Wheelabrator North Andover, Inc.
Waste Characterization Study Report

Prepared for

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Executive Summary

The Massachusetts Department of Environmental Protection (MassDEP) regulations at 310 CMR 19.300 et seq. (Class II Recycling Program) establish requirements in order for a Waste-to-Energy (WTE) Facility to qualify to be eligible to sell renewable energy credits (RECs), under the Department of Energy Resources Renewable Energy Portfolio Standards at 225 CMR 15.00. Among the requirements within the Class II Recycling Program is to conduct a Waste Characterization Study (WCS) for each Facility during the calendar year 2010 and to repeat the WCS every three years. The WCS is to be conducted in accordance with the MassDEP 2016 Class II Recycling Program Waste Characterization Scope and Methodology Guidance (MassDEP WCS Guidance), and the WCS Protocol prepared by Brown and Caldwell (BC), subsequently approved by MassDEP on October 13, 2015.

As stated in the MassDEP WCS Guidance, the goals of the WCS include the following:

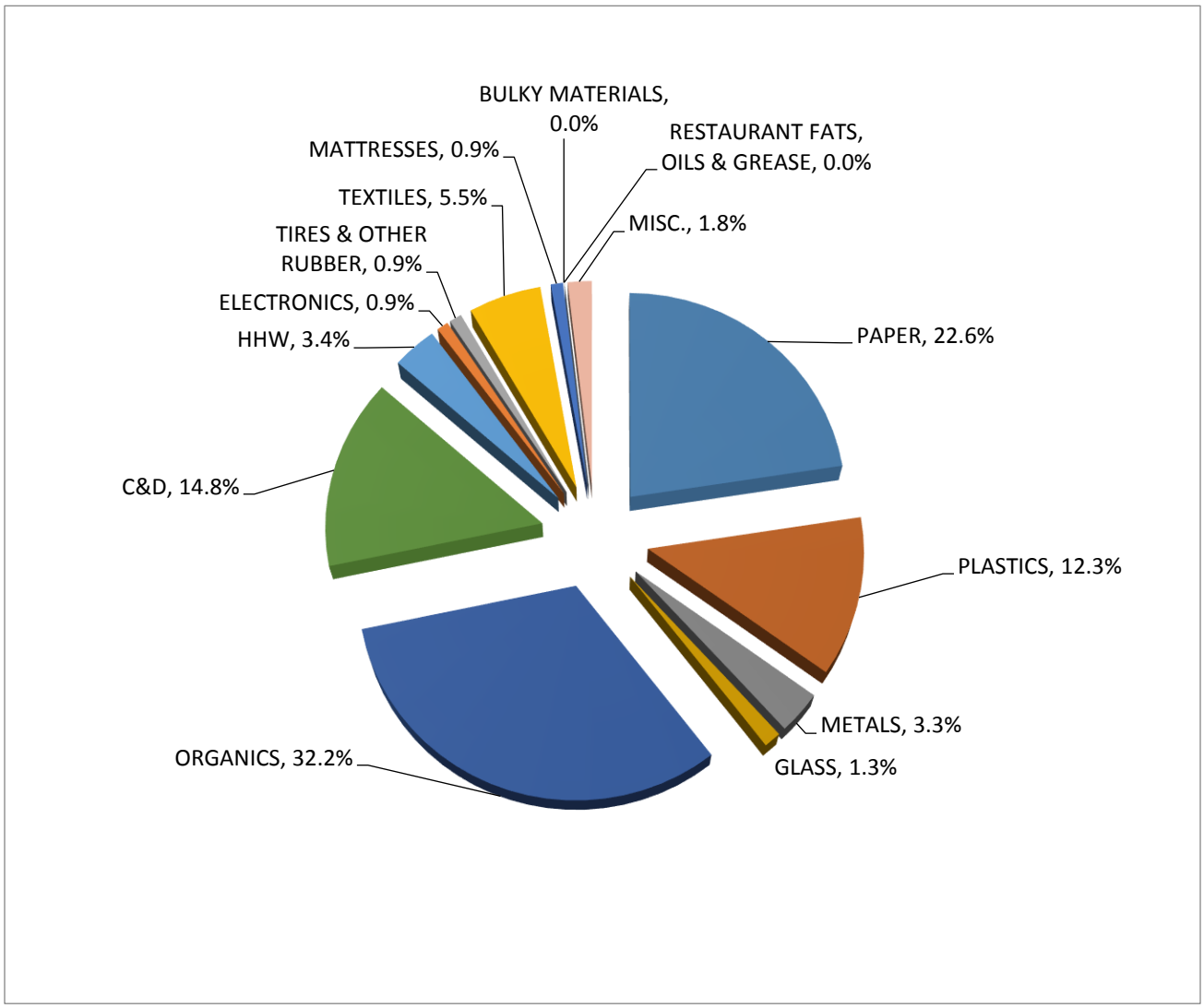
1. Characterize the solid waste disposal stream at the Facility;
2. Provide statewide waste characterization information;
3. Allow MassDEP to utilize the information to measure the success of waste reduction efforts;
4. Identify specific materials for increased diversion; and
5. Help guide MassDEP policy and program initiatives in solid waste management.

BC was retained by Wheelabrator North Andover, Inc. in 2010, 2013 and 2016 to develop and implement the WCS at the North Andover WTE Facility in North Andover, MA (the Facility). The WCS employs manual sorting of representative samples of incoming waste representing the various sectors of the solid waste stream received at the Facility.

The WCS was designed in accordance with the methodologies described in ASTM D5321-92(2008), Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste, as required in Section I (Scope), of the MassDEP WCS Guidance. The number of samples needed to achieve a 90% confidence level with a 10% precision was found to be 52. The 52 samples were evenly distributed over two study period seasons in calendar year 2016, as required by MassDEP (26 minimum samples per season). The sample allocation for the WCS was based on the standard deviation of the cardboard waste component, and selected proportionately between the two waste sectors of Residential and Industrial/Commercial/ Institutional (ICI) wastes using Facility scale house data, which resulted in a distribution of 67% Residential and 33% ICI. The first season of the 2016 WCS was conducted between February 11, 2016 and February 12, 2016, and the second season was conducted between December 5, 2016 and December 7, 2016.

Figure ES-1 provides a general overview of the waste composition at the Facility during the 2016 WCS. There are nine major waste categories and 62 sub-categories defined in MassDEP WCS Guidance. During the study period, the four largest components of waste composition at the Facility were organic material at 32.2%, paper at 22.6%, construction and demolition materials at 14.8%, and plastics at 12.3% of the waste stream. Further detail into the breakdown of waste composition for the Facility is provided in Section 3 of this report.

Figure ES-1
2016 Overall Waste Composition
Wheelabrator North Andover, Inc.



Note: Textiles, Tires and Other Rubber, Mattresses, Bulky Materials, Restaurant Fats Oil & Grease, and Misc. are sub-categories of the main category "Other".

In addition, Table ES-1 presents a comparative summary of the results of the 2010, 2013 and 2016 WCS at the Facility. The categorization is based on the nine major waste categories provided in the MassDEP WCS Guidance, as well as separating the waste into Residential and ICI sectors. Separation of the data into Residential and ICI sectors is based on Facility scalehouse data on the type of haul vehicle for the two week sampling period. This allocation into Residential and ICI sectors excluded transfer trailers, which were not included in the WCS.

Table ES-1 Summary of Waste Composition Wheelabrator North Andover, Inc. 2010, 2013 and 2016									
	2010			2013*			2016*		
WASTE CATEGORIES	Residential	ICI	Overall Waste Composition 77% Res:23% ICI	Residential	ICI	Overall Waste Composition 71% Res:29% ICI	Residential	ICI	Overall Waste Composition 67% Res:33% ICI
PAPER	29.7%	30.8%	29.9%	20.1%	29.6%	22.9%	19.7%	28.4%	22.6%
PLASTICS	12.6%	14.2%	13.0%	11.2%	14.3%	12.1%	10.7%	15.5%	12.3%
METALS	4.0%	3.8%	3.9%	3.5%	4.3%	3.7%	3.9%	2.1%	3.3%
GLASS	3.1%	3.3%	3.1%	1.7%	1.7%	1.7%	1.4%	1.0%	1.3%
ORGANIC MATERIAL	20.7%	16.2%	19.7%	32.3%	18.7%	28.4%	37.5%	21.7%	32.2%
CONSTRUCTION AND DEMOLITION	13.6%	17.5%	14.5%	17.2%	19.7%	18.0%	12.3%	19.7%	14.8%
HOUSEHOLD HAZARDOUS WASTE	6.2%	4.6%	5.9%	2.1%	2.8%	2.3%	4.2%	1.7%	3.4%
ELECTRONICS	1.6%	2.3%	1.8%	1.4%	1.6%	1.4%	1.1%	0.5%	0.9%
TIRES & OTHER RUBBER	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.5%	1.8%	0.9%
TEXTILES	2.4%	3.0%	2.6%	1.3%	0.3%	1.0%	5.9%	4.9%	5.5%
MATTRESSES	4.8%	2.4%	4.2%	6.9%	3.1%	5.8%	0.6%	1.5%	0.9%
BULKY MATERIALS							0.0%	0.0%	0.0%
RESTAURANT FATS, OILS & GREASE	0.5%	1.3%	0.7%	0.5%	0.2%	0.5%	0.0%	0.0%	0.0%
OTHER MISCELLANEOUS	0.9%	0.6%	0.8%	1.1%	3.2%	1.7%	2.1%	1.2%	1.8%
TOTAL	100%	100%	100%	100%	100%	100%	100.0%	100.0%	100.0%

**Percent waste component reductions from 2010 WCS to 2013 WCS, and from 2013 WCS to 2016 WCS are highlighted in red*

Section 1

Introduction

1.1 Background

The Green Communities Act (Chapter 169 of the Acts of 2008) identifies a Waste-to-Energy (WTE) facility in commercial operation prior to December 31, 1997, using conventional municipal solid waste technology to generate electricity, as a Class II renewable energy generating source if it "operates or contracts for one or more recycling programs approved by the department of environmental protection." Massachusetts Department of Environmental Protection (MassDEP) regulations at 310 CMR 19.300 et seq. (Class II Recycling Program) establishes further requirements in order to qualify to be eligible to sell renewable energy credits (RECs) under the Department of Energy Resources Renewable Energy Portfolio Standards at 225 CMR 15.00. Among these requirements is to conduct a Waste Characterization Study (WCS) during the calendar year 2010, and every three years thereafter.

The objective of the Wheelabrator North Andover 2016 WCS is to attempt to characterize the solid waste stream brought to the Wheelabrator North Andover WTE facility for disposal. The WCS was conducted in accordance with the following documents and permit approvals.

- Permit Modification Approval – Final Decision, Class II Recycling Program, Transmittal No. X228987, dated September 25, 2009
- MassDEP 2016 Class II Recycling Program, Waste Characterization Scope and Methodology Guidance (MassDEP WCS Guidance)
- Wheelabrator North Andover, Inc., Waste Characterization Study Protocol, prepared by Brown and Caldwell, revised September 23, 2015
- 2016 Waste Characterization Study Protocol Approval, dated October 13, 2015

The MassDEP WCS Guidance establishes a protocol for the WCS that implements ASTM D 5231–92(2008) Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste.

1.2 Introduction

The Wheelabrator North Andover Inc. facility (the Facility) is located at 285 Holt Road, North Andover, MA. The Facility is designed to combust 1,500 tons per day of municipal solid waste (MSW), and consists of two mass-burn, municipal waste combustion units. The Facility currently serves 21 communities via contract, as presented in Table 1-1. Non-contract or "spot market" customers vary daily and comprise the remainder of the solid waste disposed at the Facility. A site locus map is included as Figure 1-1, and an aerial map is included as Figure 1-2.

The WCS protocol for the North Andover Facility 2016 WCS required the data collection to be conducted for the first season between January 15, 2016 and March 15, 2016, and for the second season between October 15, 2016 and December 15, 2016. The field work was conducted by Brown and Caldwell (BC) during February 11 – 12, 2016 and December 5 – 7, 2016. The WCS was performed in accordance with the Class II Recycling Program, MassDEP's WCS Guidance, the Facility Class II Recycling Permit issued by MassDEP on September 25, 2009, and the WCS Protocol prepared by Brown and Caldwell (BC) and approved by MassDEP on October 13, 2015.

Table 1-1 Wheelabrator North Andover, Inc. Municipal Contracts		
Acton	Hamilton	Newburyport
Amesbury	Ipswich	North Andover
Arlington	Lexington	Pepperell
Belmont	Lincoln	Waltham
Billerica	Lowell	Watertown
Boxborough	Manchester	Wenham
Carlisle	Methuen	Wilmington

The results of the North Andover 2016 WCS are presented in this report. These results include the following:

1. Final WCS Design: An account of the variation in the sampling period, number and categorical allocation of waste samples, vehicle types sampled, loads sampled, and final sort design.
   - Waste composition for each sample load for the first season is presented in Appendix B and for the second season is presented in Appendix C.
2. Overall Composition of Waste: A summary account of the overall composition of the waste stream.
   - Table ES-1 and Figure ES-1 provide a summary of the overall composition of the waste stream measured by the WCS for the Facility.
3. Composition by Sectors:
   - A summary account of the composition of the waste stream, grouped into Residential and ICI sectors, is presented in Section 3.4 of this report.
4. Composition by Haul Type: A summary account of the composition of the waste stream grouped by the following vehicle types:
   - Roll-off - open top
   - Roll-off - closed top
   - Roll-off - compactor
   - Rear loading packer
   - Front loading packer
   - Side loading packer

The results of the composition by vehicle haul type are presented in Section 3.5 of this report.

During the development of the WCS protocol and discussions with MassDEP regarding the WCS, it was decided that transfer trailers from municipal drop-off programs would not be sampled and not be included in the WCS. Therefore, this report excludes any data related to transfer trailers, as they were not sampled nor included in the WCS.

Section 2

Methodology

The methodology used for the WCS was based on the 2016 MassDEP WCS Guidance, which references the methodology and protocol described in ASTM D5321-92(2008), Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste. As previously described, sampling and data collection was implemented over the course of two sampling periods in 2016, to account for seasonal variation.

2.1 Allocation of Number of Samples by Haul Type

Statistical experimental design is effective in eliminating known sources of bias, guarding against unknown sources of bias, ensuring that the study provides precise information on the subject of interest, and providing an economical design through minimization of wasted effort. All of the MassDEP WCS Guidelines were considered during the design of the WCS field work and data interpretation, to ensure quality in the study plan. The number of samples sorted was determined based on statistical criteria specified by MassDEP and calculated according to the ASTM D-532-92(2008) method. The number of samples was determined as a function of the waste components to be sorted, and the desired precision as applied to each component. The calculation is presented in Appendix F. The MassDEP WCS Guidelines require a 90% confidence level and 10% precision.

Corrugated cardboard required the highest number of samples to meet 90% confidence level and 10% precision. Therefore, to satisfy these requirements, a minimum of 52 samples must be selected and sorted at the Facility over both seasonal events. The total required number was divided equally between both seasons, with 26 samples being conducted during the spring season event and 26 during the fall season event.

The MassDEP WCS Guidance defines the waste sectors of Residential, ICI, and Unacceptable waste as follows:

- Residential – vehicles in which 80% or more of the waste is from residential sources (single family or multi-family). Typically these vehicles will include residential drop-off containers (usually roll-offs) and rear-load packer trucks.
- ICI – vehicles in which 80% or more of the waste is from ICI sources. Typically these vehicles will include stationary compactor boxes, open top boxes and front-load packers.
- Unacceptable Loads – loads that contain less than 80% of either Residential or ICI waste, loads that are more than 50% construction and demolition material, and loads originating from out of state.

Site specific data was also used in developing the sampling plan for the Facility. This was accomplished by making the number of samples of each vehicle type proportional to the numbers of different vehicle types hauling waste to the Facility, based on Facility scalehouse data during a one-year period from July 1, 2014 to June 30, 2015.

MassDEP presents results of statewide data showing that 45% of the waste is in the Residential sector and 55% is in the ICI sector. Data from all three Wheelabrator facilities in Massachusetts indicates that the distribution of incoming waste types at these facilities is not the same as the statewide data. Each individual Facility's distribution varied and this is accounted for in the WCS. The distribution of waste tonnage for the Facility based on scale house records was 66.6% Residential and 33.4% ICI.

Table 2.1 presents the number of planned and actual samples by vehicle haul type for the Facility.

Table 2-1
Number and Allocation of Samples - Wheelabrator North Andover, Inc.

Haul Type	Tonnage Distribution, %	Planned Number of Samples based on Facility Tonnage Distribution	Actual Number of Samples
Roll-off - open top	2.0%	1	1
Roll-off - closed top	3.6%	2	2
Roll-off - compactor	7.0%	4	5
Rear loading packer	66.6%	34	18
Side loading packer	0%	0	15
Front loading packer	20.8%	11	11
Total	100 %	52	52

Note: The number of samples were determined proportional to the waste tonnage delivered by haul type

2.2 Sampling Procedure

In general terms, the sampling procedure consisted of load selection, the physical sorting of the sample, and the documentation of the data for each sample. These WCS components are discussed in the following sections, and as a whole constitute the sampling procedures for the collection of the data.

The waste categories used in the WCS were as specified in the MassDEP WCS Guidance, and consisted of nine categories and 62 sub-categories. These categories and sub-categories are described in detail in Appendix A. A sampling period of two to three days was used for each season, with the number of vehicles sampled per day proportional to the distribution of vehicle types incoming to the Facility during a one year period. In applying the tonnage distribution percentages to the required number of vehicles, it was determined that a minimum of 52 vehicles should be sampled for the WCS; 26 vehicles were sampled during the first season sampling event and 26 vehicles were sampled during the second season sampling event.

2.2.1 Load Selection

The types of haul vehicles sampled were based on the distribution of tonnage by vehicle type at the Facility. Individual vehicles for sampling were selected at random during each day of the sampling period, to provide a representative cross-section of the incoming waste stream. The selection of vehicles was conducted in accordance with ASTM test method D5231-92(2008), as required in the MassDEP WCS Guidance.

Once a vehicle was identified to be sampled, the driver was interviewed and the information provided was recorded on a Driver Questionnaire form. A copy of the Driver Questionnaire form is provided in Appendix D. The following information was recorded on the Driver Questionnaire form:

- Time and Date
- Facility Truck Identification Number
- Hauling company and Truck type
- Truck weight from scale ticket
- Waste type based on driver's route
- Other route information, including precipitation

Following the selection of the vehicle to be sampled and completion of the Driver Questionnaire form, the vehicle was directed to a segregated location on the tipping floor where the entire load was deposited. All handling and sorting of the discharged load was conducted on a clean surface of the tipping floor. Figure 1-3 is provided to show the general location of the sorting area used at the Facility during the WCS.

