waste. The analysis indicates that there is a variation between USEPA percentages and those identified by this study.

Statistical Analysis (pages 18-28 to 18-42): This analysis addresses the determination of the 90% confidence level of the data. This analysis focused on the total database and was performed utilizing the three major components of the waste stream (paper fibers, plastics, and metals). Based on this analysis, it was determined that the data did skew slightly to the high end of the data. The data was then refined to address this skew. It was determined that refining the data had limited impact on the original averages and standard deviations.

Application (pages 18-43 to 18-44): This analysis involves determining whether the data developed for this waste characterization study could be applied to the other counties and solid waste management districts in Ohio. A number of comparison options were considered and it was determined that the optimal approach would be to utilize specific demographics as the basis of comparison. Ten demographic categories were identified for use in the comparison process. A workbook will be generated that counties and districts throughout Ohio can use to determine which of the 11 selected solid waste management districts are most comparable.

Detailed Sample Analysis

As a part of this waste characterization study, detailed sample analysis was performed. This detailed sample analysis complements the efforts of the traditional waste sort by identifying the impact of moisture on the sorted materials.

The impact of moisture on any waste can result in increased weight, reduced volume, and reduced ability to reuse or recycle the material. Moisture in the waste adds costs to collection, processing, and disposal and artificially increases the cost of the solid waste system to its users. For these reasons, it is important to identify the impact moisture has on the residential and commercial waste stream in Ohio.

This analysis determines what level of moisture exists in a variety of samples gathered as a part of the waste characterization study. The reasons for gathering this information include:

1. To identify the impact of moisture on the waste stream.
2. To identify those portions of the waste stream most impacted by moisture.
3. To identify how various elements of the waste stream can both absorb and contain moisture.
4. To identify potential sources of moisture.
5. To identify comparisons of moisture content to weather conditions.

Detailed Sample Analysis Approach

The approach is to gather a detailed sort sample that is independent of the sample gathered from a particular load for the waste characterization study. This independent sample is gathered from a portion of the load that appears to be wet to very wet. The independent sample is placed in a plastic bag, tagged, and weighed. The bagged independent sample is then placed in a separate storage container which is sealed and is not opened until it is brought to the testing area. The testing area used for this study was located in the project storage facility for the project which was located near Mason, Ohio.

Once the bagged sample is delivered to the testing area, it is weighed again to determine its current weight. The new weight is noted and if a discrepancy is discovered, the container and bag are inspected for potential leaks. If there is no difference in weight or the difference is less than 5%, the sample bag is opened and prepared for testing.

The sample is removed from the bag and the sample is then inspected and any initial aspects of the sample are noted. Once the initial inspection is completed, the sample is placed in a drying container and air dried for 10 minutes. This drying process is repeated until the difference between the weights of the sample from one drying period to the next are less than 10%. When this level of dryness is reached, the independent sample is sorted into categories, each category is weighed, and the materials either recycled or discarded.

This approach provides a weight of the entire independent sample and an identification of those items that comprise the independent sample. This approach also allows for the independent sample to be dried as one unit which reduces the potential for loss of moisture content of the entire sample from first capture of the sample until the drying and sorting process is complete. Separating the constituents prior to the drying process can alter the extent of the moisture content in the independent sample.

Independent Sample Testing Procedure

Each of the independent samples captured for detailed analysis were bagged and weighed in the field and then placed in a sealed container for transport to the testing area. The independent sample container was kept in a shaded, cool area in order to reduce any artificial drying of the samples.

The independent samples were tested on a weekly basis. The samples gathered during the previous week were delivered to the testing area and each sample was tested separately. The first step in the testing process was weighing the sample. The weight of the sample was measured and compared to the weight noted in the field when the sample was captured. If the weights were identical or within 5% of each other, the testing process proceeded. If the weight differential was outside this tolerance, the sample bag and the container were examined to determine why the weight discrepancy occurred. If the discrepancy could not be determined or the weight differential was too great, the sample was discarded. If the sample weights were within tolerance, the testing process continued.

The sample was removed from its bag, weighed again, and then inspected. The initial inspection determined the general characteristics of the sample and noted such things as material condition, odor, dimensions, and texture. The sample was not handled excessively or dismembered. It remained in the same form and condition as when it was first gathered.

Once the initial inspection was complete, the sample was placed in the dryer box. This box was sized to contain the sample and allow for air flow to surround the sample. The box was also sized to allow for the potential expansion of the sample as it dried. The sample was dried at a minimum air temperature of 175° F. utilizing a dryer with a minimum of 1,875 watts. The drying box was heated to 175° F. by injecting hot air into the box via a blower system. The box was also vented to allow for air to be ejected, reducing the humidity level of the air within the box.

The heating process continued for a period of 10 minutes. At the end of the ten minutes, the sample was removed from the box and weighed. If the sample's weight was reduced by more than 10%, the sample was returned to the box for an additional ten minutes of drying. This process continued until the weight variance from drying cycle to drying cycle was less than 10%.

Once the sample was dried, it was again weighed and categorized to determine all of the characteristics of the sample. All information pertaining to the testing process was noted.

Detailed Sample Analysis Testing Results

A total of 28 samples were gathered and 25 of these samples were tested during the waste characterization study. Samples were gathered from all 11 districts. Table 18.1 presents the results of the testing. The sample numbers correspond to the waste characterization sample sorted at the various sites (see Table 17.1 and Table 17.2 for specific sample number information). The initial weight listed in Table 18.1 is the weight measured on the day of testing. None of the independent sample weight's varied more than 4% from their capture weight to their testing weight.

TABLE 18.1
DETAILED SAMPLE ANALYSIS RESULTS

Sample No.	Initial Weight (lb)	Final Weight (lb)	Difference (%)	Three Largest Components			Contaminant
0605D1.04	4.66	3.48	25.30	Food	Magazines	Other Plastics	Food
0610D2.06	13.24	8.33	37.08	Corrugated	Other Paper	Office Paper	Unknown
0613D2.02	2.12	0.95	55.19	Magazines	Other Plastics	Mixed Paper	Unknown
0618D1.04	3.19	1.86	41.69	Diapers	Mixed Paper	Paperboard	Diapers
0619D2.08	4.81	3.19	33.67	Paperboard	Mixed Paper	Other Plastics	Unknown
0910D4.07	7.20	6.11	15.14	Book	Corrugated	Paperboard	Water & Food
0910D4.08	4.67	4.03	13.70	Office Paper	Corrugated	Other Plastics	Unknown
0911D4.05	2.59	2.15	16.99	Magazines	Newsprint	Office Paper	Water & Food
0915D4.10	1.93	0.90	53.37	Corrugated	Paperboard	HDPE #2	Unknown
0916D5.09	3.78	2.55	32.54	Paperboard	Mixed Paper	HDPE #2	Unknown
0919D4.10	1.02	0.73	28.43	Corrugated	Office Paper	Mixed Paper	Unknown
0922D3.01	1.22	0.56	54.10	Corrugated	Paperboard	Mixed Paper	Unknown
0926D4.07	3.18	1.83	42.45	Corrugated	Mixed Paper	LDPE #4	Unknown
1002D7.09	0.87	0.49	43.68	Newsprint	Diapers	Mixed Paper	Diapers
1002D7.10	0.30	0.21	30.00	Newsprint	Corrugated	Office Paper	Unknown
1009D5.01	0.57	0.41	28.07	Newsprint	Mixed Paper	HDPE #2	Diapers
1009D5.02	1.42	0.56	60.56	Newsprint	Mixed Paper		Food
1009D5.12	0.59	0.32	45.76	Newsprint	Mixed Paper	HDPE #2	Food
1009D5.13	0.73	0.60	17.81	Paperboard	Mixed Paper	HDPE #2	Food
1016D3.04	1.45	0.64	55.86	Newsprint	Mixed Paper	PS #6	Water
1017D4.08	0.49	0.33	32.65	Corrugated	Paperboard	Mixed Paper	Water
1020D3.07	1.13	0.58	48.67	Newsprint	Magazines	Office Paper	Food
1021D4.10	0.82	0.67	18.29	Corrugated	Mixed Paper	Paperboard	Water & Food
1027D3.08	1.88	1.18	37.23	Corrugated	Paperboard	Mixed Paper	Water
1028D4.04	2.74	1.56	43.07	Newsprint	Corrugated	HDPE #2	Water

The most prominent category of materials found in the independent samples was paper. Some plastics, food and diapers were also noted. The major contaminants of the samples were food and water. The other contaminant was diapers.

The most significant aspect of the analysis was the variance in the weight of each sample. The weight loss varies from 13.70% to 60.56%. The average weight loss is 36.45% and the mean is 37.08%. Of the five samples with the lowest percentage of weight loss, the predominant materials included plastics, magazines, books, and paperboard. Only one of these samples had a predominance of mixed paper. In turn, four of the five samples with the highest percentage of moisture, more than 50%, contained mixed paper.

Analyzing the results of the tests conducted on the 25 independent samples, it is possible to provide answers to the five reasons previously indicated for this detailed sample analysis.

1. The impact of moisture on the waste stream appears to be significant. The average moisture content for these samples was more than 35%. Further, from visual observations, the samples were typically consolidated and intertwined making it difficult to source separate the waste stream.

2. The portion of the waste stream that appears to be most impacted by the moisture is the paper fibers component. In particular, mixed paper appears to be significantly impacted by moisture. This is likely because mixed paper is produced in such a manner as to be an absorbent and to hold moisture (paper towels, etc.)

3. The various elements of the waste stream that absorb or contain moisture can do so in a variety of ways. It was observed that plastics can contain or retain moisture by forming reservoirs that hold water. In addition, some plastics are shaped to allow water to be absorbed into openings in the plastic where the moisture is then contained. Paper products and diapers have various levels of absorbency. From observations made in the field during the sample gathering events and during the independent sample testing, it was noted that corrugated paper does not tend to absorb a great deal of moisture unless it is torn or has been submerged in moisture. Other paper products, particularly newsprint and mixed paper, have a tendency to absorb significant amounts of moisture. The type of moisture that is absorbed appears to be dependent upon the density of the moisture and the absorbency of the paper product.

4. The identified potential sources of moisture were food, diapers, yard waste, and water. The majority of the moisture was introduced to the waste stream by other waste in the load. Given the number of plastic bags utilized for containing the waste as well as the number of carts and toters utilized throughout the study area, contamination of the waste stream by rain or snow appears to be limited. Further, when observing the collection vehicles during the field gathering events for this waste characterization study, a large quantity of moisture was discharged from the vehicle when it was unloaded and was not a part of the solid waste.

5. During both the detailed sample analysis, the visual inspections undertaken in the field, and the categorization process conducted during the waste sorts, a number of observations were made regarding weather conditions and the impact these conditions had on the waste stream. As noted above, the types of containers utilized to store the waste prior to collection appear to have a significant impact on the amount of rain or snow entering the waste stream. From observations made during the sample gathering process, the majority of the waste appeared dry, even on wet days. In addition, when the collection vehicles discharged their loads, it appeared that most of the moisture in the vehicle was discharged separately from the waste. Finally, based on the results of the detailed sample analysis, it appears that the majority of the moisture contamination occurs from the interaction of the various constituents within the waste stream and not from outside sources such as rain or snow.