2.2.2 Sorting Procedures

Unprocessed solid waste is a heterogeneous mixture of materials. Therefore, care was taken during the sorting process in order to obtain representative samples for sorting. Once the vehicle deposited its waste load on the segregated area of the tipping floor, the Facility-operated front-end loader was used to cut the waste load approximately in half longitudinally in order to obtain a representative cross-section of the waste material. The mass of material was gauged visually to determine if it satisfied the desired weight of the sample (approximately 1,000 pounds). The waste was then mixed with the front-end loader and quartered into four equal piles. As required in ASTM D5231-92(2008), using a random method of selection to minimize or eliminate bias, one quarter of minimum 225 pounds was selected as the sorting sample. The sorting sample was then transferred to the designated coned-off protected sorting area for sorting into appropriate waste categories and sub-categories. Material of each sub-category was placed into one of 62 20-gallon plastic bins to be weighed and recorded.

After the waste was sorted, weighed, and the amounts recorded, materials that were able to be recycled were placed in the appropriate bin or roll-off container for recycling. Some of the material that was recycled included the following:

- Glass
- Metal
- Single polymer plastics
- Cardboard
- Recyclable Paper

If a large oversized item was discovered in the selected sample load, (e.g. furniture, large white good, etc.), a visual estimation of its weight and the full vehicle load weight were noted. The estimated weight of the item as a percentage of the load was calculated. If an oversize item composed a large weight percentage of the sorting sample, a notation was added on the field sheet, and the item was weighed and information documented on the field sheet.

2.2.3 Documentation of Sample Data

After sorting was completed, the sorted waste samples were weighed and the results recorded for each of the 62 sub-categories. Tare weights for the bins were determined between each sorting day. At the conclusion of the sorting period at the Facility, the data from the field sheets was entered into spreadsheets for analysis.

Documentation of each load sampled and the percentage of waste composed in each sample from the first sampling season is provided in Appendix B. Documentation of each load sampled and the percentage of waste composed in each sample from the second sampling season is provided in Appendix C.

Section 3

Results

3.1 Method of Data Analysis

The lower and upper confidence intervals indicate the likelihood that the population (the actual composition of the entire waste stream) falls close to the sample mean (the samples analyzed in the study). The lower and upper bound throughout this report have been calculated at 90 percent level of confidence. This means we can be 90 percent confident that the true fraction of this material in the overall population falls between the lower and upper bound shown. The inverse is also true; there is a 10 percent chance that the true mean falls outside the intervals. For example, if the mean composition of cardboard in front end loaders was 11.2 percent, we can be 90 percent confident that the actual fraction of cardboard in the waste stream falls between 9.3 percent and 13.1 percent.

The results of the 2016 WCS for both seasons at the Facility are included in this section. Analysis of the data consisted of calculating the mean waste composition, standard deviation, and confidence intervals using the composition of each sorted sample.

3.2 Overall Composition of Waste

This section describes the overall composition of waste determined during the WCS for the Facility. Figure 3-1 is a bar graph depicting the 62 sub-categories in the waste sampled during the study periods. As can be seen in Figure ES-1, four categories constitute approximately 82% of the waste stream incoming to the Facility during the WCS. Organic material constitutes the highest percentage of material at 32.2%, followed by paper at approximately 22.6%. C&D materials represented approximately 14.8% and plastics represented about 12.3% of the materials during the WCS.

Figure 3-1 OVERALL COMPOSITION OF WASTE - WHEELABRATOR NORTH ANDOVER, INC.

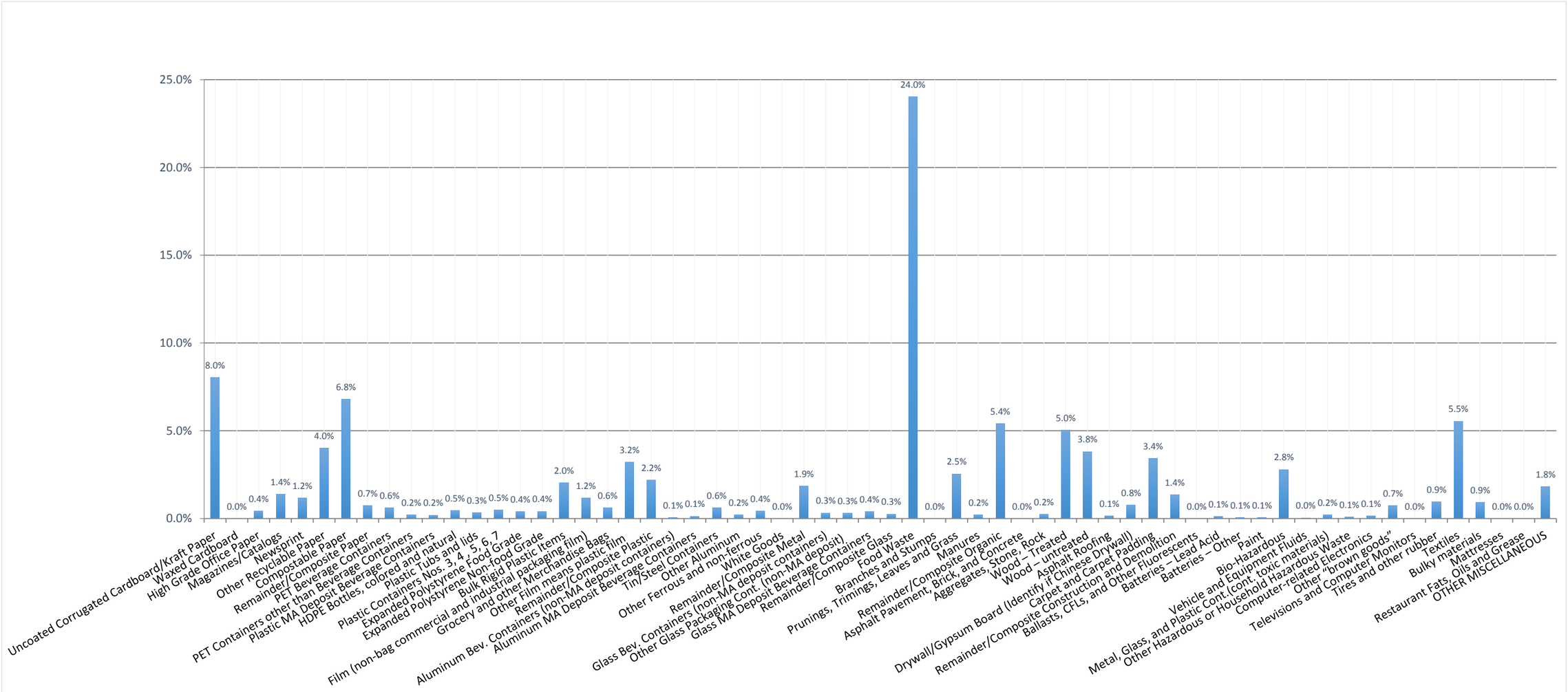


Table 3-1 below presents the data for all 62 waste sub-categories as described in MassDEP's WCS Guidance. The information is based on the data gathered from 52 samples during the 2016 WCS at the Facility.

Table 3-1 Overall Waste Composition at Wheelabrator North Andover, Inc.

	Categories	Residential 100%	ICI 100%	Overall WCS 66%(R):33% (ICI)
1.0	**PAPER**			22.6%
1.1	Uncoated Corrugated Cardboard/Kraft Paper	4.0%	16.1%	8.0%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.4%	0.6%	0.4%
1.4	Magazines/Catalogs	1.8%	0.5%	1.4%
1.5	Newsprint	1.2%	1.0%	1.2%
1.6	Other Recyclable Paper	4.4%	3.3%	4.0%
1.7	Compostable Paper	7.1%	6.2%	6.8%
1.8	Remainder/Composite Paper	0.7%	0.8%	0.7%
2.0	**PLASTICS**			12.3%
2.1	PET Beverage Containers	0.6%	0.7%	0.6%
2.2	PET Containers other than Beverage Containers	0.2%	0.1%	0.2%
2.3	Plastic MA Deposit Beverage Containers	0.2%	0.2%	0.2%
2.4	HDPE Bottles, colored and natural	0.5%	0.4%	0.5%
2.5	Plastic Tubs and lids	0.4%	0.3%	0.3%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.6%	0.4%	0.5%
2.7	Expanded Polystyrene Food Grade	0.4%	0.3%	0.4%
2.8	Expanded Polystyrene Non-food Grade	0.1%	1.1%	0.4%
2.9	Bulk Rigid Plastic Items	1.7%	2.7%	2.0%
2.10	Film (non-bag commercial and industrial packaging	0.3%	3.0%	1.2%
2.11	Grocery and other Merchandise Bags	0.7%	0.4%	0.6%
2.12	Other Film means plastic film	3.3%	3.0%	3.2%
2.13	Remainder/Composite Plastic	1.8%	2.9%	2.2%
3.0	**METALS**			3.3%
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.0%	0.1%	0.1%
3.2	Aluminum MA Deposit Beverage Containers	0.1%	0.1%	0.1%
3.3	Tin/Steel Containers	0.8%	0.3%	0.6%
3.4	Other Aluminum	0.2%	0.1%	0.2%
3.5	Other Ferrous and non-ferrous	0.6%	0.1%	0.4%
3.6	White Goods	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	2.1%	1.3%	1.9%
4.0	**GLASS**			1.3%
4.1	Glass Beverage Containers (non-MA deposit containers)	0.3%	0.3%	0.3%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.4%	0.0%	0.3%
4.3	Glass MA Deposit Beverage Containers	0.4%	0.5%	0.4%
4.4	Remainder/Composite Metal	0.3%	0.1%	0.3%
5.0	**ORGANIC MATERIAL**			32.2%
5.1	Food Waste	28.4%	15.3%	24.0%
5.2	Branches and Stumps	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	3.5%	0.6%	2.5%
5.4	Manures	0.3%	0.0%	0.2%
5.5	Remainder/Composite Organic	5.2%	5.8%	5.4%

Table 3-1 Overall Waste Composition at Wheelabrator North Andover, Inc. Continued				
Categories		Residential 100%	ICI 100%	Overall WCS 66%(R):33% (ICI)
6.0	**CONSTRUCTION AND DEMOLITION**			14.8%
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.3%	0.0%	0.2%
6.3	Wood – Treated	3.7%	7.7%	5.0%
6.4	Wood – untreated	1.6%	8.2%	3.8%
6.5	Asphalt Roofing	0.2%	0.0%	0.1%
6.6	Drywall/Gypsum Board	1.1%	0.0%	0.8%
6.7	Carpet and Carpet Padding	4.1%	2.0%	3.4%
6.8	Remainder/Composite Construction and Demolition	1.2%	1.7%	1.4%
7.0	**HOUSEHOLD HAZARDOUS WASTE**			3.4%
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.2%	0.0%	0.1%
7.3	Batteries – Other	0.1%	0.0%	0.1%
7.4	Paint	0.1%	0.1%	0.1%
7.5	Bio-Hazardous (Diapers)	3.4%	1.6%	2.8%
7.6	Vehicle and Equipment Fluids	0.1%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers (contained toxic materials)	0.3%	0.0%	0.2%
7.8	Other Hazardous or Household Hazardous Waste	0.1%	0.0%	0.1%
8.0	**ELECTRONICS**			0.9%
8.1	Computer-related Electronics	0.2%	0.1%	0.1%
8.2	Other "brown goods"	0.9%	0.4%	0.7%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%
9.0	**OTHER MATERIALS**			7.4%
9.1	Tires and other rubber	0.5%	1.8%	0.9%
9.2	Textiles	5.9%	4.9%	5.5%
9.3	Mattresses	0.6%	1.5%	0.9%
9.4	Bulky materials	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%
10.0	**OTHER MISCELLANEOUS**	2.1%	1.2%	1.8%

3.3 Composition of Waste by Sampling Season

A comparison of the waste composition by sampling season is presented in Table 3-2. It was determined that a minimum of 52 vehicles should be sampled for the WCS; 26 vehicles were sampled during the first season sampling event and 26 vehicles were sampled during the second season sampling event.

Table 3-2 Composition of Waste by Season

	Categories	Season 1		Season 2	
		Average	At 90 % confidence Level (+/-)	Average	At 90 % confidence Level (+/-)
1.0	**PAPER**				
1.1	Uncoated Corrugated Cardboard/Kraft Paper	10.1%	4.7%	7.0%	3.1%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.4%	0.1%	0.5%	0.3%
1.4	Magazines/Catalogs	1.6%	1.1%	1.2%	0.4%
1.5	Newsprint	1.4%	0.5%	1.0%	0.4%
1.6	Other Recyclable Paper	4.7%	1.4%	3.4%	1.1%
1.7	Compostable Paper	5.7%	1.2%	7.4%	1.3%
1.8	Remainder/Composite Paper	0.4%	0.2%	1.1%	0.4%
2.0	**PLASTICS**				
2.1	PET Beverage Containers	0.5%	0.2%	0.7%	0.2%
2.2	PET Containers other than Beverage containers	0.2%	0.0%	0.2%	0.1%
2.3	Plastic MA Deposit Beverage Containers	0.2%	0.1%	0.2%	0.1%
2.4	HDPE Bottles, colored and natural	0.4%	0.1%	0.5%	0.1%
2.5	Plastic Tubs and lids	0.4%	0.1%	0.3%	0.1%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.7%	0.2%	0.3%	0.1%
2.7	Expanded Polystyrene Food Grade	0.4%	0.1%	0.4%	0.2%
2.8	Expanded Polystyrene Non-food Grade	0.8%	1.0%	0.3%	0.3%
2.9	Bulk Rigid Plastic Items	2.0%	0.9%	1.4%	1.5%
2.10	Film (non-bag commercial and industrial packaging film)	0.9%	1.0%	1.0%	1.1%
2.11	Grocery and other Merchandise Bags	0.6%	0.1%	0.6%	0.1%
2.12	Other Film means plastic film	2.4%	0.4%	4.0%	0.6%
2.13	Remainder/Composite Plastic	2.1%	1.0%	2.1%	0.7%
3.0	**METALS**				
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.1%	0.0%	0.0%	0.0%
3.2	Aluminum MA Deposit Beverage Containers	0.1%	0.0%	0.2%	0.1%
3.3	Tin/Steel Containers	0.6%	0.2%	0.5%	0.1%
3.4	Other Aluminum	0.3%	0.1%	0.2%	0.1%
3.5	Other Ferrous and non-ferrous	0.2%	0.1%	0.7%	0.5%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	3.1%	2.0%	0.7%	0.3%
4.0	**GLASS**				
4.1	Glass Beverage Containers (non-MA deposit containers)	0.5%	0.4%	0.1%	0.1%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.3%	0.2%	0.3%	0.1%
4.3	Glass MA Deposit Beverage Containers	0.2%	0.1%	0.6%	0.3%
4.4	Remainder/Composite Metal	0.3%	0.1%	0.2%	0.1%

Table 3-2 Composition of Waste by Season Continued					
		Season 1		Season 2	
	Categories	Average	At 90 % confidence Level (+/-)	Average	At 90 % confidence Level (+/-)
5.0	**ORGANIC MATERIAL**				
5.1	Food Waste	22.0%	4.1%	25.3%	5.4%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.1%	0.0%	4.4%	3.8%
5.4	Manures	0.2%	0.3%	0.2%	0.3%
5.5	Remainder/Composite Organic	7.1%	2.6%	2.9%	2.0%
6.0	**CONSTRUCTION AND DEMOLITION**				
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.1%	0.4%	0.6%
6.3	Wood – Treated	3.2%	1.5%	7.1%	3.7%
6.4	Wood – untreated	6.3%	4.9%	2.3%	1.6%
6.5	Asphalt Roofing	0.3%	0.4%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.8%	0.9%	0.7%	0.9%
6.7	Carpet and Carpet Padding	3.3%	3.0%	4.3%	2.7%
6.8	Remainder/Composite Construction and Demolition	2.0%	1.3%	0.8%	0.7%
7.0	**HOUSEHOLD HAZARDOUS WASTE**				
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	0.2%	0.3%
7.3	Batteries – Other	0.0%	0.0%	0.1%	0.0%
7.4	Paint	0.1%	0.1%	0.1%	0.1%
7.5	Bio-Hazardous (Diapers)	3.1%	1.3%	2.5%	0.9%
7.6	Vehicle and Equipment Fluids	0.1%	0.1%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers (contained toxic materials)	0.0%	0.0%	0.4%	0.3%
7.8	Other Hazardous or Household Hazardous Waste	0.1%	0.1%	0.1%	0.1%
8.0	**ELECTRONICS**				
8.1	Computer-related Electronics	0.0%	0.0%	0.3%	0.4%
8.2	Other "brown goods"	0.8%	0.6%	0.6%	0.4%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%
9.0	**OTHER MATERALS**				
9.1	Tires and other rubber	1.1%	1.0%	0.8%	1.0%
9.2	Textiles	5.6%	1.8%	6.4%	4.9%
9.3	Mattresses	0.0%	0.0%	1.9%	1.4%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%
10.0	**OTHER MISCELLANEOUS**	2.5%	1.8%	1.1%	0.4%

3.4 Composition of Waste by Sector

This section provides a summary account of the overall composition of the waste stream encountered during the WCS grouped into the two sectors of Residential and ICI waste. The results from facility data indicate that the Residential sector makes up approximately 66.6% of the waste stream and the ICI sector makes up approximately 33.4% of the waste stream.

Figures 3-2 and 3-3 provide breakdown of the waste stream into the nine major categories and five sub-categories defined by MassDEP.