Weather Impact

As an additional consideration of the potential impact of weather on the waste stream, a comparison of rain events and truck weights was conducted. The initial analysis involved reviewing truck weights provided by the Solid Waste Authority of Central Ohio during the waste characterization study. This information was then compared to weather conditions that occurred during and prior to the time period when the weights were taken. Based on this initial analysis, it does not appear that there is a direct correlation. The weights of the collection vehicles did not significantly increase during or after a storm event. Although the information gathered is limited, it does indicate that weather conditions may not impact the weights of the solid waste as much as the moisture introduced by the waste generators.

The impact of weather conditions on the solid waste stream should continue to be evaluated. This impact may not be as significant as initially thought; however, further analysis may provide a more refined concept of the impact of weather conditions on the waste stream.

Commercial Loads Analysis

Of the 460 loads sampled during the two-season 2003 Waste Sort, 58 loads were pure commercial loads. A pure commercial load contains only solid waste generated by retail businesses, offices, schools, nursing homes or medical centers, or a combination of these generators. There were an additional 158 loads that contained commercial solid waste that was mixed with either apartment, residential, or apartment and residential waste. For this analysis, only the pure commercial loads were considered.

At 9 of the 11 districts where sorts were conducted, at least one pure commercial load was sampled. Only at the Brown County Landfill in the Brown County Solid Waste Authority's district and the Hoffman Road Landfill in the Lucas County Solid Waste Management District were no pure commercial loads sampled. However, there were mixed commercial loads sampled at these two facilities. Table 18.2 lists the number of pure commercial loads sampled at each of the 11 selected solid waste management districts during the 2003 Waste Sort.

TABLE 18.2
NUMBER OF PURE COMMERCIAL LOADS SAMPLED

District	Number of Pure Commercial Loads Sampled
Ashtabula County Solid Waste Management District	1
Athens-Hocking Joint Solid Waste Management District	1
Brown County Solid Waste Authority	0
Defiance-Fulton-Paulding-Williams Joint Solid Waste Management District	1
Hamilton County Solid Waste Management District	10
Logan County Solid Waste Management District	1
Lucas County Solid Waste Management District	0
Montgomery County Solid Waste Management District	5
Ottawa-Sandusky-Seneca Joint Solid Waste Management District	8
Richland County Regional Solid Waste Management Authority	5
Solid Waste Authority of Central Ohio	26
TOTAL NUMBER OF PURE COMMERCIAL LOADS SAMPLED	**58**

The smaller sites had a number of mixed commercial loads. This is not surprising given the limited number of commercial accounts and the routes the collection vehicles traverse. The only exception to this was at the Ottawa County Landfill in the Ottawa-Sandusky-Seneca Joint Solid Waste Management District. At this site, 8 pure commercial loads were captured. This is a unique site because of the impact of the tourist industry. There are several restaurants and other commercial activities that would not be typically found in an area of this size.

The following tables present summary information on the pure commercial loads sampled during the Spring Sort, the Fall Sort, and the combined two-season waste sort. Following this series of tables, Table 18.9 and Table 18.10 present information on the type of commercial waste collected in these sampled loads during the Spring Sort and during the Fall Sort. Finally, Table 18.11 presents a comparison of pure commercial loads sampled (58) and all of the loads sampled (460) during the combined two-season waste sort.

TABLE 18.3
STATEWIDE OHIO PROFILE – PURE COMMERCIAL LOADS
SPRING SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	865.21	23.80%	11.31%
Office Paper	1,080.77	29.72%	14.13%
Mixed Paper	766.42	21.08%	10.02%
Newsprint	412.47	11.34%	5.39%
Magazines	340.01	9.35%	4.45%
Paperboard	171.20	4.71%	2.24%
TOTAL PAPER FIBERS	3,636.08		47.54%
LDPE #4	246.32	16.98%	3.22%
PET #1	239.29	16.49%	3.13%
HDPE #2	464.53	32.02%	6.07%
PVC #3	32.82	2.26%	0.43%
PP #5	51.77	3.57%	0.68%
PS #6	213.57	14.72%	2.79%
Other Plastics	202.64	13.97%	2.65%
TOTAL PLASTICS	1,450.94		18.97%
Aluminum Beverage Cans	100.15	44.84%	1.31%
Aluminum Foil/Food Trays	45.66	20.44%	0.60%
Other Aluminum	18.54	8.30%	0.24%
Tin Food Cans	45.74	20.48%	0.60%
Other Tin Cans	13.27	5.94%	0.17%
TOTAL METALS	223.36		2.92%
Yard Waste	477.71		6.25%
Textiles	243.39		3.18%
Diapers	171.01		2.24%
Food	1,018.33		13.31%
Glass	351.53		4.60%
Empty Aerosol Cans	18.06		0.24%
Medical Waste	45.50		0.59%
Fines and Superfines	12.22		0.16%
NET WEIGHT	7,648.13		100.00%

TABLE 18.4
STATEWIDE OHIO PROFILE – PURE COMMERCIAL LOADS
SPRING SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	212.01	28.13%	12.91%
Office Paper	264.82	35.14%	16.13%
Mixed Paper	79.71	10.58%	4.85%
Newsprint	44.02	5.84%	2.68%
Magazines	61.48	8.16%	3.74%
Paperboard	91.54	12.15%	5.58%
TOTAL PAPER FIBERS	753.58		45.90%
LDPE #4	68.13	13.64%	4.15%
PET #1	70.38	14.09%	4.29%
HDPE #2	162.45	32.53%	9.89%
PVC #3	16.41	3.29%	1.00%
PP #5	23.53	4.71%	1.43%
PS #6	97.08	19.44%	5.91%
Other Plastics	61.41	12.30%	3.74%
TOTAL PLASTICS	499.39		30.42%
Aluminum Beverage Cans	35.77	40.60%	2.18%
Aluminum Foil/Food Trays	21.74	24.68%	1.32%
Other Aluminum	11.59	13.15%	0.71%
Tin Food Cans	12.36	14.03%	0.75%
Other Tin Cans	6.64	7.53%	0.40%
TOTAL METALS	88.10		5.37%
Yard Waste	91.58		5.58%
Textiles	52.05		3.17%
Diapers	19.21		1.17%
Food	79.56		4.85%
Glass	38.21		2.33%
Empty Aerosol Cans	10.03		0.61%
Medical Waste	10.11		0.62%
Fines and Superfines			0.00%
NET VOLUME	1,641.83		100.00%

TABLE 18.5
STATEWIDE OHIO PROFILE – PURE COMMERCIAL LOADS
FALL SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	396.39	14.33%	7.38%
Office Paper	861.03	31.12%	16.03%
Mixed Paper	678.75	24.53%	12.64%
Newsprint	306.72	11.09%	5.71%
Magazines	189.15	6.84%	3.52%
Paperboard	334.72	12.10%	6.23%
TOTAL PAPER FIBERS	2,766.76		51.51%
LDPE #4	152.76	18.50%	2.84%
PET #1	122.81	14.87%	2.29%
HDPE #2	279.44	33.85%	5.20%
PVC #3	14.80	1.79%	0.28%
PP #5	26.93	3.26%	0.50%
PS #6	88.28	10.69%	1.64%
Other Plastics	140.60	17.03%	2.62%
TOTAL PLASTICS	825.62		15.37%
Aluminum Beverage Cans	66.21	33.96%	1.23%
Aluminum Foil/Food Trays	31.87	16.35%	0.59%
Other Aluminum	14.59	7.48%	0.27%
Tin Food Cans	74.45	38.19%	1.39%
Other Tin Cans	7.82	4.01%	0.15%
TOTAL METALS	194.94		3.63%
Yard Waste	167.98		3.13%
Textiles	98.75		1.84%
Diapers	209.40		3.90%
Food	811.81		15.11%
Glass	271.51		5.05%
Empty Aerosol Cans	7.88		0.15%
Medical Waste	11.80		0.22%
Fines and Superfines	5.21		0.10%
NET WEIGHT	5,371.66		100.00%

TABLE 18.6
STATEWIDE OHIO PROFILE – PURE COMMERCIAL LOAD
FALL SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	97.13	15.55%	8.43%
Office Paper	210.98	33.78%	18.32%
Mixed Paper	70.59	11.30%	6.13%
Newsprint	32.73	5.24%	2.84%
Magazines	34.20	5.48%	2.97%
Paperboard	178.97	28.65%	15.54%
TOTAL PAPER FIBERS	624.61		54.23%
LDPE #4	42.25	15.17%	3.67%
PET #1	36.12	12.97%	3.14%
HDPE #2	97.72	35.09%	8.48%
PVC #3	7.40	2.66%	0.64%
PP #5	12.24	4.40%	1.06%
PS #6	40.13	14.41%	3.48%
Other Plastics	42.61	15.30%	3.70%
TOTAL PLASTICS	278.47		24.18%
Aluminum Beverage Cans	23.65	32.85%	2.05%
Aluminum Foil/Food Trays	15.18	21.09%	1.32%
Other Aluminum	9.12	12.67%	0.79%
Tin Food Cans	20.12	27.96%	1.75%
Other Tin Cans	3.91	5.43%	0.34%
TOTAL METALS	71.97		6.25%
Yard Waste	32.20		2.80%
Textiles	21.12		1.83%
Diapers	23.53		2.04%
Food	63.42		5.51%
Glass	29.51		2.56%
Empty Aerosol Cans	4.38		0.38%
Medical Waste	2.62		0.23%
Fines and Superfines			0.00%
NET VOLUME	1,151.84		100.00%

TABLE 18.7
STATEWIDE OHIO PROFILE – PURE COMMERCIAL LOADS
2003 SORT SUMMARY – WEIGHT DATA

Material Category	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Corrugated Paper	1,261.60	19.70%	9.69%
Office Paper	1,941.80	30.33%	14.91%
Mixed Paper	1,445.17	22.57%	11.10%
Newsprint	719.19	11.23%	5.52%
Magazines	529.16	8.26%	4.06%
Paperboard	505.92	7.90%	3.89%
TOTAL PAPER FIBERS	6,402.84		49.18%
LDPE #4	399.08	17.53%	3.07%
PET #1	362.10	15.91%	2.78%
HDPE #2	743.97	32.68%	5.71%
PVC #3	47.62	2.09%	0.37%
PP #5	78.70	3.46%	0.60%
PS #6	301.85	13.26%	2.32%
Other Plastics	343.24	15.08%	2.64%
TOTAL PLASTICS	2,276.56		17.49%
Aluminum Beverage Cans	166.36	39.77%	1.28%
Aluminum Foil/Food Trays	77.53	18.53%	0.60%
Other Aluminum	33.13	7.92%	0.25%
Tin Food Cans	120.19	28.73%	0.92%
Other Tin Cans	21.09	5.04%	0.16%
TOTAL METALS	418.30		3.21%
Yard Waste	645.69		4.96%
Textiles	342.14		2.63%
Diapers	380.41		2.92%
Food	1,830.14		14.06%
Glass	623.04		4.79%
Empty Aerosol Cans	25.94		0.20%
Medical Waste	57.30		0.44%
Fines and Superfines	17.43		0.13%
NET WEIGHT	13,019.79		100.00%

TABLE 18.8
STATEWIDE OHIO PROFILE – PURE COMMERCIAL LOADS
2003 SORT SUMMARY – VOLUME DATA

Material Category	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Corrugated Paper	309.13	22.43%	11.07%
Office Paper	475.81	34.52%	17.03%
Mixed Paper	150.30	10.91%	5.38%
Newsprint	76.75	5.57%	2.75%
Magazines	95.69	6.94%	3.43%
Paperboard	270.51	19.63%	9.68%
TOTAL PAPER FIBERS	1,378.19		49.33%
LDPE #4	110.38	14.19%	3.95%
PET #1	106.50	13.69%	3.81%
HDPE #2	260.18	33.45%	9.31%
PVC #3	23.81	3.06%	0.85%
PP #5	35.77	4.60%	1.28%
PS #6	137.20	17.64%	4.91%
Other Plastics	104.01	13.37%	3.72%
TOTAL PLASTICS	777.86		27.84%
Aluminum Beverage Cans	59.41	37.12%	2.13%
Aluminum Foil/Food Trays	36.92	23.06%	1.32%
Other Aluminum	20.71	12.94%	0.74%
Tin Food Cans	32.48	20.29%	1.16%
Other Tin Cans	10.55	6.59%	0.38%
TOTAL METALS	160.07		5.73%
Yard Waste	123.79		4.43%
Textiles	73.17		2.62%
Diapers	42.74		1.53%
Food	142.98		5.12%
Glass	67.72		2.42%
Empty Aerosol Cans	14.41		0.52%
Medical Waste	12.73		0.46%
Fines and Superfines			0.00%
NET VOLUME	2,793.66		100.00%

TABLE 18.9
TYPES OF WASTE IN PURE COMMERCIAL LOADS
SPRING SORT

District	Retail	Businesses	Schools	Nursing Homes	Medical Centers
Ashtabula County SWMD	•	•	•		
Athens-Hocking Joint SWMD	•	•			
Hamilton County SWMD	•	•	•		
Hamilton County SWMD	•	•			
Hamilton County SWMD	•	•			
Hamilton County SWMD	•	•			
Hamilton County SWMD	•	•			
Montgomery County SWMD	•	•			
Montgomery County SWMD	•				
Ottawa-Sandusky-Seneca Joint SWMD	•				
Ottawa-Sandusky-Seneca Joint SWMD	•	•	•		
Ottawa-Sandusky-Seneca Joint SWMD	•				
Ottawa-Sandusky-Seneca Joint SWMD	•				
Ottawa-Sandusky-Seneca Joint SWMD	•	•	•		
Richland County Regional Solid Waste Authority	•	•			
Richland County Regional Solid Waste Authority		•	•		
Richland County Regional Solid Waste Authority	•	•			
Richland County Regional Solid Waste Authority		•			
Solid Waste Authority of Central Ohio	•				
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•	•		
TOTALS	**32**	**29**	**6**	**0**	**0**

TABLE 18.10
TYPES OF WASTE IN PURE COMMERCIAL LOADS
FALL SORT

District	Retail	Businesses	Schools	Nursing Homes	Medical Centers
Defiance-Fulton-Paulding-Williams Joint SWMD	•	•	•	•	
Hamilton County SWMD		•			
Hamilton County SWMD	•	•			
Hamilton County SWMD		•			
Hamilton County SWMD	•	•	•	•	
Hamilton County SWMD	•	•	•	•	
Logan County SWMD		•			
Montgomery County SWMD	•				
Montgomery County SWMD	•	•			
Montgomery County SWMD	•	•			
Ottawa-Sandusky-Seneca Joint SWMD	•				
Ottawa-Sandusky-Seneca Joint SWMD	•				
Ottawa-Sandusky-Seneca Joint SWMD	•		•		
Richland County Regional Solid Waste Authority		•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•	•		•
Solid Waste Authority of Central Ohio	•	•		•	
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
Solid Waste Authority of Central Ohio	•	•			
TOTALS	**20**	**20**	**5**	**4**	**1**

TABLE 18.11
COMPARISON OF PURE COMMERCIAL LOADS TO ALL LOADS SAMPLED DURING THE 2003 WASTE SORT

Material Category	Pure Commercial Loads = 58	All Loads Sampled = 460	Percentage Difference
	Percentage of Weight in Sampled Loads		
Corrugated Paper	9.69%	7.01%	2.68%
Office Paper	14.91%	7.91%	7.00%
Mixed Paper	11.10%	8.75%	2.35%
Newsprint	5.52%	8.33%	-2.81%
Magazines	4.06%	3.90%	0.16%
Paperboard	3.89%	5.73%	-1.85%
TOTAL PAPER FIBERS	49.18%	41.64%	7.54%
LDPE #4	3.07%	2.50%	0.56%
PET #1	2.78%	2.37%	0.41%
HDPE #2	5.71%	6.02%	-0.30%
PVC #3	0.37%	0.38%	-0.01%
PP #5	0.60%	0.51%	0.10%
PS #6	2.32%	1.56%	0.76%
Other Plastics	2.64%	2.32%	0.32%
TOTAL PLASTICS	17.49%	15.65%	1.84%
Aluminum Beverage Cans	1.28%	1.39%	-0.12%
Aluminum Foil/Food Trays	0.60%	0.41%	0.19%
Other Aluminum	0.25%	0.25%	0.00%
Tin Food Cans	0.92%	1.58%	-0.66%
Other Tin Cans	0.16%	0.23%	-0.07%
TOTAL METALS	3.21%	3.87%	-0.66%
Yard Waste	4.96%	9.12%	-4.16%
Textiles	2.63%	5.70%	-3.07%
Diapers	2.92%	3.68%	-0.76%
Food	14.06%	15.09%	-1.03%
Glass	4.79%	4.71%	0.07%
Empty Aerosol Cans	0.20%	0.27%	-0.07%
Medical Waste	0.44%	0.27%	0.17%
Fines and Superfines	0.13%	0.00%	0.13%

Commercial Loads Analysis Results

When assessing the percentages for the combined two-season waste sort (see Table 18.7), paper fibers account for close to 50% of the weight of the pure commercial loads sampled. More importantly, the amount of corrugated paper, office paper, and mixed paper is significant. In turn, the amount of newsprint, magazines, and paperboard is relatively low. This likely reflects the combined impact of the number of retail and business accounts collected.

Comparing the pure commercial loads sampled to all of the loads sampled during the combined two-season waste sort, the difference in percentages is significant. As can be seen in Table 18.11, paper fibers account for 41.64% of all the loads sampled and 49.18% of the pure commercial loads sampled. Plastics are also higher in the pure commercial loads compared to all the loads sampled. All of the other major component categories are higher when all of the loads sampled are compared to the pure commercial loads.

In considering the paper fibers category separately, the major difference between the pure commercial loads and all of the loads sampled is the significant difference in every subcategory, except magazines. The most significant differences occur in corrugated paper (2.68%), office paper (7.00%), and mixed paper (2.35%).

Further evaluation of the comparison between the pure commercial loads and all of the loads indicates that the greatest impact of commercial loads is in the paper, yard waste, and textiles categories, and to a lesser extent in the food and plastics categories. Although the pure commercial loads account for only 58 of the 460 loads sampled, commercial waste is actually included in an additional 158 loads of mixed waste.

Based on this analysis, the key targets for waste reduction efforts in the commercial section should concentrate on corrugated paper, office paper, and mixed paper. Corrugated paper is likely generated from all sub-sectors of the commercial waste stream (retail, businesses, schools, etc.) The office paper portion is likely generated by businesses other than retail stores. Utilizing information gathered during interviews with the collection vehicle drivers for those loads that contained waste generated in schools (there are 11 pure commercial loads with school waste), there appears to be a large percentage of waste that would be categorized as office paper in this specific waste stream.

Mixed paper appears to be generated from retail businesses (restaurants, convenience stores, etc.). Other contributors to mixed paper are nursing homes and medical centers. This appears to be a result of the use of paper towels, paper gowns, and similar paper products in the medical industry. This assessment is based on very limited information given that only 5 pure commercial loads contained either nursing home or medical center waste.

From this analysis, pure commercial loads have a high paper and plastic content combined with lower yard waste and textiles content. The lower amounts of yard waste and food result in drier loads which can be more difficult to compact. Further, paper and plastics (particularly corrugated paper, LDPE #4, and PET #1) can be difficult to compact both in the collection vehicle and at the disposal site. A reduction in these materials or a modification in how these products are prepared for collection would likely improve the collection and disposal of the commercial loads by increasing the compactability of the waste.

Visual Inspection Analysis

As a part of the waste sort process, each load that was selected for sampling was also visually inspected. This visual inspection involved noting items seen during a walk around of the load. The walk around was actually two complete tours of the load which involved walking around the load in one direction and then walking around the load in the opposite direction. During the walk around, a visual survey of the load was conducted and large items in the load were noted.

Using the information gathered during these visual inspections, Table 18.12 was generated. This table provides information on the large items identified during the Spring Sort, the Fall Sort, and the combined two-season waste sort.

TABLE 18.12
VISUAL INSPECTION SUMMARY

Large Items	Spring Sort Summary Total Loads Sampled = 208		Fall Sort Summary Total Loads Sampled = 252		District Summary Total Loads Sampled = 460	
	Number and percentage of sampled loads in which the following items were noted:					
CPUs	50	24.04%	29	11.51%	79	17.17%
Keyboards	8	3.85%	6	2.38%	14	3.04%
Monitors	13	6.25%	19	7.54%	32	7.00%
Drives	2	0.96%	4	1.59%	6	1.30%
Printers	18	8.65%	32	12.70%	50	10.87%
Carpet	130	62.50%	156	61.90%	286	62.17%
Scrap Tires	36	17.31%	41	16.27%	77	16.74%
Wood Pallets	40	19.23%	43	17.06%	83	18.04%
Loose Wood	145	69.71%	201	79.76%	346	75.22%
Large Appliances	35	16.83%	33	13.10%	68	14.78%
Small Appliances	86	41.35%	109	43.25%	195	42.39%
Lead-Acid Batteries	1	0.48%	2	0.79%	3	0.65%
TVs	28	13.46%	17	6.75%	45	9.78%
Stereos	25	12.02%	37	14.68%	62	13.48%
Speakers	0	0.00%	3	1.19%	3	0.65%
Telephones	8	3.85%	8	3.17%	16	3.48%
VCRs	6	2.88%	3	1.195	9	1.96%
DVD Players	1	0.48%	2	0.79%	3	0.65%
Dead Animals	1	0.48%	4	1.59%	5	1.09%
C & D Debris	100	48.08%	139	55.16%	239	51.96%
Gypsum Wallboard	16	7.69%	24	9.52%	40	8.70%
Baby Cribs	4	1.92%	7	2.78%	11	2.39%
Wood Furniture	57	27.40%	79	31.35%	136	29.57%
Plastic Barrels/Bins	62	29.81%	109	43.25%	171	37.17%
Lawn Mowers	11	5.29%	10	3.97%	21	4.57%
Bicycles	12	5.77%	23	9.13%	35	7.61%
Fiberglass	2	0.96%	4	1.59%	6	1.30%
Car Parts/Body	13	6.25%	8	3.17%	21	4.57%
Car Parts/Engine	19	9.13%	28	11.11%	47	10.22%
Car Parts/Seats	5	2.40%	3	1.19%	8	1.74%
Car Parts/Other	14	6.73%	9	3.57%	23	5.00%
Metal Tanks	23	11.06%	33	13.10%	56	12.17%
Plastic Toys	32	15.38%	61	24.21%	93	20.22%
Life Preservers	1	0.48%	0	0.00%	1	0.22%
Garden Hose	27	12.98%	58	23.02%	85	18.48%
Office Furniture	20	9.62%	26	10.32%	46	10.00%
Styrofoam	11	5.29%	17	6.75%	28	6.09%
Child Car Seats	14	6.73%	19	7.54%	33	7.17%
BBQ Grills	7	3.37%	16	6.35%	23	5.00%
Oil Filters	4	1.92%	2	0.79%	6	1.30%
Mattresses	39	18.75%	60	23.81%	99	21.52%
Sofas	32	15.38%	76	30.16%	108	23.48%
Bed Frames	7	3.37%	9	3.57%	16	3.48%
Stuffed Toys	2	0.96%	4	1.59%	6	1.30%
Patio Furniture	25	12.02%	44	17.46%	69	15.00%
Suitcases	8	3.85%	13	5.16%	21	4.57%
Strollers	2	0.96%	9	3.57%	11	2.39%

The large item most frequently noted during the Spring Sort was loose wood. Loose wood was found in 69.71% of the 208 loads sampled. The second most frequently identified item was carpet, which was found in 62.5% of the 208 loads sampled. These were the only two items that were found in more than 50% of the loads sampled during the Spring Sort.