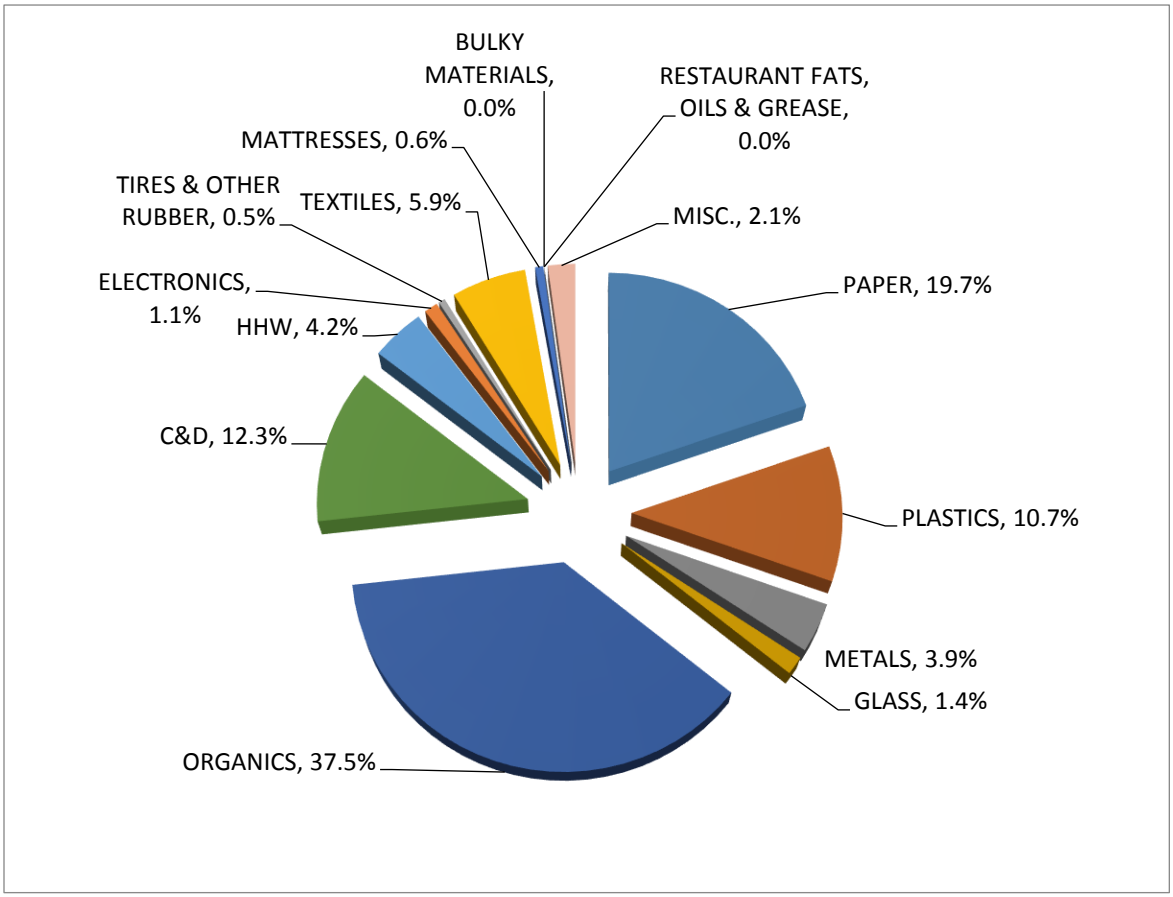
3.4.1 Residential Sector

Figure 3-2 displays the distribution of the Residential waste sector at the Facility over the nine main categories of waste described in the MassDEP WCS Guidance, based on the 52 samples analyzed over the course of both sampling seasons. Organic material comprised the most material in the residential waste stream at 37.5% (32.3% in 2013), and paper constituted next highest percentage at 19.7% (20.1% in 2013). C&D materials were the third highest at 12.3% (17.2% in 2013), plastic was fourth highest at 10.7% (11.2% in 2013), and textiles were the fifth highest at 5.9% (1.3% in 2013).

Figure 3-2

Residential Waste Composition

Wheelabrator North Andover, Inc.



Note: Textiles, Tires and Other Rubber, Mattresses, Bulky Materials, Restaurant Fats Oil & Grease, and Misc. are sub-categories of the main category "Other".

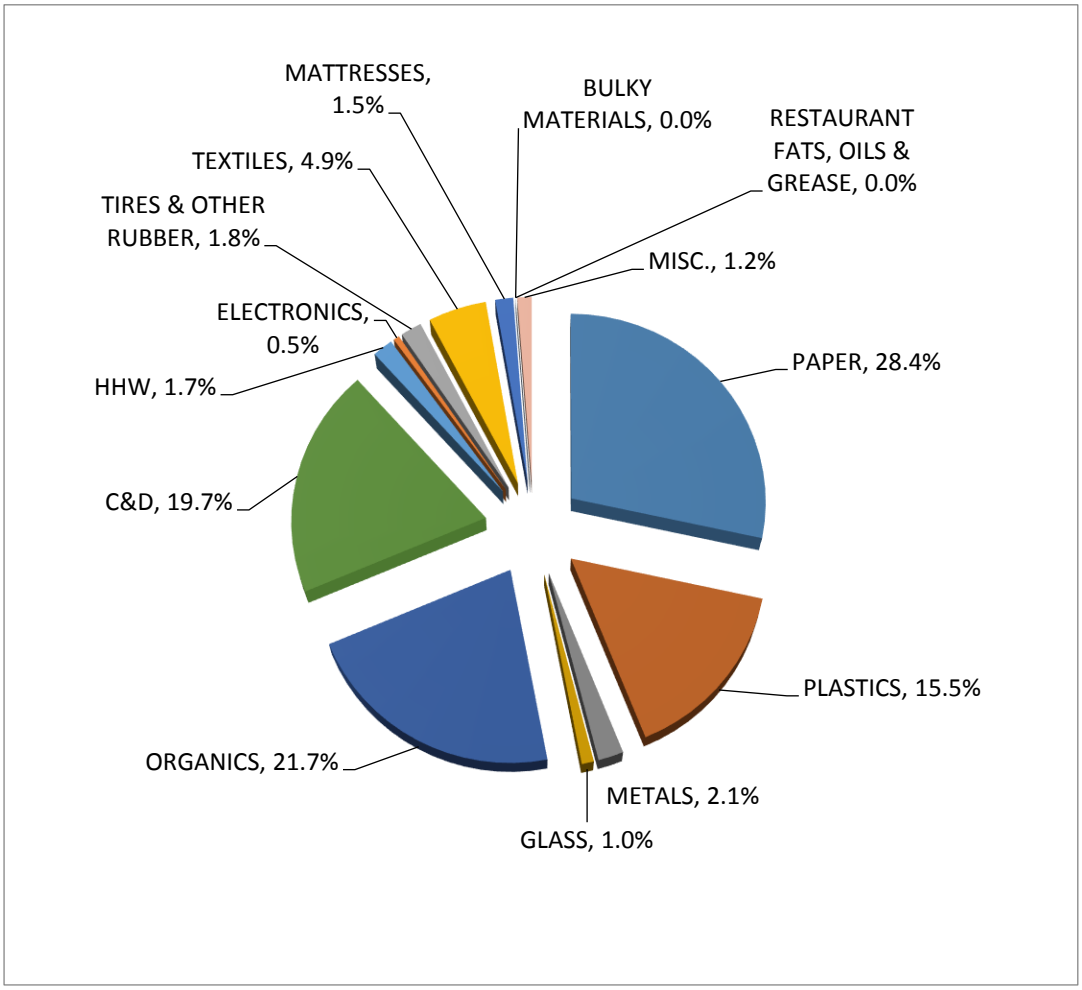
3.4.2 ICI Sector

Figure 3-3 displays the distribution of the ICI waste sector at the Facility over the nine main categories of waste described in the MassDEP WCS Guidance, based on the 52 samples analyzed over the course of both sampling seasons. Paper comprised the most material in the ICI waste stream at 28.4% (29.6% in 2013), with organic materials constituting the second highest percentage at approximately 21.7% (18.7% in 2013). C&D materials represented approximately 19.7% (19.7% in 2013) and plastic material represented around 15.5% (14.3% in 2013) of the materials found in the ICI waste stream.

Figure 3-3

ICI Waste Composition

Wheelabrator North Andover, Inc.



Note: Textiles, Tires and Other Rubber, Mattresses, Bulky Materials, Restaurant Fats Oil & Grease, and Misc. are sub-categories of the main category "Other".

3.4.3 Unacceptable Loads

Unacceptable loads are defined as loads that contain less than 80% of either Residential or ICI waste, loads that are more than 50% construction and demolition material, and loads originating from out of state. During the WCS, no out of state loads were identified based on interviews with the drivers of vehicles selected for sampling.

The driver interview process allowed the WCS crew supervisor to identify any loads that may have contained less than 80% waste of either Residential or ICI sectors, and thereby be determined to be unacceptable. There were no loads identified during the WCS that were determined to be unacceptable for the WCS.

3.5 Waste Composition by Haul Type

Tables 3-3 through 3-8 describe the waste composition by vehicle type, based on the total of 157 samples sorted during the 2016 WCS for all three Wheelabrator facilities in Massachusetts. Including all vehicles sampled during the WCS for the three facilities allows for a more accurate calculation of the results instead of limiting the data to one facility. For example, the roll-off compactor type would be limited to 5 vehicles instead of 15 vehicles if only the North Andover data were included.

The summary account of the waste composition by haul type has been categorized by the six vehicle types listed in Table 3-3. Table 3-3 also indicates how many vehicles of each type were sampled during the 2016 WCS at all three Wheelabrator facilities in Massachusetts.

Table 3-3
Number and Allocation of Samples by Vehicle Type

Haul Type	Number of Vehicles Sampled
Roll-off - open top	4
Roll-off - closed top	5
Roll-off - compactor	15
Rear loading packer	73
Side loading packer	15
Front loading packer	45
Total	157

Table 3-4 Waste Composition of Roll-off Open Top				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
1.0 PAPER	1.1	Uncoated Corrugated Cardboard/Kraft Paper	34.5%	29.9%
	1.2	Waxed Cardboard	0.0%	0.0%
	1.3	High Grade Office Paper	0.0%	0.0%
	1.4	Magazines/Catalogs	0.0%	0.0%
	1.5	Newsprint	0.0%	0.0%
	1.6	Other Recyclable Paper	0.0%	0.0%
	1.7	Compostable Paper	0.0%	0.0%
	1.8	Remainder/Composite Paper	0.0%	0.0%
2.0 PLASTICS	2.1	PET Beverage Containers	0.0%	0.0%
	2.2	PET Containers other than Beverage Containers	0.0%	0.0%
	2.3	Plastic MA Deposit Beverage Containers	0.0%	0.0%
	2.4	HDPE Bottles, colored and natural	0.0%	0.0%
	2.5	Plastic Tubs and lids	1.8%	2.9%
	2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.0%	0.0%
	2.7	Expanded Polystyrene Food Grade	0.0%	0.0%
	2.8	Expanded Polystyrene Non-food Grade	0.0%	0.0%
	2.9	Bulk Rigid Plastic Items	2.2%	3.7%
	2.10	Film (non-bag commercial and industrial packaging film)	2.4%	4.0%
	2.11	Grocery and other Merchandise Bags	0.0%	0.0%
	2.12	Other Film means plastic film	1.2%	2.0%
	2.13	Remainder/Composite Plastic	6.5%	10.7%
3.0 METALS	3.1	Aluminum Bev. Containers (non-MA deposit containers)	0.0%	0.0%
	3.2	Aluminum MA Deposit Beverage Containers	0.0%	0.0%
	3.3	Tin/Steel Containers	0.0%	0.0%
	3.4	Other Aluminum	0.0%	0.0%
	3.5	Other Ferrous and non-ferrous	3.0%	4.9%
	3.6	White Goods	0.0%	0.0%
	3.7	Remainder/Composite Metal	1.3%	2.1%
4.0 GLASS	4.1	Glass Bev. Containers (non-MA deposit containers)	0.0%	0.0%
	4.2	Other Glass Packaging Cont. (non-MA deposit)	0.0%	0.0%
	4.3	Glass MA Deposit Beverage Containers	0.0%	0.0%
	4.4	Remainder/Composite Glass	0.0%	0.0%
5.0 ORGANIC	5.1	Food Waste	7.2%	11.8%
	5.2	Branches and Stumps	0.0%	0.0%
	5.3	Prunings, Trimmings, Leaves and Grass	0.0%	0.0%
	5.4	Manures	0.0%	0.0%
	5.5	Remainder/Composite Organic	2.3%	3.8%
6.0 C & D	6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%
	6.2	Aggregates, Stone, Rock	0.0%	0.0%
	6.3	Wood – Treated	5.2%	7.2%
	6.4	Wood – untreated	15.3%	15.0%
	6.5	Asphalt Roofing	0.0%	0.0%
	6.6	Drywall/Gypsum Board (Identify if Chinese Drywall)	0.0%	0.0%
	6.7	Carpet and Carpet Padding	0.0%	0.0%
	6.8	Remainder/Composite Construction and Demolition	0.0%	0.0%

Table 3-4 Waste Composition of Roll-off Open Top Continued				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
7.0 HHW	7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%
	7.2	Batteries – Lead Acid	0.0%	0.0%
	7.3	Batteries – Other	0.0%	0.0%
	7.4	Paint	0.0%	0.0%
	7.5	Bio-Hazardous	0.0%	0.0%
	7.6	Vehicle and Equipment Fluids	0.0%	0.0%
	7.7	Metal, Glass, and Plastic Cont. (cont. toxic materials)	0.2%	0.4%
	7.8	Other Hazardous or Household Hazardous Waste	0.0%	0.0%
8.0 ELETT	8.1	Computer-related Electronics	0.0%	0.0%
	8.2	Other "brown goods"	0.0%	0.0%
	8.3	Televisions and Computer Monitors	0.0%	0.0%
9.0 OTHER	9.1	Tires and other rubber	0.0%	0.0%
	9.2	Textiles	16.9%	25.6%
	9.3	Mattresses	0.0%	0.0%
	9.4	Bulky materials	0.0%	0.0%
	9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%
	10	**OTHER MISCELLANEOUS**	0.0%	0.0%

Table 3-5 Waste Composition of Roll-off Closed Top				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
1.0 PAPER	1.1	Uncoated Corrugated Cardboard/Kraft Paper	19.3%	17.9%
	1.2	Waxed Cardboard	0.0%	0.0%
	1.3	High Grade Office Paper	0.1%	0.1%
	1.4	Magazines/Catalogs	0.1%	0.1%
	1.5	Newsprint	0.3%	0.5%
	1.6	Other Recyclable Paper	10.1%	16.1%
	1.7	Compostable Paper	9.4%	8.5%
	1.8	Remainder/Composite Paper	0.6%	0.8%
2.0 PLASTICS	2.1	PET Beverage Containers	0.3%	0.3%
	2.2	PET Containers other than Beverage Containers	0.0%	0.0%
	2.3	Plastic MA Deposit Beverage Containers	0.0%	0.0%
	2.4	HDPE Bottles, colored and natural	0.1%	0.2%
	2.5	Plastic Tubs and lids	0.0%	0.0%
	2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.1%	0.2%
	2.7	Expanded Polystyrene Food Grade	0.1%	0.1%
	2.8	Expanded Polystyrene Non-food Grade	0.0%	0.0%
	2.9	Bulk Rigid Plastic Items	6.6%	5.9%
	2.10	Film (non-bag commercial and industrial packaging film)	5.6%	6.0%
	2.11	Grocery and other Merchandise Bags	0.0%	0.1%
	2.12	Other Film means plastic film	15.7%	23.0%
	2.13	Remainder/Composite Plastic	1.6%	2.0%
3.0 METALS	3.1	Aluminum Bev. Containers (non-MA deposit containers)	0.0%	0.0%
	3.2	Aluminum MA Deposit Beverage Containers	0.1%	0.0%
	3.3	Tin/Steel Containers	0.2%	0.2%
	3.4	Other Aluminum	0.0%	0.0%
	3.5	Other Ferrous and non-ferrous	0.7%	1.2%
	3.6	White Goods	0.0%	0.0%
	3.7	Remainder/Composite Metal	0.0%	1.7%

Table 3-5 Waste Composition of Roll-off Closed Top Continued				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
4.0 GLASS	4.1	Glass Bev. Containers (non-MA deposit containers)	0.0%	0.0%
	4.2	Other Glass Packaging Cont. (non-MA deposit)	0.1%	0.1%
	4.3	Glass MA Deposit Beverage Containers	0.1%	0.1%
	4.4	Remainder/Composite Glass	0.0%	0.0%
5.0 ORGANIC	5.1	Food Waste	11.9%	9.7%
	5.2	Branches and Stumps	0.0%	0.0%
	5.3	Prunings, Trimmings, Leaves and Grass	1.0%	1.7%
	5.4	Manures	0.0%	0.0%
	5.5	Remainder/Composite Organic	5.1%	8.1%
6.0 C & D	6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%
	6.2	Aggregates, Stone, Rock	0.0%	0.0%
	6.3	Wood – Treated	6.0%	6.3%
	6.4	Wood – untreated	2.5%	4.0%
	6.5	Asphalt Roofing	0.0%	0.0%
	6.6	Drywall/Gypsum Board (Identify if Chinese Drywall)	0.0%	0.0%
	6.7	Carpet and Carpet Padding	0.0%	0.0%
	6.8	Remainder/Composite Construction and Demolition	0.0%	0.0%
7.0 HHW	7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%
	7.2	Batteries – Lead Acid	0.0%	0.0%
	7.3	Batteries – Other	0.0%	0.0%
	7.4	Paint	0.0%	0.0%
	7.5	Bio-Hazardous	0.5%	0.8%
	7.6	Vehicle and Equipment Fluids	0.0%	0.0%
	7.7	Metal, Glass, and Plastic Cont. (cont. toxic materials)	0.0%	0.0%
	7.8	Other Hazardous or Household Hazardous Waste	0.0%	0.0%
8.0 ELETT	8.1	Computer-related Electronics	0.6%	1.0%
	8.2	Other "brown goods"	0.0%	0.0%
	8.3	Televisions and Computer Monitors	0.0%	0.0%
9.0 OTHER	9.1	Tires and other rubber	0.2%	0.3%
	9.2	Textiles	0.7%	0.7%
	9.3	Mattresses	0.0%	0.0%
	9.4	Bulky materials	0.0%	0.0%
	9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%
	10	**OTHER MISCELLANEOUS**	0.2%	0.3%