Other large items noted in at least 40% of the sample loads during the Spring Sort were small appliances and C & D debris. Computer equipment was found in at least 24% of the sampled loads, furniture in at least 27% of the sampled loads, and car parts in 9% of the sampled loads. Metal bins were found in 11% of the sampled loads while plastic barrels/bins were found in over 29% of the sampled loads.

The fewest large items noted during the Spring Sort were stereo speakers, lead-acid batteries, DVD players, dead animals, and life preservers. Of the 47 different large items listed in Table 18.12, only one item — stereo speakers — was not noted in any of the 208 sampled loads. Of the 47 items listed, 29 were noted in less than 10% of the loads and of these 29 items, 9 were noted in less than 1% of the sampled loads.

The large item most frequently seen during the Fall Sort was loose wood. Loose wood was found in 79.76% of the 252 loads sampled. The second most frequently identified item was carpet, which was found in 61.90% of the loads sampled. C & D debris was the third most frequently noted item and was found in 55.16% of the 252 sampled loads. These were the only three items that were found in more than 50% of the loads sampled during the Fall Sort.

Other large items noted in at least 40% of the loads were small appliances and plastic barrels/bins. Computer equipment was found in at least 12% of the sampled loads, furniture in at least 31% of the sampled loads, and car parts in 11% of the sampled loads. Metal bins were found in 13% of the sampled loads while patio furniture was found in more than 17% of the sampled loads.

The fewest items noted were life preservers, DVD players, and oil filters. Of the 47 different large items listed in Table 18.12, only one item — life preservers — was not noted in any of the 252 sampled loads. Of the 47 items listed, 27 were noted in less than 10% of the loads and of these 27 items, 4 were noted in less than 1% of the sampled loads.

The large item most frequently noted during the combined two-season waste sort was loose wood. Loose wood was found in 75.22% of the 460 loads sampled. The second most frequently identified large item was carpet, which was found in 62.17% of the loads sampled. C & D debris was the third most frequently noted item and was found in 51.96% of the 460 sampled loads. These were the only three items that were found in more than 50% of the loads sampled during the combined two-season waste sort.

Other large items noted in at least 40% of the loads were small appliances and plastic barrels/bins. Computer equipment was found in at least 17% of the sampled loads, furniture in at least 29% of the sampled loads, and car parts in 10% of the sampled loads. Metal bins were found in 12% of the sampled loads while plastic barrels/bins were found in more than 37% of the sampled loads.

The most significant item noted was carpet. This item was found in 62.17% of the 460 sampled loads. It was found in significant amounts in a number of these loads. Carpet does not tend to compact well, it is heavy, and easily absorbs moisture. These characteristics can cause difficulties in both collection and disposal.

The loose wood and C & D debris were also prominent items found in many of the loads. These items can also be very bulky and difficult to compact. If the wood is splintered, it can absorb moisture as can certain types of C & D debris. As with carpet, these items can adversely impact both collection and disposal.

Although the carpet, loose wood, and C & D debris items were found in a significant portion of the 460 sampled loads, items such as oil filters, lead-acid batteries, and dead animals were not. Also, items such as scrap tires, large appliances, lawn mowers, car parts, and computer parts were not found in a majority of the 460 sample loads. However, these items were identified in almost 20% of the sampled loads, and as a consequence the presence of these items should be further evaluated.

Ohio Statewide Profile Compared to National Profile

The results of this waste characterization study were compared to the U.S. Environmental Protection Agency (USEPA) figures for the year 2000 (*Municipal Solid Waste in the United States: 2000 Fact and Figures*, Office of Solid Waste and Emergency Response, EPA520-R-02-001, June 2002, <http://www.epa.gov>). Given that the focus of the waste sorts conducted as a part of this study were restricted to commercial and residential loads and that these loads were sorted based on a limited number of categories, only those portions of the USEPA data that directly relate to the results of this study were compared.

Table 18.13 presents the USEPA weights and percentages for the major component categories used throughout this study. It is important to note that the percentages presented in Table 18.13 were calculated based only on the weights of these categories. This will vary from the USEPA percentages presented in the referenced report as those percentages are based on the USEPA's entire waste stream.

Table 18.13 also presents the weights and percentages for the waste sort conducted throughout Ohio. Again, these percentages vary from the percentages presented for the combined two-season waste sort conducted in Ohio. Certain categories in the Ohio data are not comparable to the information available from the USEPA.

TABLE 18.13
MAJOR COMPONENT COMPARISON
OHIO vs. USEPA

Material Category	Ohio	USEPA	Difference
Paper	41.87%	37.82%	4.05%
Plastic	15.73%	14.07%	1.66%
Metal	3.89%	1.89%	2.00%
Yard Waste	9.17%	9.89%	-0.72%
Textiles	5.73%	4.60%	1.13%
Diapers	3.70%	2.76%	0.94%
Food	15.17%	20.84%	-5.67%
Glass	4.74%	8.13%	-3.39%

Based on the information presented in Table 18.13, it is apparent that there are variances in all eight of the categories listed. The most significant differences occurred in the paper, metals, food, and glass categories. The only categories where the difference was less than 1% occurred in the yard waste and diapers categories.

In order to more accurately assess and compare the data gathered during the waste sorts conducted in Ohio, the 11 selected solid waste management districts were segregated into small, medium, and large sized districts. Table 18.14 provides a listing the 11 districts and how they were classified. Table 18.15 provides a comparison of the USEPA data to the small, medium, and large sized districts.

TABLE 18.14
DISTRICT CLASSIFICATION

Small Districts	Medium Districts	Large Districts
Ashtabula County SWMD	Brown County Solid Waste Authority	Hamilton County SWMD
Athens-Hocking Joint SWMD	Defiance-Fulton-Paulding-Williams Joint SWMD	Montgomery County SWMD
Logan County SWMD	Lucas County SWMD	Solid Waste Authority of Central Ohio
Ottawa-Sandusky-Seneca Joint SWMD	Richland County Regional Solid Waste Management Authority	

TABLE 18.15
MAJOR COMPONENT COMPARISON
SMALL, MEDIUM, AND LARGE DISTRICTS vs. USEPA

SMALL DISTRICTS			
Material Category	**Ohio**	**USEPA**	**Difference**
Paper	40.03	37.82	2.21%
Plastic	16.56	14.07	2.49%
Metal	4.26	1.89	2.37%
Yard Waste	8.13	9.89	-1.76%
Textiles	6.02	4.60	1.42%
Diapers	3.32	2.76	0.56%
Food	16.27	20.84	-4.57%
Glass	5.40	8.13	-2.73%
MEDIUM DISTRICTS			
Material Category	**Ohio**	**USEPA**	**Difference**
Paper	40.50	37.82	2.68%
Plastic	16.04	14.07	1.97%
Metal	4.22	1.89	2.33%
Yard Waste	9.97	9.89	0.08%
Textiles	5.87	4.60	1.27%
Diapers	4.08	2.76	1.32%
Food	15.12	20.84	-5.72%
Glass	4.20	8.13	-3.93%
LARGE DISTRICTS			
Material Category	**Ohio**	**USEPA**	**Difference**
Paper	43.53	37.82	5.71%
Plastic	15.18	14.07	1.11%
Metal	3.52	1.89	1.63%
Yard Waste	9.13	9.89	-0.76%
Textiles	5.51	4.60	0.91%
Diapers	3.64	2.76	0.88%
Food	14.72	20.84	-6.12%
Glass	4.78	8.13	-3.35%

When the Ohio data is segregated into the various sized districts, the differences are also significant. The difference between the USEPA percentages and each of the three different sized districts is even more distinct than the statewide percentages. For example, the variance in the paper category increases from the small districts to the large districts. The small districts have a greater percentage of paper by 2.21% and for the large districts, the difference is almost 6%. The variance in the plastics category increases from the large districts to the small districts.

The greatest differences across all categories occur in the small districts classification. In every category, except diapers, the difference between the percentages for the small districts and the USEPA percentages is greater than 1%, and for the majority of the categories it is well over 2%.

The medium districts and large districts each have fewer categories with differences over 2%; however, those differences that are greater than 2% are significantly greater. The glass, food, and paper categories are all over 2% and, except for the paper category in the medium sized districts, most of these differences are well over 3%.

These differences indicate a significant disconnect between USEPA percentages and the percentages generated in this study for Ohio. The differences reflect both the unique characteristics of Ohio as well as the potential inflexibility in the USEPA's approach to determining the character or composition of the municipal waste stream.

The difference among the three different sized district classifications also reflects the unique aspects of each of these site types. The higher percentage of plastics and metals in the small districts, the higher percentage of yard waste and diapers in the medium sized districts, and the large percentage of paper in the large sized districts all identify potential targets for more aggressive waste reduction. These percentages also reflect the nature of each of the different sized district types and how this aspect of each site affects the waste stream.

Statistical Analysis

A total of 460 samples were gathered during the waste characterization study conducted in May and June 2003 (Spring Sort) and September and October 2003 (Fall Sort). These samples were gathered utilizing the procedure outlined in Section 5 of this report. The waste sorts were conducted at 14 different transfer station and landfill facilities in 11 selected solid waste management districts located throughout Ohio. Nine of the facilities were landfills and five facilities were transfer stations. One landfill accepted almost exclusively residential and apartment solid waste and one landfill accepted predominantly commercial and apartment solid waste. The 11 solid waste management districts were selected based on size, location, and willingness to participate in the waste characterization study. Facility access and potential costs to the district were also factored into the selection process.

The waste sort was performed exactly the same at each facility. The sort procedure and waste-material categories were determined prior to the commencement of the first waste sort. Loads for sampling and the samples were randomly selected. These processes were maintained throughout the entire study.