Table 3-6 Waste Composition of Roll-off Compactor				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
1.0 PAPER	1.1	Uncoated Corrugated Cardboard/Kraft Paper	15.1%	4.4%
	1.2	Waxed Cardboard	1.7%	1.9%
	1.3	High Grade Office Paper	1.4%	1.8%
	1.4	Magazines/Catalogs	0.5%	0.9%
	1.5	Newsprint	0.2%	0.2%
	1.6	Other Recyclable Paper	3.4%	2.1%
	1.7	Compostable Paper	4.9%	2.0%
	1.8	Remainder/Composite Paper	1.4%	1.1%
2.0 PLASTICS	2.1	PET Beverage Containers	1.0%	1.1%
	2.2	PET Containers other than Beverage Containers	0.1%	0.0%
	2.3	Plastic MA Deposit Beverage Containers	0.1%	0.1%
	2.4	HDPE Bottles, colored and natural	0.2%	0.1%
	2.5	Plastic Tubs and lids	0.4%	0.2%
	2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	1.5%	1.8%
	2.7	Expanded Polystyrene Food Grade	0.1%	0.1%
	2.8	Expanded Polystyrene Non-food Grade	1.4%	1.7%
	2.9	Bulk Rigid Plastic Items	2.3%	1.8%
	2.10	Film (non-bag commercial and industrial packaging film)	2.0%	1.7%
	2.11	Grocery and other Merchandise Bags	0.3%	0.2%
	2.12	Other Film means plastic film	4.3%	1.4%
	2.13	Remainder/Composite Plastic	3.5%	1.9%
3.0 METALS	3.1	Aluminum Bev. Containers (non-MA deposit containers)	0.0%	0.0%
	3.2	Aluminum MA Deposit Beverage Containers	0.4%	0.5%
	3.3	Tin/Steel Containers	0.8%	1.3%
	3.4	Other Aluminum	0.1%	0.0%
	3.5	Other Ferrous and non-ferrous	1.2%	2.0%
	3.6	White Goods	0.0%	0.0%
	3.7	Remainder/Composite Metal	0.1%	0.1%
4.0 GLASS	4.1	Glass Bev. Containers (non-MA deposit containers)	0.0%	0.0%
	4.2	Other Glass Packaging Cont. (non-MA deposit)	0.2%	0.2%
	4.3	Glass MA Deposit Beverage Containers	0.3%	0.3%
	4.4	Remainder/Composite Glass	0.0%	0.0%
5.0 ORGANIC	5.1	Food Waste	19.7%	8.1%
	5.2	Branches and Stumps	0.8%	1.3%
	5.3	Prunings, Trimmings, Leaves and Grass	0.4%	0.5%
	5.4	Manures	0.0%	0.0%
	5.5	Remainder/Composite Organic	2.7%	2.9%
6.0 C & D	6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%
	6.2	Aggregates, Stone, Rock	2.5%	3.1%
	6.3	Wood – Treated	5.4%	3.5%
	6.4	Wood – untreated	9.4%	8.1%
	6.5	Asphalt Roofing	0.0%	0.0%
	6.6	Drywall/Gypsum Board (Identify if Chinese Drywall)	0.0%	0.0%
	6.7	Carpet and Carpet Padding	0.0%	0.0%
	6.8	Remainder/Composite Construction and Demolition	2.0%	1.8%
7.0 HHW	7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%
	7.2	Batteries – Lead Acid	0.0%	0.0%
	7.3	Batteries – Other	0.0%	0.0%
	7.4	Paint	0.1%	0.2%
	7.5	Bio-Hazardous	0.1%	0.1%
	7.6	Vehicle and Equipment Fluids	0.0%	0.0%
	7.7	Metal, Glass, and Plastic Cont. (cont. toxic materials)	0.0%	0.0%
	7.8	Other Hazardous or Household Hazardous Waste	0.0%	0.0%

Table 3-6 Waste Composition of Roll-off Compactor Continued				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
8.0 ELETT	8.1	Computer-related Electronics	0.0%	0.0%
	8.2	Other "brown goods"	0.5%	0.8%
	8.3	Televisions and Computer Monitors	0.0%	0.0%
9.0 OTHER	9.1	Tires and other rubber	0.2%	0.2%
	9.2	Textiles	7.3%	8.5%
	9.3	Mattresses	0.0%	0.0%
	9.4	Bulky materials	0.0%	0.0%
	9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%
	10	**OTHER MISCELLANEOUS**	0.1%	0.1%

Table 3-7 Waste Composition of Rear Loader				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
1.0 PAPER	1.1	Uncoated Corrugated Cardboard/Kraft Paper	7.2%	1.4%
	1.2	Waxed Cardboard	0.2%	0.4%
	1.3	High Grade Office Paper	0.3%	0.1%
	1.4	Magazines/Catalogs	1.4%	0.5%
	1.5	Newsprint	1.0%	0.2%
	1.6	Other Recyclable Paper	3.0%	0.3%
	1.7	Compostable Paper	6.3%	0.6%
	1.8	Remainder/Composite Paper	0.6%	0.1%
2.0 PLASTICS	2.1	PET Beverage Containers	0.5%	0.1%
	2.2	PET Containers other than Beverage Containers	0.2%	0.0%
	2.3	Plastic MA Deposit Beverage Containers	0.1%	0.0%
	2.4	HDPE Bottles, colored and natural	0.5%	0.1%
	2.5	Plastic Tubs and lids	0.3%	0.0%
	2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.7%	0.1%
	2.7	Expanded Polystyrene Food Grade	0.4%	0.1%
	2.8	Expanded Polystyrene Non-food Grade	0.1%	0.0%
	2.9	Bulk Rigid Plastic Items	1.6%	0.7%
	2.10	Film (non-bag commercial and industrial packaging film)	0.2%	0.1%
	2.11	Grocery and other Merchandise Bags	0.7%	0.1%
	2.12	Other Film means plastic film	3.6%	0.2%
	2.13	Remainder/Composite Plastic	2.0%	0.4%
3.0 METALS	3.1	Aluminum Bev. Containers (non-MA deposit containers)	0.1%	0.0%
	3.2	Aluminum MA Deposit Beverage Containers	0.2%	0.0%
	3.3	Tin/Steel Containers	0.5%	0.1%
	3.4	Other Aluminum	0.3%	0.1%
	3.5	Other Ferrous and non-ferrous	0.6%	0.2%
	3.6	White Goods	0.0%	0.0%
	3.7	Remainder/Composite Metal	1.7%	1.0%
4.0 GLASS	4.1	Glass Bev. Containers (non-MA deposit containers)	0.7%	0.1%
	4.2	Other Glass Packaging Cont. (non-MA deposit)	0.5%	0.2%
	4.3	Glass MA Deposit Beverage Containers	0.4%	0.1%
	4.4	Remainder/Composite Glass	0.3%	0.1%
5.0 ORGANIC	5.1	Food Waste	29.1%	2.3%
	5.2	Branches and Stumps	0.2%	0.0%
	5.3	Prunings, Trimmings, Leaves and Grass	3.5%	1.6%
	5.4	Manures	0.2%	0.1%
	5.5	Remainder/Composite Organic	3.9%	0.8%

Table 3-7 Waste Composition of Rear Loader Continued				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
6.0 C & D	6.1	Asphalt Pavement, Brick, and Concrete	0.2%	0.0%
	6.2	Aggregates, Stone, Rock	0.2%	0.3%
	6.3	Wood – Treated	3.6%	1.0%
	6.4	Wood – untreated	0.8%	0.5%
	6.5	Asphalt Roofing	0.2%	0.4%
	6.6	Drywall/Gypsum Board (Identify if Chinese Drywall)	0.4%	0.4%
	6.7	Carpet and Carpet Padding	2.9%	1.5%
	6.8	Remainder/Composite Construction and Demolition	2.4%	0.9%
7.0 HHW	7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%
	7.2	Batteries – Lead Acid	0.0%	0.0%
	7.3	Batteries – Other	0.1%	0.0%
	7.4	Paint	0.0%	0.1%
	7.5	Bio-Hazardous	4.2%	0.9%
	7.6	Vehicle and Equipment Fluids	0.1%	0.1%
	7.7	Metal, Glass, and Plastic Cont. (cont. toxic materials)	0.1%	0.1%
	7.8	Other Hazardous or Household Hazardous Waste	0.1%	0.0%
8.0 ELETT	8.1	Computer-related Electronics	0.2%	0.2%
	8.2	Other "brown goods"	0.5%	0.3%
	8.3	Televisions and Computer Monitors	0.0%	0.0%
9.0 OTHER	9.1	Tires and other rubber	0.7%	0.5%
	9.2	Textiles	7.9%	1.1%
	9.3	Mattresses	0.3%	0.5%
	9.4	Bulky materials	0.1%	0.1%
	9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%
	10	**OTHER MISCELLANEOUS**	1.8%	0.9%

Table 3-8 Waste Composition of Front Loader				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
1.0 PAPER	1.1	Uncoated Corrugated Cardboard/Kraft Paper	13.6%	1.9%
	1.2	Waxed Cardboard	0.8%	0.7%
	1.3	High Grade Office Paper	0.6%	0.3%
	1.4	Magazines/Catalogs	0.4%	0.2%
	1.5	Newsprint	0.8%	0.3%
	1.6	Other Recyclable Paper	3.4%	1.2%
	1.7	Compostable Paper	5.2%	0.9%
	1.8	Remainder/Composite Paper	0.8%	0.3%
2.0 PLASTICS	2.1	PET Beverage Containers	0.6%	0.1%
	2.2	PET Containers other than Beverage Containers	0.2%	0.0%
	2.3	Plastic MA Deposit Beverage Containers	0.2%	0.1%
	2.4	HDPE Bottles, colored and natural	0.5%	0.1%
	2.5	Plastic Tubs and lids	0.3%	0.1%
	2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.4%	0.1%
	2.7	Expanded Polystyrene Food Grade	0.3%	0.1%
	2.8	Expanded Polystyrene Non-food Grade	0.1%	0.1%
	2.9	Bulk Rigid Plastic Items	2.3%	1.0%
	2.10	Film (non-bag commercial and industrial packaging film)	0.2%	0.1%
	2.11	Grocery and other Merchandise Bags	0.4%	0.1%
	2.12	Other Film means plastic film	3.7%	0.6%
	2.13	Remainder/Composite Plastic	3.2%	1.8%

Table 3-8 Waste Composition of Front Loader Continued				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
3.0 METALS	3.1	Aluminum Bev. Containers (non-MA deposit containers)	0.0%	0.0%
	3.2	Aluminum MA Deposit Beverage Containers	0.2%	0.0%
	3.3	Tin/Steel Containers	0.5%	0.2%
	3.4	Other Aluminum	0.3%	0.2%
	3.5	Other Ferrous and non-ferrous	0.8%	0.8%
	3.6	White Goods	0.1%	0.1%
	3.7	Remainder/Composite Metal	2.0%	1.2%
4.0 GLASS	4.1	Glass Bev. Containers (non-MA deposit containers)	0.3%	0.2%
	4.2	Other Glass Packaging Cont. (non-MA deposit)	0.2%	0.1%
	4.3	Glass MA Deposit Beverage Containers	0.3%	0.2%
	4.4	Remainder/Composite Glass	0.6%	0.6%
5.0 ORGANIC	5.1	Food Waste	23.0%	4.0%
	5.2	Branches and Stumps	0.0%	0.0%
	5.3	Prunings, Trimmings, Leaves and Grass	1.1%	0.7%
	5.4	Manures	0.0%	0.0%
	5.5	Remainder/Composite Organic	1.2%	0.6%
6.0 C & D	6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%
	6.2	Aggregates, Stone, Rock	0.2%	0.2%
	6.3	Wood – Treated	8.9%	2.5%
	6.4	Wood – untreated	2.2%	1.0%
	6.5	Asphalt Roofing	0.5%	0.8%
	6.6	Drywall/Gypsum Board (Identify if Chinese Drywall)	1.3%	0.8%
	6.7	Carpet and Carpet Padding	3.8%	2.0%
	6.8	Remainder/Composite Construction and Demolition	3.7%	1.5%
7.0 HHW	7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.1%
	7.2	Batteries – Lead Acid	0.1%	0.1%
	7.3	Batteries – Other	0.1%	0.1%
	7.4	Paint	0.2%	0.3%
	7.5	Bio-Hazardous	1.7%	0.7%
	7.6	Vehicle and Equipment Fluids	0.0%	0.1%
	7.7	Metal, Glass, and Plastic Cont. (cont. toxic materials)	0.2%	0.1%
	7.8	Other Hazardous or Household Hazardous Waste	0.2%	0.1%
8.0 ELETT	8.1	Computer-related Electronics	0.4%	0.4%
	8.2	Other "brown goods"	0.5%	0.4%
	8.3	Televisions and Computer Monitors	0.1%	0.2%
9.0 OTHER	9.1	Tires and other rubber	1.0%	0.8%
	9.2	Textiles	4.1%	1.1%
	9.3	Mattresses	0.7%	0.6%
	9.4	Bulky materials	0.4%	0.5%
	9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%
	10	**OTHER MISCELLANEOUS**	1.2%	0.6%

Table 3-9 Waste Composition of Side Loader				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
1.0 PAPER	1.1	Uncoated Corrugated Cardboard/Kraft Paper	3.3%	1.8%
	1.2	Waxed Cardboard	0.0%	0.0%
	1.3	High Grade Office Paper	0.3%	0.2%
	1.4	Magazines/Catalogs	1.3%	0.7%
	1.5	Newsprint	1.1%	0.6%
	1.6	Other Recyclable Paper	4.8%	2.2%
	1.7	Compostable Paper	7.2%	1.8%
	1.8	Remainder/Composite Paper	0.6%	0.3%
2.0 PLASTICS	2.1	PET Beverage Containers	0.7%	0.2%
	2.2	PET Containers other than Beverage Containers	0.3%	0.1%
	2.3	Plastic MA Deposit Beverage Containers	0.2%	0.1%
	2.4	HDPE Bottles, colored and natural	0.5%	0.2%
	2.5	Plastic Tubs and lids	0.4%	0.1%
	2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.6%	0.2%
	2.7	Expanded Polystyrene Food Grade	0.4%	0.1%
	2.8	Expanded Polystyrene Non-food Grade	0.1%	0.0%
	2.9	Bulk Rigid Plastic Items	1.4%	1.1%
	2.10	Film (non-bag commercial and industrial packaging film)	0.3%	0.3%
	2.11	Grocery and other Merchandise Bags	0.8%	0.2%
	2.12	Other Film means plastic film	3.2%	0.5%
	2.13	Remainder/Composite Plastic	2.2%	1.5%
3.0 METALS	3.1	Aluminum Bev. Containers (non-MA deposit containers)	0.1%	0.0%
	3.2	Aluminum MA Deposit Beverage Containers	0.1%	0.1%
	3.3	Tin/Steel Containers	0.8%	0.2%
	3.4	Other Aluminum	0.2%	0.1%
	3.5	Other Ferrous and non-ferrous	0.4%	0.2%
	3.6	White Goods	0.0%	0.0%
	3.7	Remainder/Composite Metal	0.8%	0.7%
4.0 GLASS	4.1	Glass Bev. Containers (non-MA deposit containers)	0.4%	0.3%
	4.2	Other Glass Packaging Cont. (non-MA deposit)	0.4%	0.2%
	4.3	Glass MA Deposit Beverage Containers	0.4%	0.2%
	4.4	Remainder/Composite Glass	0.3%	0.2%
5.0 ORGANIC	5.1	Food Waste	29.9%	7.3%
	5.2	Branches and Stumps	0.0%	0.0%
	5.3	Prunings, Trimmings, Leaves and Grass	5.5%	6.6%
	5.4	Manures	0.3%	0.6%
	5.5	Remainder/Composite Organic	6.3%	3.5%
6.0 C & D	6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%
	6.2	Aggregates, Stone, Rock	0.1%	0.1%
	6.3	Wood – Treated	4.2%	2.6%
	6.4	Wood – untreated	1.6%	1.8%
	6.5	Asphalt Roofing	0.4%	0.7%
	6.6	Drywall/Gypsum Board (Identify if Chinese Drywall)	1.0%	1.6%
	6.7	Carpet and Carpet Padding	4.7%	3.7%
	6.8	Remainder/Composite Construction and Demolition	1.3%	1.1%

Table 3-9 Waste Composition of Side Loader Continued				
WASTE CATEGORIES			Average	90% Confidence Level (+/-)
7.0 HHW	7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%
	7.2	Batteries – Lead Acid	0.4%	0.6%
	7.3	Batteries – Other	0.1%	0.1%
	7.4	Paint	0.0%	0.0%
	7.5	Bio-Hazardous	3.0%	1.2%
	7.6	Vehicle and Equipment Fluids	0.0%	0.0%
	7.7	Metal, Glass, and Plastic Cont. (cont. toxic materials)	0.4%	0.5%
	7.8	Other Hazardous or Household Hazardous Waste	0.1%	0.1%
8.0 ELETT	8.1	Computer-related Electronics	0.0%	0.0%
	8.2	Other "brown goods"	0.9%	0.9%
	8.3	Televisions and Computer Monitors	0.0%	0.0%
9.0 OTHER	9.1	Tires and other rubber	0.5%	0.7%
	9.2	Textiles	5.2%	2.0%
	9.3	Mattresses	0.0%	0.0%
	9.4	Bulky materials	0.0%	0.0%
	9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%
	10	**OTHER MISCELLANEOUS**	0.8%	0.4%

3.6 Observations and Analysis

Fractions of Residential & ICI Sector Waste Streams

At the North Andover Facility, the Residential sector waste stream was estimated to be approximately 66.6% of the total and the ICI sector waste stream was estimated to be approximately 33.4% of the total. These numbers differ from those estimated by the MassDEP, which is a statewide average of 45% Residential waste and 55% ICI waste.

Largest Overall Waste Categories

The largest waste categories, for the total waste stream (Residential and ICI sectors combined), were as follows:

Waste Category	Fraction of Total Waste Stream
Organic Material	32.2%
Paper	22.6%
Construction and Demolition	14.8%
Plastics	12.3%

The largest sub-categories, expressed as a fraction of the major categories, were as follows:

Waste Category	Sub-Categories
Organic Material	Food Waste: 70.7%
Paper	Uncoated Corrugated Cardboard: 35.6% Compostable Paper: 30.1% Other Recyclable Paper: 17.7%
Construction and Demolition	Wood – Untreated: 41.6% Wood – Treated: 39.1% Carpet/Carpet Padding: 10.4% Remainder/Composite C&D: 8.9%

Plastics	Other Film: 26.0% Remainder/Composite Plastic: 17.8% Bulk Rigid Plastic Items: 16.4% Film (non-bag commercial and industrial packaging film): 9.5%

Largest Residential Waste Categories

The largest residential waste categories, expressed as a fraction of the residential waste stream, were as follows:

Waste Category	Fraction of Residential Waste Stream
Organic Material	37.5%
Paper	19.7%
Construction & Demolition	12.3%
Plastics	10.7%

The sub-categories that contributed the highest percentages are reported in the table below. The sub-categories are reported as a fraction of their respective main category observed in the residential waste stream.

Waste Category	Sub-Categories
Organic Materials	Food Waste: 75.7%
Paper	Compostable Paper: 36.1% Other Recyclable Paper: 22.2% Uncoated Corrugated Cardboard/Kraft Paper: 20.4%
Construction & Demolition	Carpet & Carpet Padding: 33.4% Wood-Treated: 30.0% Wood – Untreated: 13.2%
Plastics	Other Film: 30.9% Remainder/Composite Plastic: 17.0% Bulk Rigid Plastic Items: 15.6%

Largest ICI Waste Categories

The largest ICI waste categories, expressed as a fraction of the ICI waste stream, were as follows:

Waste Category	Fraction of ICI Waste Stream
Paper	28.4%
Organic Material	21.7%
Construction and Demolition	19.7%
Plastic	15.5%

The sub-categories that contributed the highest percentages are reported in the table below. The sub-categories are reported as a fraction of their respective main category observed in the ICI waste stream.

Waste Category	Sub-Categories
Paper	Uncoated Corrugated Cardboard: 56.7% Compostable Paper: 21.8% Other Recyclable Paper: 11.5%
Organic Materials	Food Waste: 70.7%
Construction and Demolition	Wood – Untreated: 41.6% Wood – Treated: 39.1% Carpet and carpet padding: 10.4% Remainder/Composite C&D: 8.9%

Plastics	Other Film: 19.4% Film (non-bag commercial and industrial packaging film): 19.1% Remainder/Composite: 18.8% Bulk Rigid Plastic Items: 17.6%

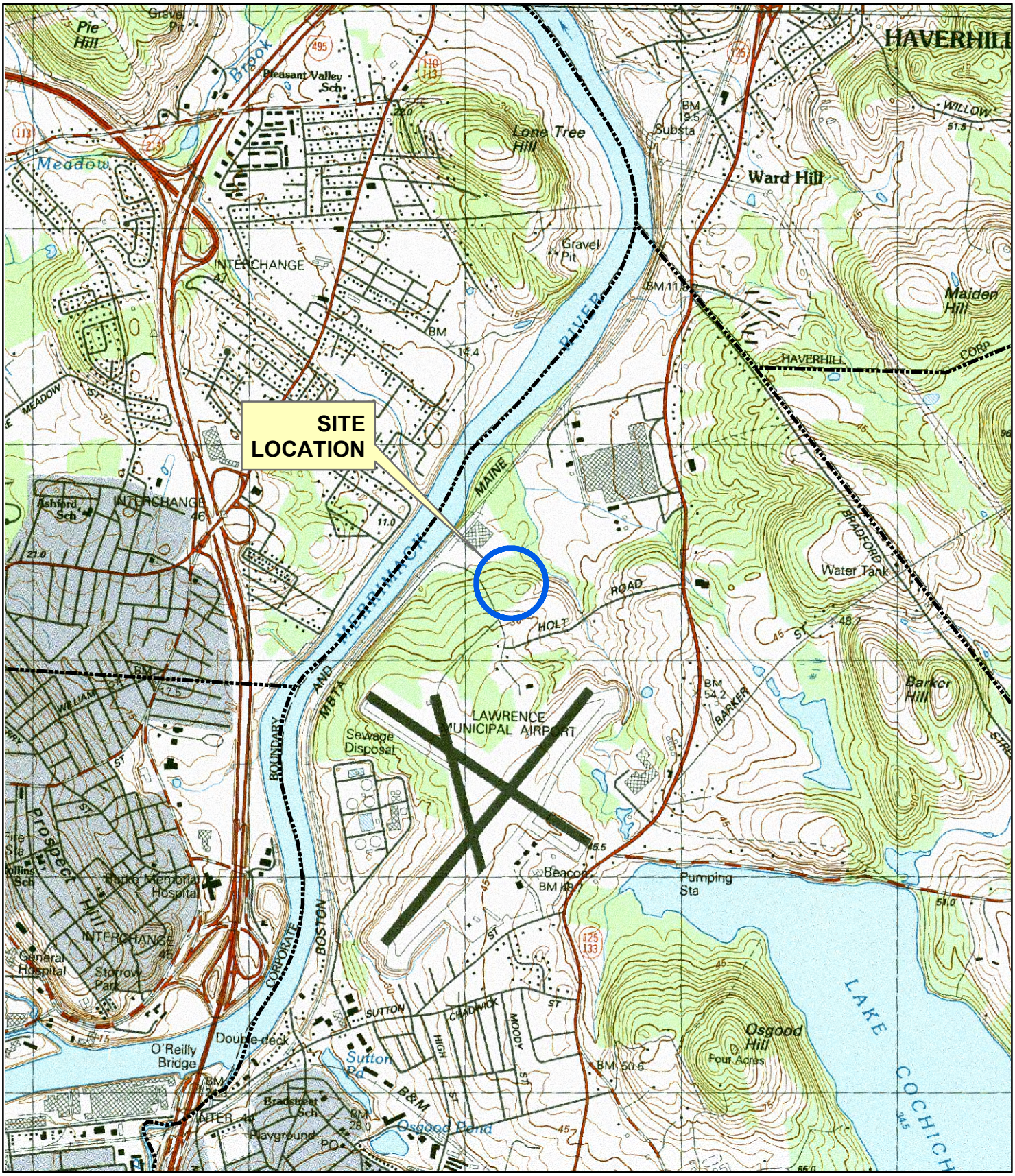
Section 4

References

ASTM D 5231-92 (Reapproved 2008), Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste.

MassDEP 2016 Class II Recycling Program, Waste Characterization Scope and Methodology Guidance.

Figures



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101 Industrial Park Road, Suite 205
Taunton, Massachusetts

Note: USGS Quad Maps obtained from MassGIS scanned 5-CDset, dated July 1996. All other data from MassGIS Data Viewer software, updated May 2009.

FIGURE 1-1
SITE LOCUS MAP

285 Holt Road
N. Andover, Massachusetts

Prepared for:
Wheelabrator N. Andover, Inc.

N
W E
S

0 250 500 1,000
Ft

Date: 1/24/2017

Project: 148301

Scale: 1" = 2000'

File: N. Andover Site Locus

Brown AND Caldwell

101 Industrial Park Road, Suite 205
Taunton, Massachusetts

Note: USGS Quad Maps obtained from MassGIS scanned 5-CDset, dated July 1996. All other data from MassGIS Data Viewer software, updated May 2009.

FIGURE 1-2
AERIAL MAP

285 Holt Road
N. Andover, Massachusetts

Prepared for:
Wheelabrator N. Andover, Inc.

N
W E
S

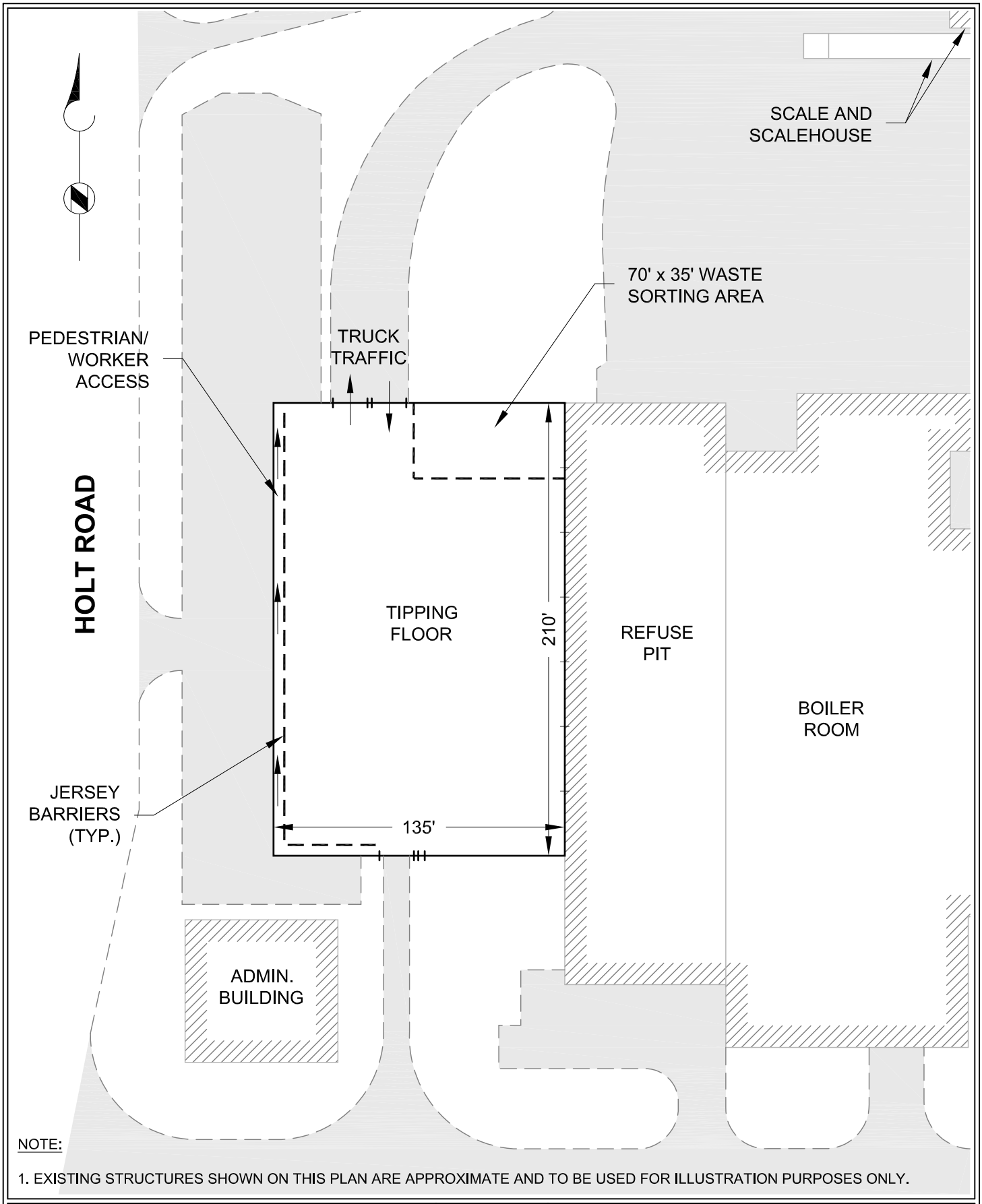
0 250 500 1,000
Ft

Date: 1/24/2017

Project: 148301

Scale: 1" = 1000'

File: N. Andover-Aerial



NOTE:

1. EXISTING STRUCTURES SHOWN ON THIS PLAN ARE APPROXIMATE AND TO BE USED FOR ILLUSTRATION PURPOSES ONLY.

Brown AND Caldwell

TAUNTON, MASSACHUSETTS

DATE: 8/26/15	**FIGURE 1-3**
SCALE: 1"=60'	**TIPPING FLOOR SITE PLAN**
PROJECT: 148301	WHEELABRATOR NORTH ANDOVER, INC. 285 HOLT ROAD NORTH ANDOVER, MASSACHUSETTS 01845
FILE: N-Andover	PREPARED FOR: WHEELABRATOR NORTH ANDOVER, INC.

Aug 26, 2015 - 4:43pm LRoberts
P:\Wheelabrator Environmental Systems\148301_Waste_Composition_Study_2016\CADD\2-Sheets\C-Civil\Figure 2-1_N-Andover.dwg

Appendix A:

Description of Waste Categories

Description of Waste Categories

PAPER

Uncoated Corrugated Cardboard/Kraft Paper means corrugated boxes or paper bags made from Kraft paper. Uncoated Corrugated Cardboard has a wavy center layer and is sandwiched between the two outer layers and does not have any wax coating on the inside or outside. Examples include entire cardboard containers, such as shipping and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons. This type does not include chipboard. Examples of Kraft paper include paper grocery bags, un-soiled fast food bags, department store bags, and heavyweight sheets of Kraft packing paper.

Waxed Cardboard means cardboard with wax coating on the inside or outside.

High Grade Office Paper means the type of paper that is free of ground wood fibers; usually sulfite or sulphate paper; includes office printing and writing papers such as white ledger, color ledger, envelopes, and computer printout paper, bond, rag, or stationary grade paper. This subtype does not include fluorescent dyed paper or deep-tone dyed paper such a goldenrod colored paper.

Magazines/Catalogs means items made of glossy coated paper. This paper is usually slick, smooth to the touch, and reflects light. Examples include glossy magazines, catalogs, brochures, and pamphlets.

Newsprint means the class or kind of paper chiefly used for printing newspapers – i.e. uncoated ground-wood paper.

Other Recyclable Paper means paper, other than the paper mentioned above, which can be recycled. Examples include manila folders, manila envelopes, index cards, white envelopes, notebook paper, carbonless forms, junk mail, chipboard and uncoated paperboard, phone directories, non glossy catalogs, offshore cardboard and deep-toned or fluorescent dyed paper.

Compostable Paper means low grade paper that is not capable of being recycled, as well as food contaminated paper. Examples include paper towels, paper plates, waxed papers, egg cartons, pizza boxes, and tissues.

Remainder/Composite Paper means items made mostly of paper but combined with large amounts of other materials such as plastic, metal, glues, foil, and moisture. Examples include plastic coated corrugated cardboard, cellulose insulation, aseptic packages, polycoated (gable top) cartons, blueprints, sepia, onionskin, foiled lined fast food wrappers, frozen juice containers, carbon paper, self-adhesive notes, soft cover and hardcover books, and photographs.

PLASTICS

PET Beverage Containers (non-MA deposit containers) means clear or colored PET beverage bottles other than MA deposit containers (water, flavored water, juice, sports drinks, etc.). When marked for identification, it bears the number 1 in the center of the triangular recycling symbol and may also bear the letters PETE or PET. A PET container usually has a small dot left from the manufacturing process, not a seam.

PET Containers other than Beverage Containers (which originally contained non-hazardous material) means types of containers such as PET jars, rectangular PET containers used for produce; egg cartons, etc.

Plastic MA Deposit Beverage Containers means plastic beverage containers subject to MA's bottle bill and marked as deposit containers in Massachusetts.

HDPE Bottles, colored and natural, (which originally contained non-hazardous material) means natural and colored HDPE containers. This plastic is usually either cloudy white, allowing light to pass through it (natural) or a solid color, preventing light from passing through it (colored). When marked for identification, it bears the number —2 in the triangular recycling symbol and may also bear the letters — HDPE.

Plastic Tubs and lids (HDPE, PP, etc.) Includes yogurt, margarine, sour cream, deli containers, etc. (i.e. injection molded).

Plastic Containers #3-#7 (which originally contained non-hazardous material) means plastic containers made of types of plastic other than HDPE or PET. Items may be made of PVC, PP, or PS. When marked for identification, these items may bear the number 3, 4, 5, 6, or 7 in the triangular recycling symbol. This subtype also includes unmarked plastic containers.

Expanded Polystyrene Food Grade means "Styrofoam" products includes food packaging and finished products made of expanded polystyrene including cups, plates, trays, clamshells, etc.

Expanded Polystyrene Non-food Grade includes non-food packaging and finished products made of expanded polystyrene including packing peanuts and other packaging materials.

Bulk Rigid Plastic Items means plastic objects other than disposable package items. These items are usually made to last for a few months up to many years. These include the plastics used in children toys, furniture, plastic landscape ties, buckets, crates, pallets, sporting goods, etc.

Film (non-bag clean commercial and industrial packaging film) means film plastic used for large-scale packaging or transport packaging. Examples include shrink-wrap, mattress bags, furniture wrap, and film bubble wrap.

Grocery and other Merchandise Bags means plastic shopping bags, used to contain merchandise to transport from the place of purchase, given out by the store with the purchase. Includes dry-cleaning plastic bags intended for one-time use and other plastic film commonly recycled with grocery bags.

Other Film means plastic film. Examples include garbage bags and other types of plastic bags (sandwich bags, zipper-resealable bags, produce bags, frozen vegetable bags, newspaper bags), painting tarps, food wrappers such as candy-bar wrappers, mailing pouches, bank bags, X-ray film, metalized film (wine containers and balloons), and plastic food wrap.

Remainder/Composite Plastic means plastic that cannot be put in any other type or subtype. This type includes items made mostly of plastic but combined with other materials. Examples include auto parts made of plastic attached to metal, plastic drinking straws, foam packing blocks (not including expanded polystyrene blocks), plastic strapping, new plastic laminate (e.g., Formica), vinyl, linoleum, plastic lumber, imitation ceramics, handles and knobs, some kitchen ware, plastic string (as used for hay bales), and plastic rigid bubble/foil packaging (as for medications); CD's, and rigid plastic housewares, such as mop buckets, dishes, cups, and cutlery.

METALS

Aluminum Beverage Containers (non-MA deposit containers) means beverage containers made from aluminum other than MA deposit containers.

Aluminum MA Deposit Beverage Containers means metal beverage containers subject to MA's bottle bill and marked as deposit containers in Massachusetts.

Tin/Steel Containers means rigid containers made mainly of steel, such as food and beverage containers. These items will stick to a magnet and may be tin-coated.

Other Aluminum – includes foil, food containers, aerosols (empty), etc.

Other Ferrous and non-ferrous means any iron or steel that is magnetic and metal items that are not magnetic (copper, brass, lead, zinc, etc). This subtype does not include "tin/steel containers". Examples include empty or dry paint cans, structural steel beams, boilers, clothes hangers, pipes, some cookware, security bars, scrap ferrous/nonferrous items, and galvanized items such as nails and flashing.

White Goods means appliances that employ electricity, oil, natural gas, or liquefied propane and to preserve or cook food; wash or dry clothing, kitchen utensils, or related items; or to cool or heat air or water. These are primarily encased in metal, and include items such as refrigerators, freezers, stoves, water heaters, propane/compressed tanks, water coolers, dishwashers, clothes dryers, air conditioners, gas or electric ovens and ranges. White goods do not include microwaves.

Remainder/Composite Metal means metal that cannot be put in any other type. This type includes items made mostly of metal but combined with other materials and items made of both ferrous metal and nonferrous metal combined. Examples include microwaves, bikes, motors, insulated wire, and finished products that contain a mixture of metals, or metals and other materials, whose weight is derived significantly from the metal portion of its construction.

GLASS

Glass Beverage Containers (non-MA deposit containers) includes wine bottles, nonalcoholic beverage containers, liquor bottles, etc.

Other Glass Packaging Containers (non-MA deposit containers) includes glass food and non-food containers such as sauces, jars, perfume containers, etc.

Glass MA Deposit Beverage Containers means glass beverage containers subject to MA's bottle bill and marked as deposit containers in Massachusetts.

Remainder/Composite Glass means glass that cannot be put in any other type. It may include items made mostly of glass but combined with other materials. Examples include Pyrex, Corning ware, crystal, plate glass, window and door glass, ceramics, porcelain, and other glass tableware, mirrors, non-fluorescent light bulbs, auto windshields, laminated glass, or any curved glass.

ORGANIC MATERIALS

Food Waste means food material resulting from the processing, storage, preparation, cooking, handling, or consumption of food. This type includes material from industrial, commercial, or residential sources. Examples include discarded meat scraps, dairy products, eggshells, fruit or vegetable peels, and other food items from homes, stores and restaurants. This type includes apple pomace and other processed residues or material from canneries, wineries or other industrial sources.

Branches and Stumps means trees, stumps, branches, or other wood greater than 1 inch in diameter generated from landscapes, clearing land for commercial or residential development, road construction, agricultural land clearing, storms, or natural disaster.

Prunings, Trimmings, Leaves and Grass means plant material, except woody material 1 inch or less in diameter from any public or private landscapes. Examples include branches, prunings, shrubs, leaves, grass clippings, and plants. This subtype does not include woody material greater than 4 inches in diameter.

Manures means manure and soiled bedding materials from domestic, farm, wild, or ranch animals. Examples include manure and soiled bedding from animal production operations, racetracks, riding stables, animal hospitals, laboratories, zoos, nature centers, and other sources.

Remainder/Composite Organic means organic material that cannot be put in any other type or subtype. This type includes items made mostly of organic materials but combined with other materials. Examples include cork, hemp rope, hair, cigarette butts, full vacuum bags, sawdust, and animal feces.