There were certain constraints that impacted the ability to select samples. The number of sampling bins and the amount of time allowed to sort at each facility limited the number of samples that could be gathered during any given day. When and how the collection vehicles arrived at each facility also impacted the sample gathering process. At some facilities, there was a relatively steady stream of vehicles. At other sites, there were rushes of vehicles followed by long lulls. Another aspect that impacted the waste sort efforts was the weather. At some facilities, weather conditions adversely impacted the sorting process and necessitated that the waste sort be halted. In addition to the other impacts, the one overriding key concern was safety. The facility operators dictated safety requirements and also determined if the work area was safe for sampling collection vehicles or for conducting the sorting activities.

Once a sample was gathered, it was brought to the sort area for categorization. In this area, each sample was sorted into several different material categories. Once the sample was sorted into these categories, it was weighed and the weight of each category was recorded. From this information, a weight for each category was established for each sample. For example, HDPE #2 is one material category. For each of the 460 samples there is a corresponding weight for the amount of HDPE #2 found in the sample.

The weights for each material category were then utilized to determine the percentage each category comprised within each sample. Then, the numbers for each sample were combined to determine what percentage of the solid waste generated at each site comprised each category.

The following table presents a list of the different types of loads sampled during this waste characterization study. Of the 460 samples, 47% contained pure residential waste, 13% contained pure commercial waste, and 3% contained pure apartment waste. The remaining 37% of the samples contained a mixture of waste types.

TABLE 18.16
TYPES OF WASTE IN SAMPLED LOADS

	Spring Sort May/June 2003	**Fall Sort** September/October 2003	**District**
Residential	94	121	215
Residential + Commercial	23	23	46
Residential + Apartments	7	9	16
Residential + Commercial + Apartments	12	10	22
Commercial + Apartments	30	61	91
Commercial	34	24	58
Apartments	8	4	12
TOTAL NUMBER OF LOADS SAMPLED	208	252	460

Based on the results of the analysis of pure commercial loads (presented previously in this section), there is a significant difference between commercial waste and the other types of waste collected. This differential will likely result in the potential skewing of the data collected as a result of the sample sorting process. To determine the impact of the combination of the various wastes, three components of the waste stream were evaluated. These components — paper fibers, plastics, and metals — comprise approximately 60% of the total weight of the samples. Because of the size of the database and the number of categories, the three components that comprise over 60% of the waste stream could be analyzed as a representative sample of the entire database. The weight of each of these three components for each of the 460 samples was graphed to identify its dispersion. These graphs are presented on the following pages.