CONSTRUCTION AND DEMOLITION (IN THE MSW STREAM)

Asphalt Pavement, Brick, and Concrete includes asphalt pavement, brick, and concrete from construction activities and demolition of buildings, roads, and bridges and similar sources. Asphalt pavement also includes other black or brown, tar-like material mixed with aggregate and used as a paving material. Brick also includes masonry brick, landscaping or walkway brick. Concrete also includes pieces of building foundations, concrete paving, and cinder blocks.

Aggregates, Stone, Rock includes dirt, non-organic material from construction and landscaping activities. May also include products made predominately from these materials (i.e. granite counters).

Wood – Treated means wood that contains an adhesive, paint, stain, fire retardant, pesticide or preservative.

Wood – Untreated refers to any wood which does not contain an adhesive, paint, stain, fire retardant, pesticide or preservative; includes such items as pallets, skids, spools, packaging materials, bulky wood waste or scraps from newly built wood products. Does not including land clearing debris or yard waste prunings and trimmings

Asphalt Roofing means composite shingles and other roofing material made with asphalt. Examples include asphalt shingles and attached roofing tar and tar paper.

Drywall/Gypsum Board means interior wall covering made of a sheet of gypsum sandwiched between paper layers. Examples include used or unused, broken or whole sheets of sheetrock, drywall, gypsum board, plasterboard, gypsum board, gyproc, and wallboard.

Carpet and Carpet Padding means flooring applications consisting of various natural or synthetic fibers which maybe bonded to some type of backing material and plastic, foam, felt, or other material used under carpet to provide insulation and padding.

Remainder/Composite Construction and Demolition means construction and demolition material that cannot be put in any other type or subtype. This type may include items from different types combined, which would be very hard to separate.

HOUSEHOLD HAZARDOUS WASTE

Ballasts, CFLs, and Other Fluorescents include ballasts, which are devices that electrically control fluorescent light fixtures and that include a capacitor, CFLs, which are compact fluorescent bulbs, and other fluorescent lighting, which includes tubular fluorescent lamps, neon lamps, black lights, and other lamps used for sanitation or cosmetic purposes.

Batteries – Lead Acid means lead acid storage batteries most commonly used in vehicles such as cars, trucks, boats, etc.

Batteries – Other means alkaline (including alkaline rechargeable) or household batteries such as AA, AAA, C, D, 4.5 volt, button cell, rechargeable and 9 volt used for flashlights, small appliances, and electronic devices.

Paint means containers with paint in them. Examples include latex paint, oil based paint, and tubes of pigment or fine art paint. This type does not include dried paint, empty paint cans, or empty aerosol containers.

Bio-Hazardous - means discarded animal or human medical/treatment wastes including needles, first aid wastes, diapers and other products which are used in relation to animal or human care. This category does not include cat litter or animal feces.

Vehicle and Equipment Fluids in containers and oil filters means containers with fluids used in vehicles or engines. Examples include antifreeze, oil, and brake fluid. This type does not include empty vehicle and equipment fluid containers. Oil filters include vehicle engine oil filters.

Empty Metal, Glass, and Plastic Containers (that originally contained toxic materials) means all containers that are empty but that at one time contained toxic or hazardous fluids or other materials. Examples include empty antifreeze, oil, or lye containers.

Other Hazardous or Household Hazardous Waste means all household or commercial products characterized as toxic, corrosive, flammable, ignitable, radioactive, poisonous, or reactive, including pesticides and fertilizers.

ELECTRONICS

Computer-related Electronics includes computer CPUs, laptop computers, notebook computers, processors, printers, scanners, keyboards, etc. This category does not include automated typewriters or typesetters, portable handheld calculators, portable digital assistants or other similar devices.

Other "brown goods" includes cell phones, I Pods, PDAs, small electronic appliances such as toasters, telephones, stereos, radios, clocks, hair dryers etc.

Televisions and Computer Monitors means a stand-alone display system containing a CRT or any other type of display primarily intended to receive video programming via broadcast. Examples also include non-CRT units such as plasma and LCD monitors.

OTHER MATERIALS

Tires and other rubber means a continuous solid or pneumatic rubber covering intended for use on any type of vehicle (including bicycles), or trailer to be used in tandem with any type vehicle and other rubber products.

Textiles mean natural or man-made textile materials such as cottons, wools, silk, nylon, polyester. It includes clothing, curtains, towels and other fabric materials.

Mattresses means mattresses and box springs.

Bulky Materials means products made from multiple materials and large in size, which are meant for extended use. Includes, furniture (non-plastic), sinks, toilets, and other non-metal items.

Restaurant Fats, Oils and Grease means any fats, oils and grease generated from the food preparation process.

Other Miscellaneous means any other type of waste not listed in any other sort category.

Appendix B:

Waste Composition of Sample Loads for Season 1

Table B-1 First Season Waste Composition								
Categories		Rear Loader 1-1	Front Loader 1-2	Rear Loader 1-3	Rear Loader 1-4	Rear Loader 1-5	Side Loader 1-6	Side Loader 1-7
1.0	PAPER							
1.1	Uncoated Corrugated Cardboard/Kraft Paper	0.8%	12.0%	17.8%	4.5%	0.3%	0.9%	0.8%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.8%	0.3%	0.6%	0.0%	1.4%	0.3%	1.1%
1.4	Magazines/Catalogs	0.1%	0.1%	1.2%	0.2%	1.0%	0.4%	1.1%
1.5	Newsprint	1.7%	1.2%	0.0%	2.2%	0.3%	0.5%	1.0%
1.6	Other Recyclable Paper	3.3%	1.7%	2.3%	2.5%	3.5%	5.8%	3.9%
1.7	Compostable Paper	3.9%	2.9%	2.4%	4.3%	5.7%	17.1%	6.2%
1.8	Remainder/Composite Paper	0.9%	0.1%	0.1%	0.2%	0.4%	0.5%	0.2%
2.0	PLASTICS							
2.1	PET Beverage Containers	0.7%	0.2%	0.3%	0.7%	0.1%	0.5%	0.7%
2.2	PET Containers other than Beverage Containers	0.7%	0.1%	0.0%	0.1%	0.2%	0.2%	0.2%
2.3	Plastic MA Deposit Beverage Containers	0.4%	0.4%	0.1%	0.3%	0.0%	0.1%	0.1%
2.4	HDPE Bottles, colored and natural	0.5%	0.7%	0.1%	0.9%	0.6%	0.3%	0.9%
2.5	Plastic Tubs and lids	0.3%	0.1%	0.8%	0.3%	0.2%	0.5%	0.7%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.2%	0.5%	0.5%	0.3%	0.3%	1.7%	0.4%
2.7	Expanded Polystyrene Food Grade	0.5%	0.2%	0.2%	0.2%	0.3%	0.4%	0.6%
2.8	Expanded Polystyrene Non-food Grade	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
2.9	Bulk Rigid Plastic Items	0.4%	6.3%	0.0%	0.0%	7.3%	7.3%	6.2%
2.1	Film (non-bag commercial and industrial packaging film)	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
2.11	Grocery and other Merchandise Bags	1.0%	0.6%	0.2%	0.8%	0.4%	1.2%	0.6%
2.12	Other Film means plastic film	2.8%	1.0%	2.5%	1.9%	1.9%	3.9%	2.4%
2.13	Remainder/Composite Plastic	0.1%	7.4%	0.3%	0.3%	0.6%	1.0%	1.1%
3.0	METALS							
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%
3.2	Aluminum MA Deposit Beverage Containers	0.1%	0.3%	0.1%	0.1%	0.1%	0.1%	0.0%
3.3	Tin/Steel Containers	1.1%	0.4%	1.4%	1.0%	0.3%	0.3%	1.5%
3.4	Other Aluminum	0.2%	0.0%	0.1%	0.1%	0.1%	0.2%	0.4%
3.5	Other Ferrous and non-ferrous	0.1%	0.0%	0.0%	0.9%	0.1%	0.1%	0.5%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	0.4%	0.2%	30.4%	0.2%	0.9%	0.3%	6.7%
4.0	GLASS							
4.1	Glass Beverage Containers (non-MA deposit containers)	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	2.7%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	1.0%
4.3	Glass MA Deposit Beverage Containers	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.5%
4.4	Remainder/Composite Metal	0.4%	0.0%	0.0%	0.8%	0.6%	1.2%	0.0%

Table B-1 First Season Waste Composition Continued								
Categories		Rear Loader	Front Loader	Rear Loader	Rear Loader	Rear Loader	Side Loader	Side Loader
5.0	ORGANIC MATERIAL							
5.1	Food Waste	16.7%	6.6%	29.6%	20.6%	28.3%	17.3%	34.4%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.2%	0.0%	0.0%	0.1%	0.0%	0.3%	0.0%
5.4	Manures	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.5	Remainder/Composite Organic	4.8%	1.8%	1.1%	0.6%	9.5%	22.3%	1.5%
6.0	CONSTRUCTION AND DEMOLITION							
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%
6.3	Wood – Treated	4.7%	13.1%	0.0%	2.3%	5.0%	0.3%	8.4%
6.4	Wood – untreated	10.6%	4.6%	0.0%	0.1%	0.0%	0.0%	0.0%
6.5	Asphalt Roofing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.0%	0.0%	0.0%	6.2%	13.9%	0.0%	0.2%
6.7	Carpet and Carpet Padding	0.0%	29.2%	0.0%	0.0%	0.0%	0.1%	0.8%
6.8	Remainder/Compo-site Construction and Demolition	0.0%	0.0%	7.1%	0.0%	0.0%	9.2%	0.8%
7.0	HOUSEHOLD HAZARDOUS WASTE							
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.3	Batteries – Other	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%	0.1%
7.4	Paint	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.5	Bio-Hazardous (Diapers)	14.3%	0.1%	0.1%	1.3%	0.8%	2.0%	1.6%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers (contained toxic materials)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.8	Other Hazardous or Household Hazardous Waste	0.6%	0.0%	0.0%	0.2%	0.3%	0.0%	0.0%
8.0	ELECTRONICS							
8.1	Computer-related Electronics	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8.2	Other “brown goods”	0.0%	0.0%	0.0%	6.1%	0.1%	0.0%	0.1%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.0	OTHER MATERIALS							
9.1	Tires and other rubber	7.3%	0.0%	0.3%	0.9%	0.0%	0.0%	0.0%
9.2	Textiles	18.5%	0.0%	0.0%	10.3%	15.1%	1.0%	10.3%
9.3	Mattresses	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10.0	OTHER MISCELLANEOUS	0.7%	8.1%	0.2%	27.3%	0.2%	1.1%	0.0%

Table B-2 First Season Waste Composition								
Categories		Rear loader 1-8	Front loader 1-9	Rear loader 1-10	Side Loader 1-11	Rear loader 1-12	Front loader 1-13	Front loader 1-14
1	PAPER							
1.1	Uncoated Corrugated Cardboard/Kraft Paper	1.7%	22.1%	0.9%	2.4%	12.5%	10.3%	1.7%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.3%	0.0%	0.3%	0.0%	0.2%	0.3%	0.1%
1.4	Magazines/Catalogs	16.3%	1.1%	0.0%	0.2%	3.8%	0.0%	1.8%
1.5	Newsprint	0.7%	1.5%	0.8%	1.1%	0.0%	0.6%	3.6%
1.6	Other Recyclable Paper	4.6%	2.3%	6.9%	6.8%	6.1%	8.4%	3.7%
1.7	Compostable Paper	11.9%	3.2%	5.6%	5.7%	5.8%	6.8%	6.0%
1.8	Remainder/Composite Paper	1.6%	0.1%	0.2%	0.1%	0.4%	0.0%	0.3%
2	PLASTICS							
2.1	PET Beverage Containers	0.4%	2.4%	0.2%	0.6%	0.5%	0.3%	0.9%
2.2	PET Containers other than Beverage Containers	0.2%	0.2%	0.2%	0.2%	0.2%	0.0%	0.1%
2.3	Plastic MA Deposit Beverage Containers	0.1%	1.3%	0.2%	0.3%	0.2%	0.2%	0.1%
2.4	HDPE Bottles, colored and natural	0.8%	0.5%	0.4%	0.2%	0.7%	0.1%	0.6%
2.5	Plastic Tubs and lids	0.5%	0.2%	0.3%	0.3%	0.9%	0.5%	0.3%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.6%	2.0%	0.6%	0.8%	0.7%	0.5%	0.7%
2.7	Expanded Polystyrene Food Grade	0.5%	0.2%	0.1%	0.5%	0.8%	2.0%	0.2%
2.8	Expanded Polystyrene Non-food Grade	0.0%	3.2%	0.1%	0.0%	0.0%	0.2%	0.3%
2.9	Bulk Rigid Plastic Items	0.7%	0.4%	0.3%	0.0%	0.0%	3.7%	0.7%
2.1	Film (non-bag commercial and industrial packaging film)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.11	Grocery and other Merchandise Bags	0.6%	0.3%	0.3%	1.2%	0.7%	0.3%	0.7%
2.12	Other Film means plastic film	3.3%	1.6%	2.4%	3.0%	3.0%	6.2%	1.7%
2.13	Remainder/Composite Plastic	0.8%	2.3%	1.2%	0.7%	0.6%	0.6%	0.3%
3	METALS							
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.2%	0.3%	0.0%	0.1%	0.0%	0.0%	0.3%
3.2	Aluminum MA Deposit Beverage Containers	0.2%	0.3%	0.2%	0.1%	0.1%	0.0%	0.2%
3.3	Tin/Steel Containers	2.4%	0.0%	0.1%	1.2%	0.5%	0.2%	0.6%
3.4	Other Aluminum	0.6%	0.1%	0.2%	0.1%	0.3%	0.6%	0.4%
3.5	Other Ferrous and non-ferrous	0.3%	0.4%	0.5%	0.2%	0.0%	0.0%	0.2%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	2.8%	2.9%	2.0%	1.0%	1.7%	0.0%	10.6%
4	GLASS							
4.1	Glass Beverage Containers (non-MA deposit containers)	1.0%	0.2%	0.0%	0.2%	0.5%	0.0%	0.0%
4.2	Other Glass Packaging Containers (non-MA deposit	2.5%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%
4.3	Glass MA Deposit Beverage Containers	0.2%	0.0%	0.4%	0.1%	1.5%	0.0%	0.2%
4.4	Remainder/Composite Metal	0.3%	0.5%	0.0%	0.4%	0.5%	0.0%	0.6%

Table B-2 First Season Waste Composition Continued								
Categories		Rear loader	Front loader	Rear loader	Side Loader	Rear loader	Front loader	Front loader
5	ORGANIC MATERIAL							
5.1	Food Waste	26.9%	16.7%	30.2%	23.7%	35.0%	43.2%	15.4%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.0%	0.0%	0.5%	0.2%	0.5%	0.0%	0.1%
5.4	Manures	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.5	Remainder/Composite Organic	4.7%	1.1%	0.3%	5.8%	16.3%	0.0%	16.7%
6	CONSTRUCTION AND DEMOLITION							
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.3	Wood – Treated	0.0%	0.1%	14.6%	0.4%	2.5%	0.1%	0.9%
6.4	Wood – untreated	0.1%	5.7%	0.0%	0.1%	0.0%	0.0%	10.4%
6.5	Asphalt Roofing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.7	Carpet and Carpet Padding	0.0%	0.0%	0.0%	28.5%	0.0%	0.0%	0.0%
6.8	Remainder/Compo-site Construction and Demolition	1.2%	8.1%	0.2%	0.7%	0.0%	12.2%	0.0%
7	HOUSEHOLD HAZARDOUS WASTE							
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.3	Batteries – Other	0.3%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
7.4	Paint	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.5	Bio-Hazardous (Diapers)	2.6%	0.6%	11.8%	5.8%	0.0%	1.9%	1.2%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers (contained toxic materials)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.8	Other Hazardous or Household Hazardous Waste	0.3%	0.3%	0.0%	0.0%	0.1%	0.1%	0.0%
8	ELECTRONICS							
8.1	Computer-related Electronics	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8.2	Other "brown goods"	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9	OTHER MATERIALS							
9.1	Tires and other rubber	0.2%	13.2%	0.0%	0.0%	0.0%	0.3%	0.0%
9.2	Textiles	4.0%	3.4%	13.4%	7.2%	0.5%	0.6%	11.6%
9.3	Mattresses	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10	OTHER MISCELLANEOUS	3.4%	1.3%	4.7%	0.1%	0.6%	0.0%	7.1%

Table B-3 First Season Waste Composition								
Categories		Front loader 1-15	Roll Off Compactor 1-16	Side loader 1-17	Side loader 1-18	Rear loader 1-19	Side loader 1-20	Rear loader 1-21
1	PAPER							
1.1	Uncoated Corrugated Cardboard/Kraft Paper	5.3%	28.0%	15.9%	10.0%	13.4%	0.7%	2.5%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.2%	0.1%	1.7%	0.2%	0.2%	0.4%	0.1%
1.4	Magazines/Catalogs	0.4%	0.0%	3.8%	0.3%	0.8%	6.5%	0.1%
1.5	Newsprint	4.7%	0.0%	6.0%	1.1%	2.7%	0.5%	0.0%
1.6	Other Recyclable Paper	5.6%	0.0%	22.3%	2.5%	3.3%	4.1%	5.6%
1.7	Compostable Paper	6.8%	0.0%	10.2%	2.4%	3.4%	6.0%	6.8%
1.8	Remainder/Composite Paper	0.2%	0.0%	0.7%	0.2%	0.2%	0.3%	0.2%
2	PLASTICS							
2.1	PET Beverage Containers	0.2%	0.0%	0.8%	0.4%	0.2%	0.7%	0.2%
2.2	PET Containers other than Beverage Containers	0.2%	0.0%	0.3%	0.0%	0.0%	0.1%	0.1%
2.3	Plastic MA Deposit Beverage Containers	0.2%	0.0%	0.0%	0.3%	0.0%	0.6%	0.0%
2.4	HDPE Bottles, colored and natural	1.0%	0.0%	0.3%	0.3%	0.2%	1.8%	0.3%
2.5	Plastic Tubs and lids	0.3%	0.0%	0.3%	0.5%	0.2%	0.3%	0.4%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.9%	0.0%	1.4%	0.5%	0.4%	0.7%	1.2%
2.7	Expanded Polystyrene Food Grade	0.3%	0.0%	0.2%	0.2%	0.1%	0.3%	0.5%
2.8	Expanded Polystyrene Non-food Grade	0.1%	15.0%	0.1%	0.1%	0.0%	0.1%	0.0%
2.9	Bulk Rigid Plastic Items	0.1%	0.0%	0.0%	0.0%	0.0%	6.1%	5.7%
2.1	Film (non-bag commercial and industrial packaging film)	0.0%	15.4%	0.1%	0.0%	0.0%	0.0%	1.4%
2.11	Grocery and other Merchandise Bags	0.3%	0.0%	0.5%	0.6%	0.1%	1.4%	0.7%
2.12	Other Film means plastic film	3.5%	0.0%	2.9%	1.2%	1.5%	3.2%	4.5%
2.13	Remainder/Composite Plastic	0.6%	0.2%	0.7%	1.8%	0.5%	0.7%	4.9%
3	METALS							
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%
3.2	Aluminum MA Deposit Beverage Containers	0.1%	0.0%	0.1%	0.0%	0.1%	0.3%	0.1%
3.3	Tin/Steel Containers	0.4%	0.0%	1.3%	0.5%	0.0%	1.4%	0.2%
3.4	Other Aluminum	0.3%	0.0%	0.2%	0.1%	0.5%	0.6%	1.1%
3.5	Other Ferrous and non-ferrous	0.0%	0.0%	0.7%	0.0%	0.0%	0.2%	0.1%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	0.2%	0.0%	0.0%	0.1%	0.4%	0.0%	4.8%
4	GLASS							
4.1	Glass Beverage Containers (non-MA deposit containers)	5.0%	0.0%	1.0%	0.4%	0.2%	0.3%	0.4%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.4%	0.0%	0.5%	0.3%	0.6%	0.0%	0.2%
4.3	Glass MA Deposit Beverage Containers	0.2%	0.0%	0.7%	0.2%	0.0%	0.0%	0.0%
4.4	Remainder/Composite Metal	0.8%	0.0%	0.6%	0.1%	0.1%	0.2%	0.6%

Table B-3 First Season Waste Composition Continued								
		Front loader	Roll Off Compactor	Side loader	Side loader	Rear loader	Side loader	Rear loader
	Categories	1-15	1-16	1-17	1-18	1-19	1-20	1-21
5	ORGANIC MATERIAL							
5.1	Food Waste	53.0%	0.0%	16.9%	18.9%	22.1%	34.0%	31.5%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
5.4	Manures	0.0%	0.0%	5.1%	0.0%	0.0%	0.0%	0.0%
5.5	Remainder/Composite Organic	3.9%	0.0%	1.7%	21.1%	0.1%	0.7%	10.9%
6	CONSTRUCTION AND DEMOLITION							
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.3	Wood – Treated	0.0%	0.0%	0.0%	0.0%	9.6%	8.2%	0.3%
6.4	Wood – untreated	0.0%	41.3%	0.9%	0.0%	0.0%	0.0%	0.0%
6.5	Asphalt Roofing	0.0%	0.0%	0.0%	6.4%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
6.7	Carpet and Carpet Padding	0.0%	0.0%	0.0%	0.0%	27.1%	0.9%	0.0%
6.8	Remainder/Compo-site Construction and Demolition	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7	HOUSEHOLD HAZARDOUS WASTE							
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.3	Batteries – Other	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
7.4	Paint	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.5	Bio-Hazardous (Diapers)	3.2%	0.0%	1.3%	1.1%	4.1%	11.7%	8.0%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers (contained	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.8	Other Hazardous or Household Hazardous Waste	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8	ELECTRONICS							
8.1	Computer-related Electronics	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8.2	Other "brown goods"	0.0%	0.0%	0.0%	7.2%	0.0%	4.2%	2.8%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9	OTHER MATERIALS							
9.1	Tires and other rubber	0.5%	0.0%	0.0%	6.2%	0.0%	0.2%	0.0%
9.2	Textiles	0.9%	0.0%	0.5%	13.7%	8.0%	1.7%	3.6%
9.3	Mattresses	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10	OTHER MISCELLANEOUS	0.0%	0.0%	0.1%	1.0%	0.0%	0.3%	0.3%

Table B-4 First Season Waste Composition						
Categories		Roll Off Compactor 1-22	Rear Loader 1-23	Side loader 1-24	Roll Off Compactor 1-25	Roll-off Open Top 1-26
1	PAPER					
1.1	Uncoated Corrugated Cardboard/Kraft Paper	18.8%	1.4%	0.1%	6.6%	69.9%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.4%	0.6%	0.1%	0.0%	0.0%
1.4	Magazines/Catalogs	0.1%	2.3%	0.2%	0.0%	0.0%
1.5	Newsprint	0.8%	2.8%	1.6%	0.0%	0.0%
1.6	Other Recyclable Paper	9.4%	4.1%	3.5%	0.1%	0.0%
1.7	Compostable Paper	9.0%	7.1%	7.1%	1.8%	0.0%
1.8	Remainder/Composite Paper	0.9%	0.1%	0.2%	2.4%	0.0%
2	PLASTICS					
2.1	PET Beverage Containers	1.0%	0.5%	1.2%	0.0%	0.0%
2.2	PET Containers other than Beverage Containers	0.2%	0.2%	0.3%	0.0%	0.0%
2.3	Plastic MA Deposit Beverage Containers	0.4%	0.2%	0.4%	0.0%	0.0%
2.4	HDPE Bottles, colored and natural	0.4%	0.1%	0.1%	0.0%	0.0%
2.5	Plastic Tubs and lids	0.5%	0.3%	0.5%	0.1%	0.0%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	1.1%	0.7%	0.9%	0.4%	0.0%
2.7	Expanded Polystyrene Food Grade	0.2%	0.4%	0.4%	0.0%	0.0%
2.8	Expanded Polystyrene Non-food Grade	0.2%	0.1%	0.0%	0.0%	0.0%
2.9	Bulk Rigid Plastic Items	0.0%	5.6%	0.0%	0.0%	0.0%
2.1	Film (non-bag commercial and industrial packaging film)	0.0%	0.2%	0.0%	6.4%	0.0%
2.11	Grocery and other Merchandise Bags	0.7%	0.5%	0.7%	0.1%	0.0%
2.12	Other Film means plastic film	3.3%	2.7%	2.4%	0.5%	0.0%
2.13	Remainder/Composite Plastic	1.5%	6.5%	14.7%	4.3%	0.0%
3	METALS					
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.2%	0.1%	0.0%	0.0%	0.0%
3.2	Aluminum MA Deposit Beverage Containers	0.2%	0.2%	0.0%	0.0%	0.0%
3.3	Tin/Steel Containers	0.2%	0.3%	1.5%	0.0%	0.0%
3.4	Other Aluminum	0.1%	0.2%	0.6%	0.0%	0.0%
3.5	Other Ferrous and non-ferrous	0.1%	0.2%	0.0%	0.0%	0.0%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	0.5%	8.7%	0.3%	0.0%	5.1%
4	GLASS					
4.1	Glass Beverage Containers (non-MA deposit	0.0%	1.1%	0.3%	0.0%	0.0%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.1%	1.0%	1.2%	0.0%	0.0%
4.3	Glass MA Deposit Beverage Containers	0.0%	0.4%	0.2%	0.0%	0.0%
4.4	Remainder/Composite Metal	0.0%	0.4%	0.4%	0.0%	0.0%

Table B-4 First Season Waste Composition Continued						
Categories		Roll Off Compactor	Rear Loader	Side loader	Roll Off Compactor	Roll-off Open Top
5	ORGANIC MATERIAL					
5.1	Food Waste	11.5%	14.2%	23.5%	1.1%	0.0%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.0%	0.0%	0.0%	0.0%	0.0%
5.4	Manures	0.0%	0.0%	0.0%	0.0%	0.0%
5.5	Remainder/Composite Organic	19.2%	19.0%	20.6%	0.0%	0.0%
6	CONSTRUCTION AND DEMOLITION					
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.0%	0.0%	0.0%	0.0%
6.3	Wood – Treated	1.3%	0.4%	0.5%	11.1%	0.0%
6.4	Wood – untreated	0.0%	0.8%	0.0%	65.0%	25.0%
6.5	Asphalt Roofing	0.0%	0.3%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.0%	0.0%	0.0%	0.0%	0.0%
6.7	Carpet and Carpet Padding	0.0%	0.0%	0.0%	0.0%	0.0%
6.8	Remainder/Compo-site Construction and Demolition	11.1%	0.0%	0.0%	0.0%	0.0%
7	HOUSEHOLD HAZARDOUS WASTE					
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	0.0%	0.0%	0.0%
7.3	Batteries – Other	0.1%	0.0%	0.1%	0.0%	0.0%
7.4	Paint	1.4%	0.6%	0.0%	0.0%	0.0%
7.5	Bio-Hazardous (Diapers)	0.0%	3.1%	4.0%	0.0%	0.0%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers	0.0%	0.0%	0.0%	0.0%	0.0%
7.8	Other Hazardous or Household Hazardous Waste	0.0%	0.8%	0.3%	0.0%	0.0%
8	ELECTRONICS					
8.1	Computer-related Electronics	0.0%	0.0%	0.0%	0.0%	0.0%
8.2	Other “brown goods”	0.0%	0.0%	0.0%	0.0%	0.0%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%
9	OTHER MATERIALS					
9.1	Tires and other rubber	0.1%	0.0%	0.0%	0.0%	0.0%
9.2	Textiles	5.3%	3.4%	11.7%	0.1%	0.0%
9.3	Mattresses	0.0%	0.0%	0.0%	0.0%	0.0%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%
10	OTHER MISCELLANEOUS	0.0%	8.7%	0.3%	0.0%	0.0%

Appendix C:

Waste Composition of Sample Loads for Season 2

Table C-1 Second Season Waste Composition								
	Categories	Side Loader 2-01	Front Loader 2-02	Side Loader 2-03	Rear Loader 2-04	Rear Loader 2-05	Rear Loader 2-06	Rear Loader 2-07
1	PAPER							
1.1	Uncoated Corrugated Cardboard/Kraft Paper	2.5%	7.6%	6.1%	0.7%	7.5%	0.9%	3.8%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.3%	1.8%	0.0%	0.1%	0.0%	0.0%	0.4%
1.4	Magazines/Catalogs	0.5%	2.3%	0.3%	1.3%	0.3%	1.7%	1.5%
1.5	Newsprint	0.0%	1.6%	0.4%	2.5%	1.9%	1.0%	1.4%
1.6	Other Recyclable Paper	1.4%	3.5%	1.8%	5.7%	1.5%	4.6%	2.3%
1.7	Compostable Paper	5.2%	11.8%	9.8%	16.5%	4.3%	11.7%	5.4%
1.8	Remainder/Composite Paper	0.6%	1.0%	0.2%	0.7%	1.3%	2.1%	1.1%
2	PLASTICS							
2.1	PET Beverage Containers	0.3%	0.9%	0.7%	1.8%	0.5%	0.2%	0.0%
2.2	PET Containers other than Beverage Containers	0.0%	0.2%	0.2%	0.8%	0.2%	0.2%	0.4%
2.3	Plastic MA Deposit Beverage Containers	0.3%	0.5%	0.4%	1.3%	0.0%	0.0%	0.5%
2.4	HDPE Bottles, colored and natural	0.3%	0.2%	0.7%	0.0%	0.2%	0.2%	0.1%
2.5	Plastic Tubs and lids	0.0%	0.3%	0.3%	0.1%	0.7%	0.5%	0.8%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.0%	0.3%	0.2%	0.1%	0.1%	0.9%	0.5%
2.7	Expanded Polystyrene Food Grade	0.0%	0.3%	0.3%	0.1%	0.6%	2.5%	0.3%
2.8	Expanded Polystyrene Non-food Grade	0.0%	0.1%	0.2%	0.2%	0.0%	0.0%	0.4%
2.9	Bulk Rigid Plastic Items	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.1	Film (non-bag commercial and industrial packaging film)	0.0%	0.7%	0.3%	0.0%	0.6%	0.6%	0.1%
2.11	Grocery and other Merchandise Bags	1.8%	0.7%	0.7%	0.9%	0.6%	0.6%	1.4%
2.12	Other Film means plastic film	4.2%	7.1%	2.4%	6.6%	2.5%	5.8%	4.4%
2.13	Remainder/Composite Plastic	0.9%	3.3%	1.8%	1.0%	2.2%	1.3%	0.0%
3	METALS							
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.0%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%
3.2	Aluminum MA Deposit Beverage Containers	0.1%	0.4%	0.2%	0.3%	0.0%	0.0%	0.0%
3.3	Tin/Steel Containers	0.4%	0.5%	0.1%	1.1%	0.3%	0.8%	0.7%
3.4	Other Aluminum	0.0%	0.1%	0.0%	0.3%	0.0%	0.6%	0.1%
3.5	Other Ferrous and non-ferrous	0.0%	0.4%	0.0%	0.7%	0.0%	0.7%	0.1%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	1.1%	0.4%	0.0%	3.3%	0.0%	1.6%	0.0%
4	GLASS							
4.1	Glass Beverage Containers (non-MA deposit containers)	0.2%	0.5%	0.0%	0.0%	0.8%	0.0%	0.0%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.0%	0.0%	0.0%	0.3%	0.2%	0.0%	0.0%
4.3	Glass MA Deposit Beverage Containers	0.6%	0.9%	0.6%	0.0%	0.0%	0.0%	0.1%
4.4	Remainder/Composite Metal	0.1%	0.0%	0.0%	0.2%	0.2%	0.2%	0.2%

Table C-1 Second Season Waste Composition Continued								
	Categories	Side Loader 2-01	Front Loader 2-02	Side Loader 2-03	Rear Loader 2-04	Rear Loader 2-05	Rear Loader 2-06	Rear Loader 2-07
5	ORGANIC MATERIAL							
5.1	Food Waste	5.1%	35.3%	23.7%	34.7%	14.2%	35.1%	34.2%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	57.2%	0.0%	22.5%	0.7%	0.0%	9.2%	0.1%
5.4	Manures	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.5	Remainder/Composite Organic	0.0%	0.0%	0.0%	3.7%	0.0%	2.8%	0.8%
6	CONSTRUCTION AND DEMOLITION							
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	1.0%
6.3	Wood – Treated	0.0%	10.9%	0.0%	0.0%	20.5%	0.4%	4.3%
6.4	Wood – untreated	0.0%	0.7%	14.5%	5.8%	0.0%	0.0%	0.0%
6.5	Asphalt Roofing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.7	Carpet and Carpet Padding	11.7%	0.0%	0.0%	0.0%	23.6%	0.1%	31.1%
6.8	Remainder/Compo-site Construction and Demolition	1.3%	0.0%	0.7%	0.5%	0.1%	0.0%	0.0%
7	HOUSEHOLD HAZARDOUS WASTE							
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	5.5%	0.0%	0.0%	0.0%	0.0%
7.3	Batteries – Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.4	Paint	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.5	Bio-Hazardous (Diapers)	0.0%	3.6%	3.8%	5.2%	0.9%	3.7%	0.7%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers	0.0%	0.0%	0.1%	0.5%	1.2%	0.0%	0.1%
7.8	Other Hazardous or Household Hazardous Waste	0.5%	0.0%	0.0%	0.0%	0.6%	0.1%	0.2%
8	ELECTRONICS							
8.1	Computer-related Electronics	0.0%	1.0%	0.2%	0.0%	0.0%	0.0%	0.0%
8.2	Other “brown goods”	0.3%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9	OTHER MATERIALS							
9.1	Tires and other rubber	0.0%	0.1%	0.9%	0.2%	0.0%	0.4%	0.0%
9.2	Textiles	2.6%	0.3%	0.0%	0.8%	10.8%	3.8%	1.1%
9.3	Mattresses	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10	OTHER MISCELLANEOUS	0.5%	0.1%	0.5%	0.3%	1.7%	4.6%	0.4%

Table C-2 Second Season Waste Composition								
Categories		Roll-off Comp 2-08	Front Loader 2-09	Side Loader 2-10	Side Loader 2-11	Front Loader 2-12	Roll-off Comp 2-13	Rear Loader 2-14
1	PAPER							
1.1	Uncoated Corrugated Cardboard/Kraft Paper	40.4%	13.2%	3.2%	2.7%	0.1%	0.0%	1.0%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.4%	0.4%	0.4%	0.0%	0.0%	0.0%	0.1%
1.4	Magazines/Catalogs	0.0%	0.3%	0.1%	2.1%	0.5%	0.0%	2.4%
1.5	Newsprint	0.0%	1.0%	0.5%	0.0%	0.1%	0.0%	0.4%
1.6	Other Recyclable Paper	0.6%	2.8%	3.5%	4.6%	1.5%	17.7%	2.3%
1.7	Compostable Paper	7.1%	13.8%	14.4%	8.2%	4.9%	0.0%	7.6%
1.8	Remainder/Composite Paper	1.2%	1.3%	3.3%	0.5%	0.7%	0.0%	0.6%
2	PLASTICS							
2.1	PET Beverage Containers	0.9%	2.3%	0.8%	1.7%	0.7%	0.0%	0.4%
2.2	PET Containers other than Beverage Containers	0.4%	0.3%	0.7%	0.2%	0.2%	0.0%	0.0%
2.3	Plastic MA Deposit Beverage Containers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.4	HDPE Bottles, colored and natural	0.2%	1.6%	0.5%	0.1%	0.5%	0.0%	0.3%
2.5	Plastic Tubs and lids	1.3%	1.2%	0.4%	0.4%	0.1%	0.0%	0.1%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.0%	0.2%	0.7%	0.5%	0.1%	0.0%	0.4%
2.7	Expanded Polystyrene Food Grade	0.3%	0.2%	1.0%	0.4%	0.3%	0.0%	0.5%
2.8	Expanded Polystyrene Non-food Grade	5.4%	0.4%	0.0%	0.1%	0.0%	0.0%	0.3%
2.9	Bulk Rigid Plastic Items	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.9%
2.1	Film (non-bag commercial and industrial packaging film)	0.3%	0.4%	0.0%	0.0%	0.0%	0.0%	0.7%
2.11	Grocery and other Merchandise Bags	0.4%	1.3%	0.4%	0.5%	0.2%	0.0%	0.7%
2.12	Other Film means plastic film	9.7%	6.1%	3.5%	6.6%	2.8%	4.4%	5.3%
2.13	Remainder/Composite Plastic	1.3%	2.5%	0.5%	2.6%	2.7%	0.0%	0.8%
3	METALS							
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
3.2	Aluminum MA Deposit Beverage Containers	0.0%	0.1%	0.2%	0.5%	0.1%	0.0%	0.0%
3.3	Tin/Steel Containers	0.1%	0.5%	1.6%	0.2%	0.2%	0.0%	0.6%
3.4	Other Aluminum	0.1%	0.1%	0.3%	0.2%	0.1%	0.0%	0.3%
3.5	Other Ferrous and non-ferrous	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	0.4%	1.7%	2.2%	0.3%	0.0%	0.0%	1.2%
4	GLASS							
4.1	Glass Beverage Containers (non-MA deposit containers)	0.1%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	1.1%
4.3	Glass MA Deposit Beverage Containers	0.2%	0.1%	1.8%	0.0%	4.0%	0.0%	0.1%
4.4	Remainder/Composite Metal	0.0%	0.3%	0.8%	0.4%	0.0%	0.0%	0.0%