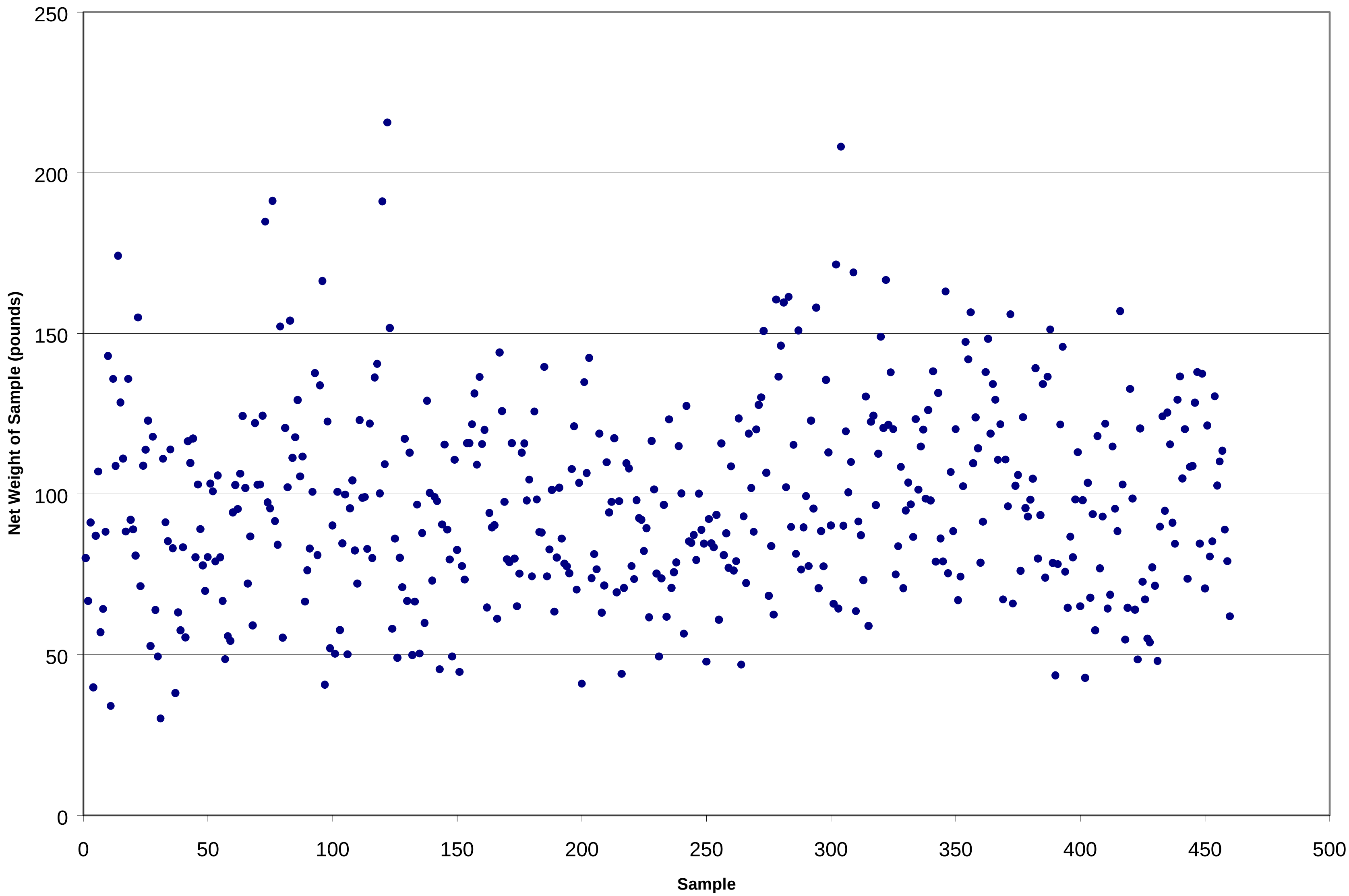


CHART 18.1
DISTRIBUTION OF THE PAPER FIBERS COMPONENT FOR ALL SAMPLES

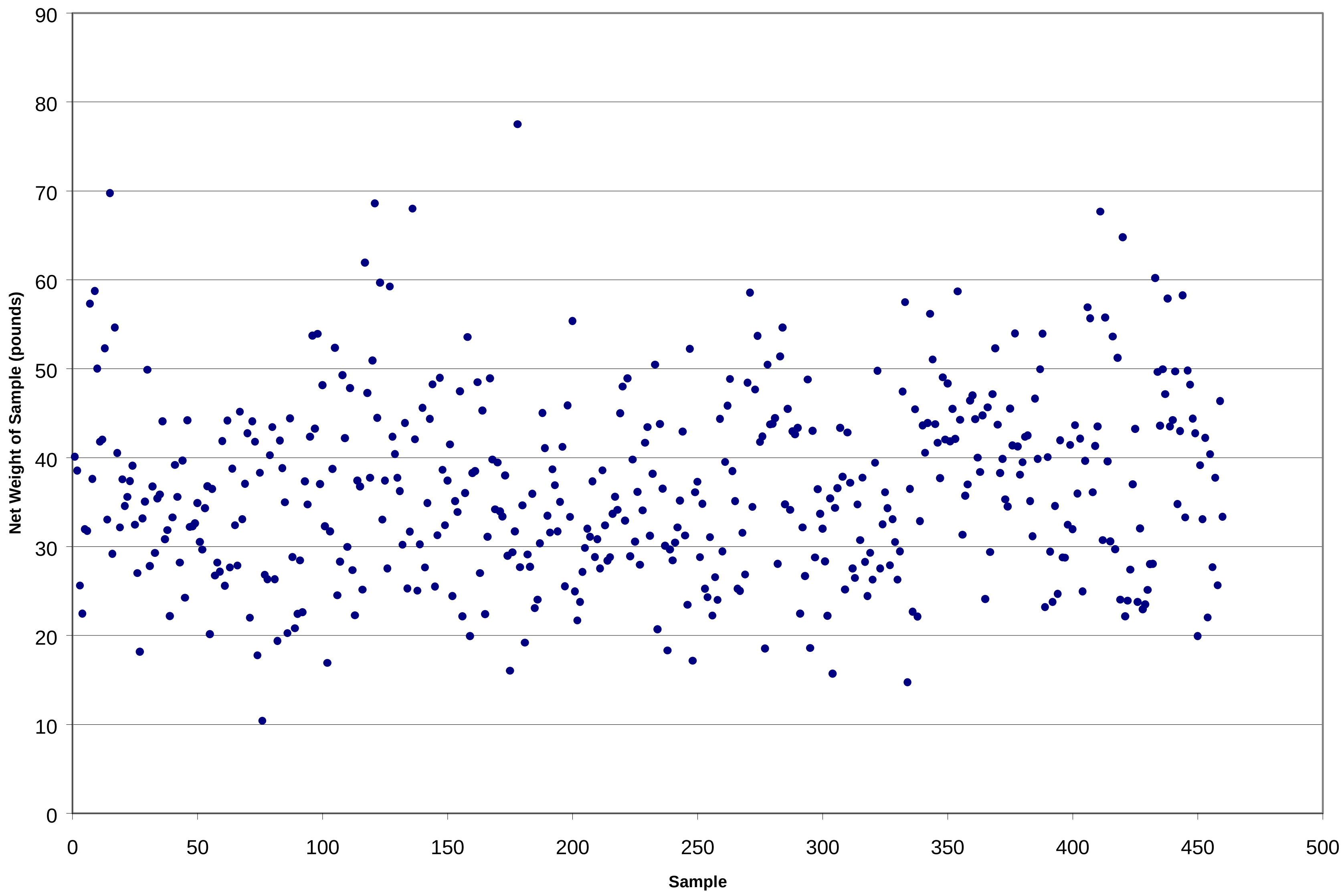


CHART 18.2
DISTRIBUTION OF THE PLASTICS COMPONENT FOR ALL SAMPLES

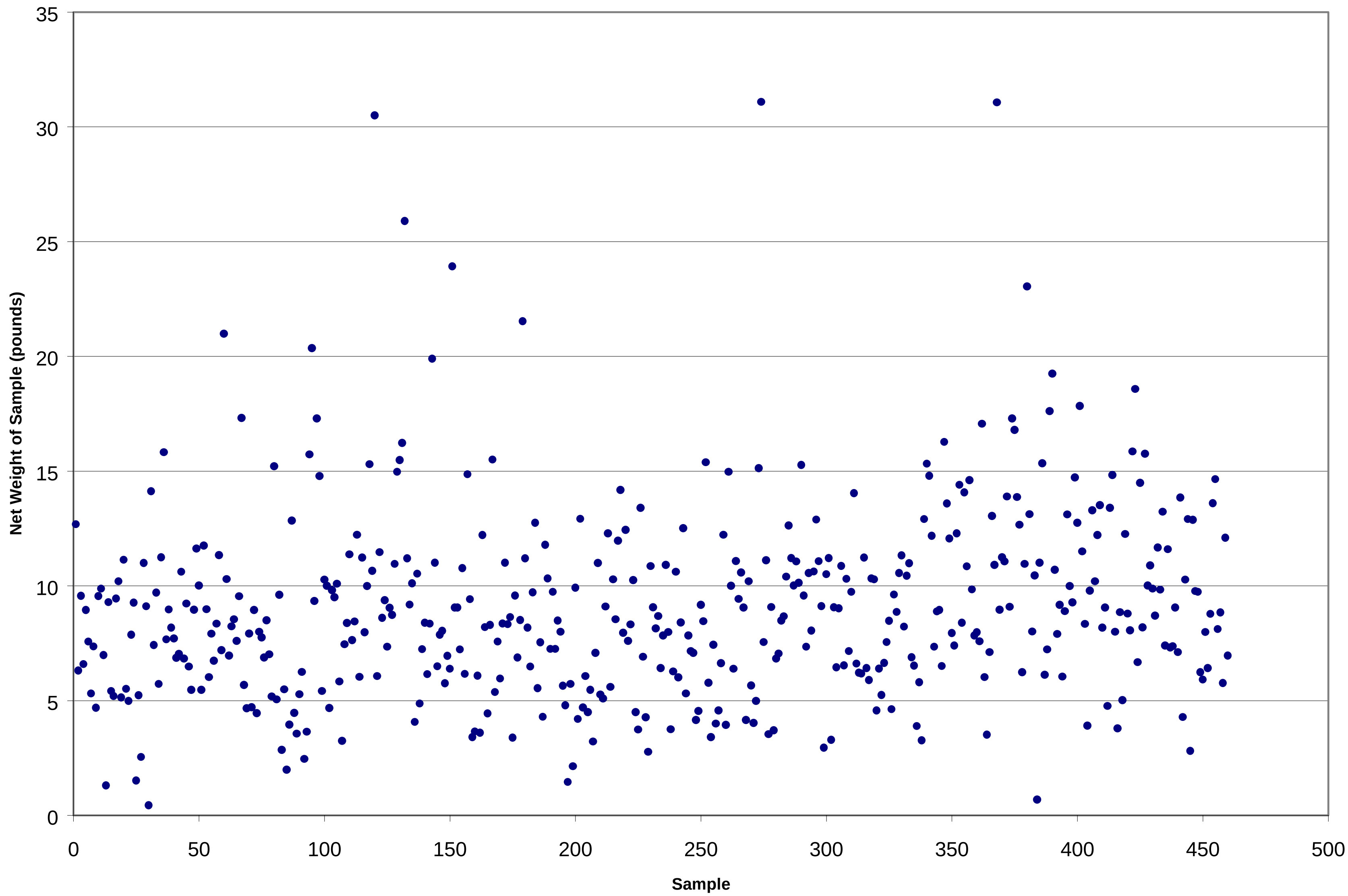


CHART 18.3
DISTRIBUTION OF THE METALS COMPONENT FOR ALL SAMPLES

The smallest weight recorded in the paper fibers category for a sample is 30.12 pounds and the largest weight recorded is 215.65 pounds. This component's average weight for the samples is 97.50 pounds and the standard deviation is 29.92. In reviewing the dispersion graph for paper, it appears that the greatest dispersion of sample weights occurs in the upper portion of the database. This portion of the graph appears to have a greater number of likely outliers.

The smallest weight recorded in the plastics category for a sample is 10.39 pounds and the largest weight recorded is 77.49 pounds. This component's average weight for the samples is 36.59 pounds and the standard deviation is 10.29. In reviewing the dispersion graph for plastics, it appears that the greatest dispersion of sample weights again occurs in the upper portion of the database. This portion of the graph appears to have a greater number of likely outliers. However, unlike paper, there also appears to be a number of outliers on the lower portion of the graph.

The smallest weight recorded in the metals category for a sample is 0.44 pounds and the largest weight recorded is 31.08 pounds. This component's average weight for the samples is 9.06 pounds and the standard deviation is 4.18. In reviewing the dispersion graph for metals, it appears that the greatest dispersion of sample weights occurs in the upper portion of the database. This portion of the graph appears to have a greater number of likely outliers. The lower portion of the graph contains a few outliers, but the majority of the samples trend toward the lower portion of the graph.

Confidence Level

To determine the 90% confidence level for the three components — paper fibers, plastics, and metals — the following equations were utilized:

$$\text{Upper Limit} = x + 1.64 * SD$$

$$\text{Lower Limit} = x - 1.64 * SD$$

where,

x = average and SD = standard deviation

This equation is utilized because it provides an accurate depiction of the confidence level required for the size of the database. The database would not be considered symmetrical, all three components trend to the high end of the data and the data does have one mode. The following table presents the results of the calculation of the upper limit and lower limit.

TABLE 18.17
CALCULATED UPPER LIMITS AND LOWER LIMITS

Component	x	SD	Upper Limit	Lower Limit
Paper Fibers	97.50	29.92	146.57	48.43
Plastics	36.59	10.29	53.47	19.71
Metal	9.06	4.18	15.92	2.20

To further represent the 90% confidence level, the following three graphs were generated. These graphs present the upper and lower limits of the 90% confidence as well as indicate the outliers both above and below the limits. All three graphs indicate the prevalence for more outliers above than below the limits. Within the 90% confidence limits, the data appears to be relatively evenly distributed with no bias toward any certain portion of the area.

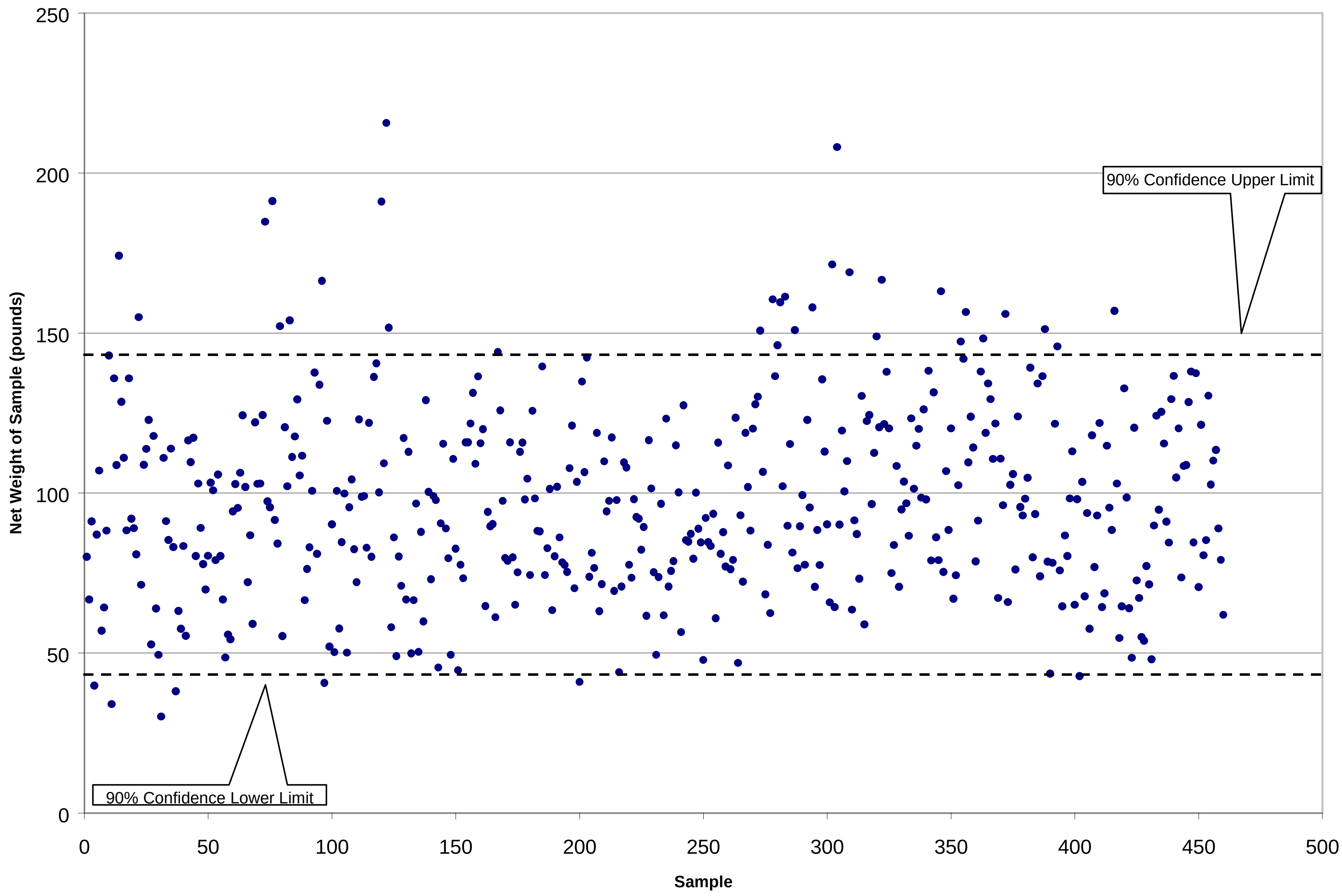


CHART 18.4
90% CONFIDENCE LEVEL OF THE PAPER FIBERS COMPONENT FOR ALL SAMPLES

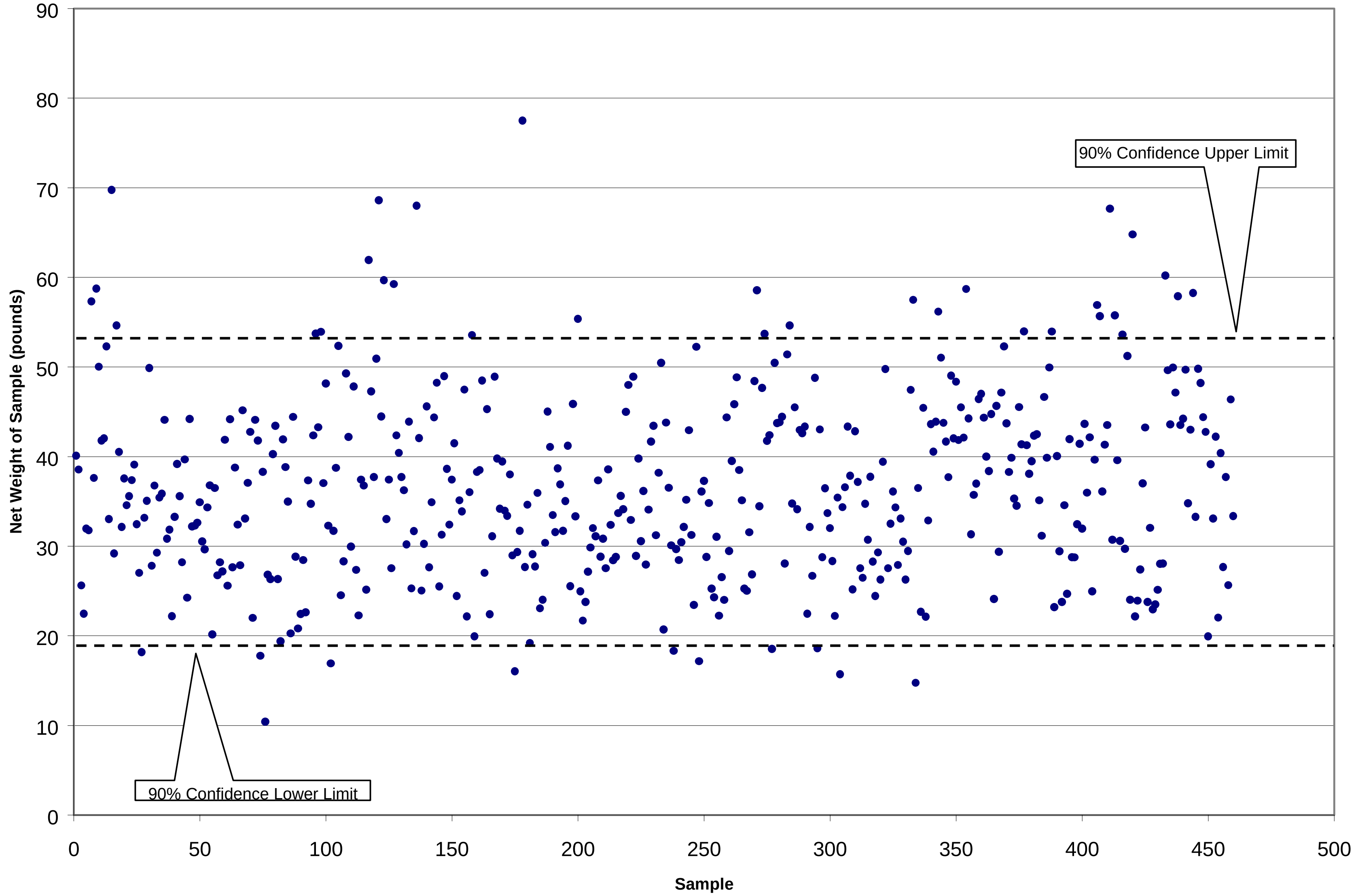


CHART 18.5
90% CONFIDENCE LEVEL OF THE PLASTICS COMPONENT FOR ALL SAMPLES

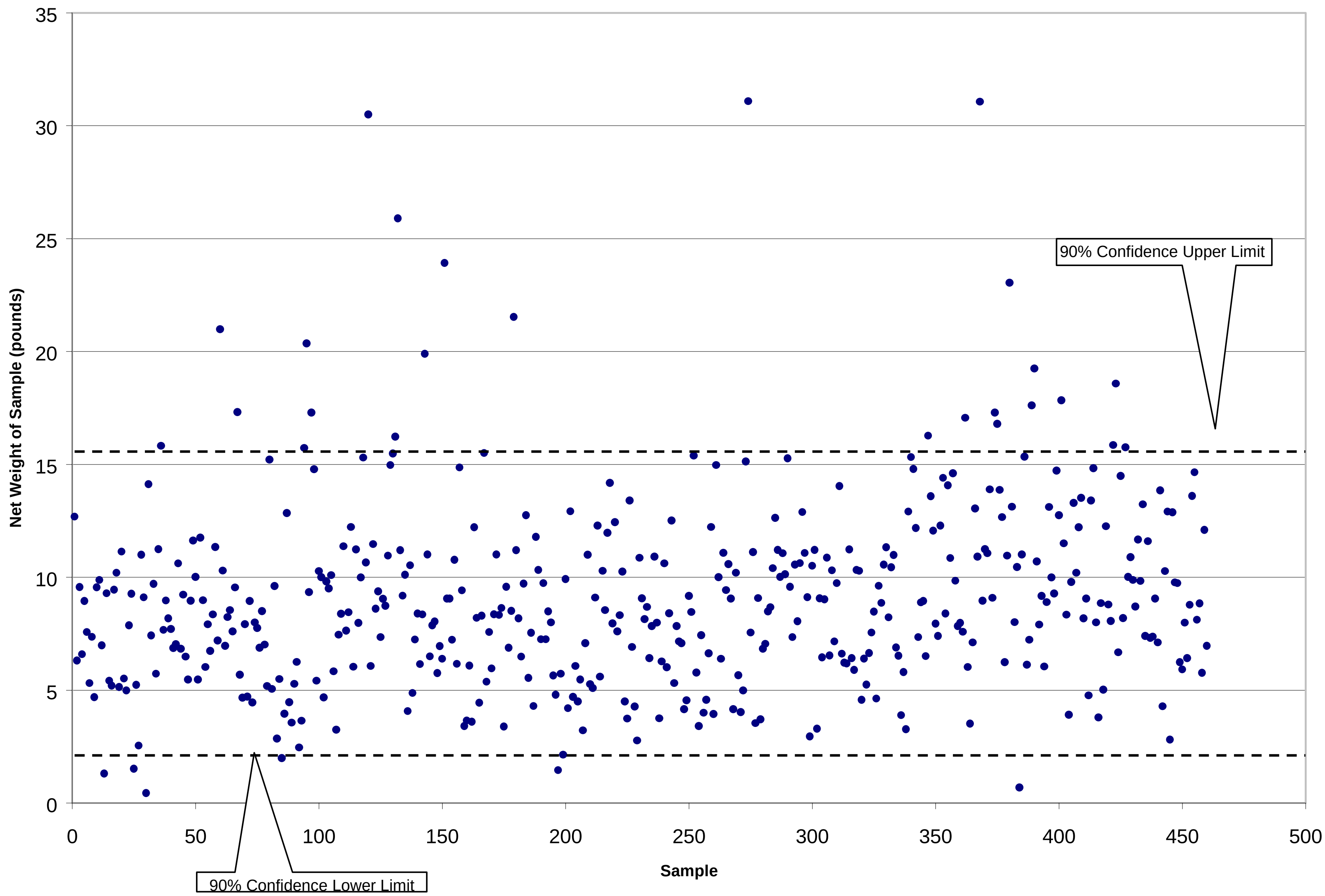


CHART 18.6
90% CONFIDENCE LEVEL OF THE METALS COMPONENT FOR ALL SAMPLES

In order to address the issue of a greater number of outliers above the confidence area than below the confidence area, the database was reset in ascending order. Once this was completed, the limits for the 90% confidence level were readjusted by adding one-half of a standard deviation to both the upper and lower limit. Once the new limits were determined, all data points above and below the new limits were deleted from the database. For the paper fibers component, this reduced the data set by 12; for the plastics component, this reduced the database by 13; and for the metals component, this reduced the database by 12.

The 12 highest data points for the plastics and metals components were deleted. The 11 highest data points for the paper fibers component were deleted. Only the lowest data point for the paper fibers and plastics components was deleted. No lower data points were deleted for the metals component.

Once the data points were deleted, the average and standard deviation for the new databases were calculated. The following table presents both the original database and the new database averages and standard deviations for each of the three components. Following this table, graphs presenting the 90% confidence area based on the adjusted databases are provided.

TABLE 18.18
CALCULATED UPPER LIMITS AND LOWER LIMITS FOR ADJUSTED DATABASES

Component	Original Average	Adjusted Average	Difference	Original Standard Deviation	Adjusted Standard Deviation	Difference
Paper Fibers	97.50	95.58	1.92	29.92	26.89	3.03
Plastic	36.59	35.90	0.69	10.29	9.23	1.06
Metal	9.06	8.66	0.40	4.18	3.37	0.81

The difference between the original and adjusted average for the metals component is less than 5% and for paper fibers and plastics components it is less than 2%. The difference between the original and adjusted standard deviation is less than 11% for the paper fibers and plastic components and less than 20% for the metals component.

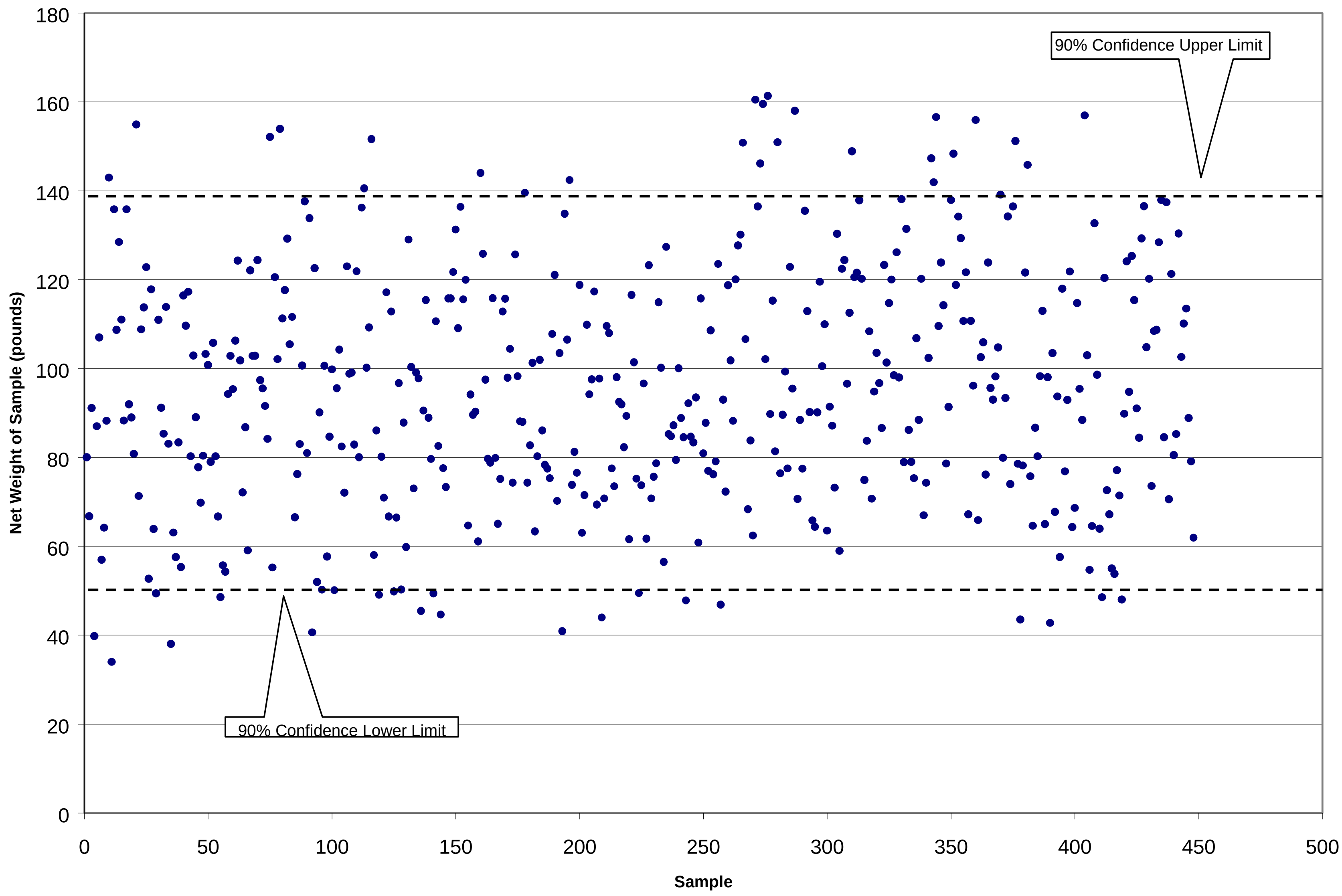


CHART 18.7
ADJUSTED 90% CONFIDENCE LEVEL OF THE PAPER FIBERS COMPONENT FOR ALL SAMPLES

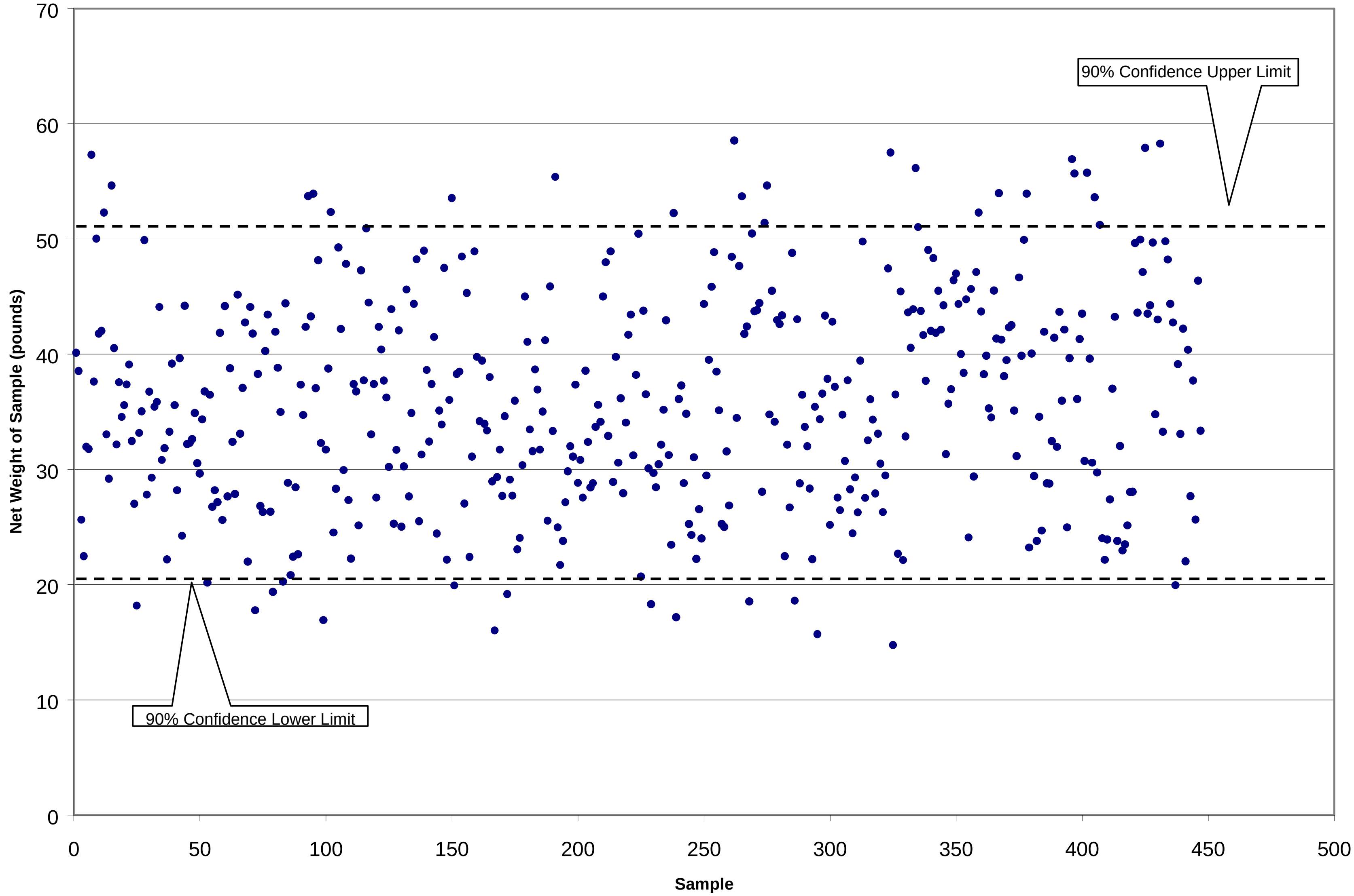


CHART 18.8
ADJUSTED 90% CONFIDENCE LEVEL OF THE PLASTICS COMPONENT FOR ALL SAMPLES

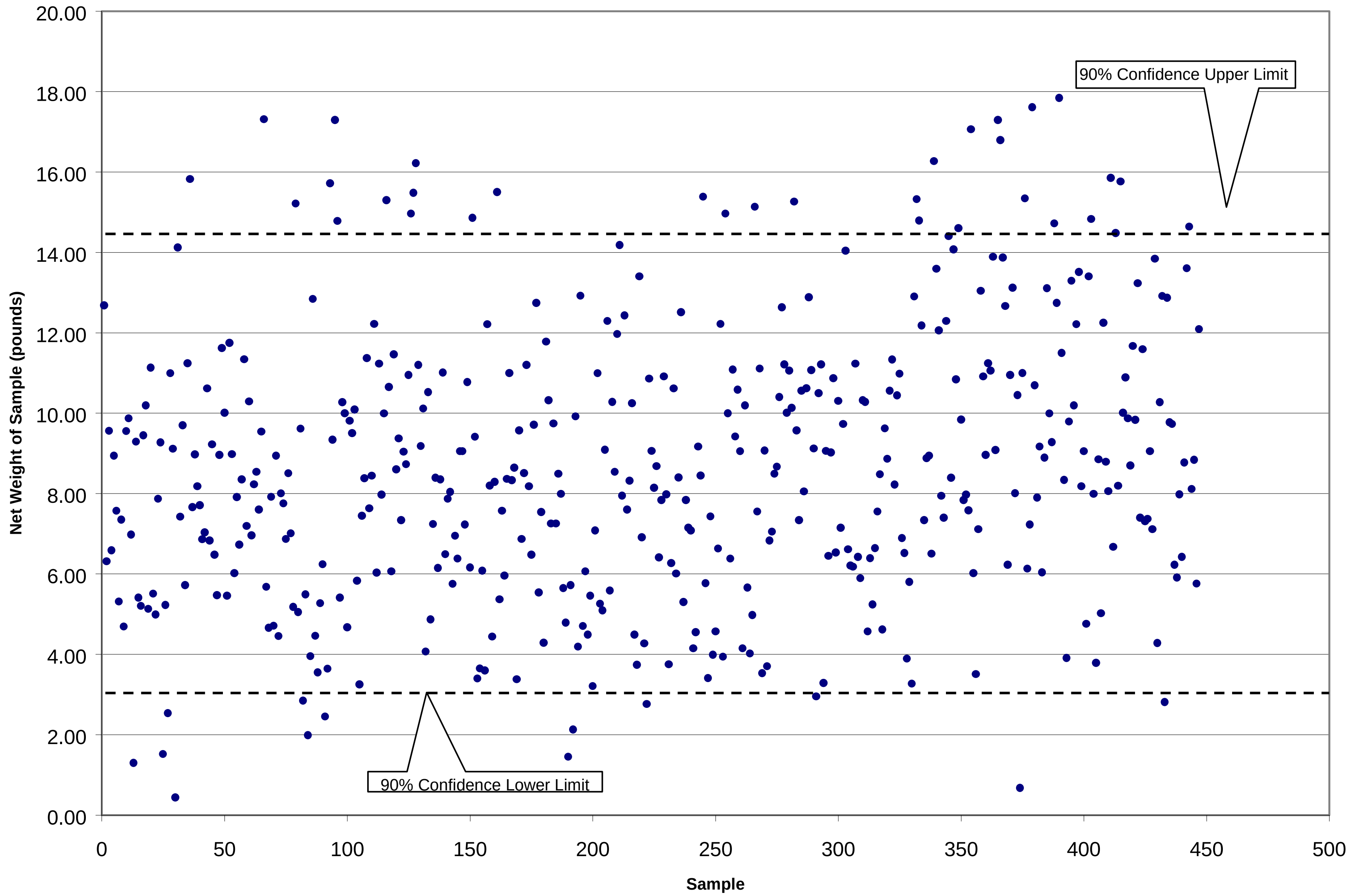


CHART 18.9
ADJUSTED 90% CONFIDENCE LEVEL OF THE METALS COMPONENT FOR ALL SAMPLES

The graphs of the adjusted databases indicate a more symmetrical graph for the paper fibers and plastics components while the metals component is still skewed to the upper side of the limits. Although the adjusted databases somewhat address the outliers and provide a more symmetrical graph for both the paper fibers and plastics components, given the limited modifications to the averages and the standard deviations, it is not enough of an improvement to warrant any adjustments to the database.

Although further refinement and verification of the 90% confidence level could be obtained with a smaller database, the issues regarding types of waste and other constraints would make the selection of any smaller database from the given database suspect. If further statistical analysis is considered, it is recommended that this analysis be focused on each type of waste (residential and commercial) and the samples that best reflect each type of waste.

Application

For this waste characterization study, 11 solid waste management districts were selected for participation. These districts are located in various portions of the state and each reflects different aspects with respect to solid waste generation and management. Because of the number of districts where the waste characterization study was performed and the uniqueness of each district, it is possible to develop a correlation between these districts and the remaining districts within the state. Further, given the number of individual counties that participated in this study — 8 of the 11 participating districts are single county districts — it is also possible to correlate these counties to other counties within the state.

There are a number of methods that could be utilized to compare districts and counties. The size of the county or district is one comparison example. Others include geographic location, industrial base, rural or urban designation, or demographics comparison. Each of these comparisons could potentially be utilized and each could be relatively easy to quantify or verify. In turn, a number of these comparisons have significant limits. For example, geographic comparisons where counties in the same region of the state would be considered similar ignore a number of key factors including the urban or rural proportions of each county or the industrial base of each county. Another example is assuming counties or districts are similar based on their population size or land area. Again, a number of other aspects for each district or county are lost in this comparison.

The most broad based comparison tool is demographics. Utilizing a number of demographic categories, a comparison can be made between counties or districts that identifies a larger cross section of characteristics. This tool can refine the comparisons so that a more realistic match of counties or districts can be accomplished.

For the districts and counties within Ohio, ten demographic categories have been identified for comparison. These categories are:

1. Population
2. Number of Households
3. Persons per Household
4. Median Age
5. Median Household Money Income
6. High School Graduates
7. Bachelor's Degree or Higher
8. Population Below Poverty Level
9. Population Density
10. Per Capita Income

In order to conduct a comparison between the 11 solid waste management districts that participated in this waste characterization study and the remaining districts and counties in the state, a comparison base must be established. This comparison base is established by identifying the characteristics of each of the 11 participating solid waste management districts utilizing the 10 demographic categories listed previously. From this data, the specific characteristics of each of the 11 participating solid waste management districts will be established and then these characteristics can be compared to the same specific characteristics in the other districts and counties in the state.

For ease of use, a workbook will be developed which will allow any county or solid waste management district in the state to perform this comparison. The workbook will provide guidance in how to perform the comparison as well as information on each of the 11 participating solid waste management districts such that when the comparison is complete, information on the waste characterization of the comparable district is available.