Table C-2 Second Season Waste Composition Continued								
Categories		Roll-off Comp 2-08	Front Loader 2-09	Side Loader 2-10	Side Loader 2-11	Front Loader 2-12	Roll-off Comp 2-13	Rear Loader 2-14
5	ORGANIC MATERIAL							
5.1	Food Waste	7.7%	25.9%	37.0%	44.0%	11.3%	0.0%	37.5%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%	3.6%
5.4	Manures	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.5	Remainder/Composite Organic	19.8%	0.5%	10.4%	3.4%	0.2%	0.0%	0.0%
6	CONSTRUCTION AND DEMOLITION							
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.3	Wood – Treated	0.0%	0.0%	0.0%	8.4%	49.4%	0.0%	0.9%
6.4	Wood – untreated	0.0%	0.0%	0.0%	0.0%	17.7%	0.0%	0.0%
6.5	Asphalt Roofing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.7	Carpet and Carpet Padding	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.8	Remainder/Compo-site Construction and Demolition	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7	HOUSEHOLD HAZARDOUS WASTE							
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.3	Batteries – Other	0.0%	0.0%	0.4%	0.2%	0.0%	0.0%	0.0%
7.4	Paint	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%
7.5	Bio-Hazardous (Diapers)	0.0%	0.7%	2.1%	1.6%	1.2%	0.0%	5.2%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers (contained toxic materials)	0.1%	0.5%	4.2%	0.1%	0.0%	0.0%	1.5%
7.8	Other Hazardous or Household Hazardous Waste	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
8	ELECTRONICS							
8.1	Computer-related Electronics	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8.2	Other “brown goods”	0.0%	0.0%	0.0%	0.8%	0.3%	0.0%	0.0%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9	OTHER MATERIALS							
9.1	Tires and other rubber	0.2%	16.0%	0.0%	0.1%	0.1%	0.0%	0.0%
9.2	Textiles	0.7%	1.2%	2.4%	4.0%	0.0%	77.9%	1.1%
9.3	Mattresses	0.0%	2.2%	0.0%	0.0%	0.0%	0.0%	4.0%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10	OTHER MISCELLANEOUS	0.6%	0.6%	1.5%	2.9%	0.0%	0.0%	2.5%

Table C-3 Second Season Waste Composition								
	Categories	Side Loader 2-15	Side Loader 2-16	Rear Loader 2-17	Side Loader 2-18	Rear Loader 2-19	Side Loader 2-20	Front Loader 2-21
1	PAPER							
1.1	Uncoated Corrugated Cardboard/Kraft Paper	1.6%	2.0%	4.5%	0.2%	14.9%	0.8%	2.8%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.0%	0.2%	0.2%	0.2%	0.0%	0.0%	3.3%
1.4	Magazines/Catalogs	0.4%	0.7%	3.7%	1.5%	4.1%	1.7%	2.2%
1.5	Newsprint	1.6%	1.1%	0.9%	0.5%	4.1%	0.4%	2.6%
1.6	Other Recyclable Paper	5.4%	0.8%	3.9%	4.5%	5.2%	1.1%	3.2%
1.7	Compostable Paper	4.0%	1.8%	7.0%	7.3%	6.0%	3.0%	7.6%
1.8	Remainder/Composite Paper	0.7%	0.3%	1.0%	0.5%	2.7%	0.4%	0.7%
2	PLASTICS							
2.1	PET Beverage Containers	0.1%	0.5%	0.2%	0.3%	0.4%	1.1%	0.8%
2.2	PET Containers other than Beverage Containers	0.5%	0.3%	0.1%	0.2%	0.4%	0.2%	0.1%
2.3	Plastic MA Deposit Beverage Containers	0.0%	0.0%	0.1%	0.1%	0.0%	0.2%	0.2%
2.4	HDPE Bottles, colored and natural	0.0%	0.1%	0.5%	0.3%	1.2%	1.0%	0.6%
2.5	Plastic Tubs and lids	0.0%	0.8%	0.3%	0.0%	0.2%	0.4%	0.2%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.1%	0.0%	0.7%	0.8%	0.8%	0.8%	0.6%
2.7	Expanded Polystyrene Food Grade	0.6%	0.1%	0.2%	0.2%	0.3%	0.4%	0.7%
2.8	Expanded Polystyrene Non-food Grade	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
2.9	Bulk Rigid Plastic Items	0.0%	0.0%	0.1%	0.0%	0.1%	0.9%	0.0%
2.1	Film (non-bag commercial and industrial packaging film)	2.9%	0.7%	0.1%	0.3%	0.1%	0.0%	0.0%
2.11	Grocery and other Merchandise Bags	0.5%	0.7%	0.5%	0.4%	0.5%	0.3%	0.8%
2.12	Other Film means plastic film	4.1%	2.0%	2.7%	2.7%	2.7%	3.1%	3.4%
2.13	Remainder/Composite Plastic	0.5%	1.1%	1.2%	1.6%	1.0%	3.0%	2.3%
3	METALS							
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.2	Aluminum MA Deposit Beverage Containers	0.0%	0.1%	0.1%	0.1%	0.7%	0.4%	0.3%
3.3	Tin/Steel Containers	0.8%	0.2%	0.3%	0.3%	0.5%	1.0%	0.7%
3.4	Other Aluminum	0.2%	0.0%	0.1%	0.2%	0.1%	0.1%	0.7%
3.5	Other Ferrous and non-ferrous	0.0%	2.1%	0.6%	0.8%	0.2%	1.1%	1.1%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	0.5%	0.0%	0.0%	0.0%	3.2%	0.0%	1.0%
4	GLASS							
4.1	Glass Beverage Containers (non-MA deposit containers)	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.5%	0.4%	1.0%	0.5%	1.2%	0.0%	0.0%
4.3	Glass MA Deposit Beverage Containers	0.2%	0.8%	0.0%	0.2%	1.8%	0.2%	1.1%
4.4	Remainder/Composite Metal	0.0%	0.0%	1.3%	0.0%	0.0%	0.1%	0.1%

Table C-3 Second Season Waste Composition Continued								
Categories		Side Loader 2-15	Side Loader 2-16	Rear Loader 2-17	Side Loader 2-18	Rear Loader 2-19	Side Loader 2-20	Front Loader 2-21
5	ORGANIC MATERIAL							
5.1	Food Waste	60.8%	11.9%	25.3%	67.3%	15.8%	30.4%	19.8%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.1%	0.0%	10.8%	0.0%	0.1%	0.0%	0.1%
5.4	Manures	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5.5	Remainder/Composite Organic	2.5%	0.0%	0.4%	0.4%	0.1%	3.4%	1.1%
6	CONSTRUCTION AND DEMOLITION							
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.0%	8.7%	0.0%	0.0%	0.0%	0.0%
6.3	Wood – Treated	1.5%	21.7%	0.0%	2.4%	0.6%	10.5%	12.3%
6.4	Wood – untreated	0.4%	8.2%	0.0%	0.0%	12.0%	0.0%	0.0%
6.5	Asphalt Roofing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	0.0%	14.3%	0.0%	0.0%	0.0%	0.3%	0.0%
6.7	Carpet and Carpet Padding	0.0%	19.1%	0.0%	0.0%	0.0%	9.6%	7.0%
6.8	Remainder/Compo-site Construction and Demolition	0.4%	0.8%	0.0%	0.0%	0.0%	6.3%	2.1%
7	HOUSEHOLD HAZARDOUS WASTE							
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
7.3	Batteries – Other	0.3%	0.0%	0.3%	0.0%	0.0%	0.2%	0.0%
7.4	Paint	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7.5	Bio-Hazardous (Diapers)	0.8%	1.1%	0.8%	4.4%	5.0%	3.0%	12.7%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%
7.7	Empty Metal, Glass, and Plastic Containers	0.2%	0.0%	0.0%	0.3%	0.2%	0.9%	0.0%
7.8	Other Hazardous or Household Hazardous Waste	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%
8	ELECTRONICS							
8.1	Computer-related Electronics	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%
8.2	Other “brown goods”	0.0%	0.0%	0.9%	0.0%	0.0%	0.8%	6.2%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9	OTHER MATERIALS							
9.1	Tires and other rubber	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
9.2	Textiles	6.2%	3.2%	14.0%	0.7%	9.1%	12.4%	1.3%
9.3	Mattresses	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10	OTHER MISCELLANEOUS	1.4%	2.4%	1.0%	0.0%	3.8%	0.6%	0.2%

Table C-4 Second Season Waste Composition						
Categories		Rear Loader	Front Loader	Roll Off Closed Top	Front Loader	Rear Loader
		2-22	2-23	2-24	2-25	2-26
1	PAPER					
1.1	Uncoated Corrugated Cardboard/Kraft Paper	1.4%	28.6%	7.7%	21.0%	7.4%
1.2	Waxed Cardboard	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	High Grade Office Paper	0.0%	0.0%	0.1%	3.1%	2.1%
1.4	Magazines/Catalogs	0.5%	0.0%	0.0%	0.0%	1.9%
1.5	Newsprint	4.7%	0.2%	0.0%	0.0%	0.0%
1.6	Other Recyclable Paper	3.9%	1.5%	0.0%	3.1%	2.5%
1.7	Compostable Paper	7.1%	5.8%	11.9%	3.8%	6.4%
1.8	Remainder/Composite Paper	0.3%	0.3%	0.3%	5.2%	2.5%
2	PLASTICS					
2.1	PET Beverage Containers	0.8%	0.5%	0.3%	0.5%	1.1%
2.2	PET Containers other than Beverage Containers	0.0%	0.1%	0.0%	0.1%	0.3%
2.3	Plastic MA Deposit Beverage Containers	0.2%	0.1%	0.1%	0.1%	0.1%
2.4	HDPE Bottles, colored and natural	0.7%	0.3%	0.1%	0.9%	1.2%
2.5	Plastic Tubs and lids	0.1%	0.0%	0.1%	0.1%	0.1%
2.6	Plastic Containers Nos. 3, 4, 5, 6, 7	0.0%	0.0%	0.0%	0.0%	0.0%
2.7	Expanded Polystyrene Food Grade	0.5%	0.5%	0.1%	0.3%	0.5%
2.8	Expanded Polystyrene Non-food Grade	0.1%	0.0%	0.0%	0.0%	0.0%
2.9	Bulk Rigid Plastic Items	0.1%	0.2%	19.2%	0.0%	0.3%
2.1	Film (non-bag commercial and industrial packaging film)	0.3%	0.1%	18.2%	0.0%	0.1%
2.11	Grocery and other Merchandise Bags	0.5%	0.2%	0.0%	0.9%	0.8%
2.12	Other Film means plastic film	4.2%	2.7%	0.6%	2.9%	2.7%
2.13	Remainder/Composite Plastic	2.0%	11.4%	6.3%	0.8%	1.5%
3	METALS					
3.1	Aluminum Beverage Containers (non-MA deposit containers)	0.0%	0.0%	0.0%	0.0%	0.0%
3.2	Aluminum MA Deposit Beverage Containers	0.0%	0.1%	0.1%	0.2%	0.2%
3.3	Tin/Steel Containers	1.1%	0.3%	0.1%	0.6%	0.3%
3.4	Other Aluminum	0.2%	0.0%	0.0%	0.1%	0.4%
3.5	Other Ferrous and non-ferrous	7.8%	0.0%	0.0%	0.0%	1.7%
3.6	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%
3.7	Remainder Composite Metal	0.3%	0.0%	0.0%	0.2%	0.5%
4	GLASS					
4.1	Glass Beverage Containers (non-MA deposit containers)	0.0%	0.0%	0.0%	0.1%	0.0%
4.2	Other Glass Packaging Containers (non-MA deposit containers)	0.5%	0.0%	0.0%	0.0%	0.3%
4.3	Glass MA Deposit Beverage Containers	0.0%	1.0%	0.4%	0.6%	0.6%
4.4	Remainder/Composite Metal	0.6%	0.0%	0.0%	0.0%	0.2%

Table C-4 Second Season Waste Composition Continued						
Categories		Rear Loader 2-22	Front Loader 2-23	Roll Off Closed Top 2-24	Front Loader 2-25	Rear Loader 2-26
5	ORGANIC MATERIAL					
5.1	Food Waste	23.4%	6.9%	2.9%	16.4%	30.8%
5.2	Branches and Stumps	0.0%	0.0%	0.0%	0.0%	0.0%
5.3	Prunings, Trimmings, Leaves and Grass	0.0%	0.0%	5.1%	0.0%	3.4%
5.4	Manures	0.0%	0.0%	0.0%	0.0%	5.1%
5.5	Remainder/Composite Organic	1.0%	0.6%	24.8%	0.0%	0.3%
6	CONSTRUCTION AND DEMOLITION					
6.1	Asphalt Pavement, Brick, and Concrete	0.0%	0.0%	0.0%	0.0%	0.0%
6.2	Aggregates, Stone, Rock	0.0%	0.0%	0.0%	0.0%	0.0%
6.3	Wood – Treated	0.9%	20.6%	0.1%	19.0%	0.8%
6.4	Wood – untreated	0.0%	0.0%	0.0%	0.0%	0.0%
6.5	Asphalt Roofing	0.0%	0.0%	0.0%	0.0%	0.0%
6.6	Drywall/Gypsum Board	2.9%	0.0%	0.0%	0.0%	0.0%
6.7	Carpet and Carpet Padding	0.0%	0.0%	0.0%	0.0%	8.6%
6.8	Remainder/Compo-site Construction and	8.5%	0.0%	0.0%	0.0%	0.3%
7	HOUSEHOLD HAZARDOUS WASTE					
7.1	Ballasts, CFLs, and Other Fluorescents	0.0%	0.2%	0.0%	0.0%	0.0%
7.2	Batteries – Lead Acid	0.1%	0.0%	0.0%	0.0%	0.0%
7.3	Batteries – Other	0.0%	0.1%	0.0%	0.0%	0.0%
7.4	Paint	0.0%	0.0%	0.0%	0.1%	0.0%
7.5	Bio-Hazardous (Diapers)	2.8%	2.0%	0.0%	0.8%	3.3%
7.6	Vehicle and Equipment Fluids	0.0%	0.0%	0.0%	0.0%	0.0%
7.7	Empty Metal, Glass, & Plastic Containers (contained toxic materials)	0.8%	0.1%	0.0%	0.0%	0.0%
7.8	Other Hazardous or Household Hazardous Waste	0.1%	0.0%	0.0%	0.0%	0.0%
8	ELECTRONICS					
8.1	Computer-related Electronics	0.0%	0.0%	0.0%	0.0%	0.0%
8.2	Other "brown goods"	2.1%	1.4%	0.0%	0.0%	2.9%
8.3	Televisions and Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%
9	OTHER MATERIALS					
9.1	Tires and other rubber	0.2%	0.6%	0.0%	0.6%	0.0%
9.2	Textiles	3.7%	0.0%	0.3%	5.2%	4.5%
9.3	Mattresses	15.2%	12.0%	0.0%	12.7%	3.4%
9.4	Bulky materials	0.0%	0.0%	0.0%	0.0%	0.0%
9.5	Restaurant Fats, Oils and Grease	0.0%	0.0%	0.0%	0.0%	0.0%
10	OTHER MISCELLANEOUS	0.4%	1.8%	0.8%	0.0%	1.0%

Appendix D:

Driver Questionnaire and Field Data Sheet

Driver Questionnaire

Site: *Wheelabrator North Andover *Wheelabrator Millbury *Wheelabrator Saugus

Date: _____ **Time:** _____

Truck ID No. _____ **Hauler Company** _____

Truck Type: *Dumpster *Front Loader *Rear Loader

*Roll-off open top *Roll-off closed top *Roll-off compactor *Transfer Trailer

*Other: _____

Truck Weight: lbs or Tons

Gross _____

Tare _____

Net _____

Waste Type:

*Residential *Multifamily *School *Church *Office *Warehouse

*Mall/Store *Factory *Hotel *Manufacturing Facility

*Other: _____ *Mixture: (Estimate Distribution) _____

Is your route scheduled: Yes No

How is it scheduled? _____

How many loads do you pick up per truck per day? _____

Are there contractual exclusions of certain waste material? _____

Was it raining today on your collection route? Yes No

Was there anything unusual or different about your route today? _____

_____

Bulky materials in load such as products made from multiple materials and are large in size, which are meant for extended use. Items such as mattresses, furniture (non-plastic), sinks, toilets, and other non-metal items.

Description of Item	Estimated Weight

Sample Number_____ Date_____ 2016 Wheelabrator WCS

Truck Type & Number_____ Hauler Company_____ Site_____

WASTE CATEGORIES			1	2	3	4	5	6	TARE
1.0 PAPER	1.1	Uncoated Corrugated Cardboard/Kraft Paper							
	1.2	Waxed Cardboard							
	1.3	High Grade Office Paper							
	1.4	Magazines/Catalogs							
	1.5	Newsprint							
	1.6	Other Recyclable Paper							
	1.7	Compostable Paper							
	1.8	Remainder/Composite Paper							
2.0 PLASTICS	2.1	PET Beverage Containers							
	2.2	PET Containers other than Beverage Containers							
	2.3	Plastic MA Deposit Beverage Containers							
	2.4	HDPE Bottles, colored and natural							
	2.5	Plastic Tubs and lids							
	2.6	Plastic Containers Nos. 3, 4 , 5, 6, 7							
	2.7	Expanded Polystyrene Food Grade							
	2.8	Expanded Polystyrene Non-food Grade							
	2.9	Bulk Rigid Plastic Items							
	2.10	Film (non-bag commercial and industrial packaging film)							
	2.11	Grocery and other Merchandise Bags							
	2.12	Other Film means plastic film							
	2.13	Remainder/Composite Plastic							
3.0 METALS	3.1	Aluminum Bev. Containers (non-MA deposit containers)							
	3.2	Aluminum MA Deposit Beverage Containers							
	3.3	Tin/Steel Containers							
	3.4	Other Aluminum							
	3.5	Other Ferrous and non-ferrous							
	3.6	White Goods							
	3.7	Remainder/Composite Metal							
4.0 GLASS	4.1	Glass Bev. Containers (non-MA deposit containers)							
	4.2	Other Glass Packaging Cont. (non-MA deposit)							
	4.3	Glass MA Deposit Beverage Containers							
	4.4	Remainder/Composite Glass							
5.0 ORGANIC	5.1	Food Waste							
	5.2	Branches and Stumps							
	5.3	Prunings, Trimings, Leaves and Grass							
	5.4	Manures							
	5.5	Remainder/Composite Organic							
6.0 C & D	6.1	Asphalt Pavement, Brick, and Concrete							
	6.2	Aggregates, Stone, Rock							
	6.3	Wood – Treated							
	6.4	Wood – untreated							
	6.5	Asphalt Roofing							
	6.6	Drywall/Gypsum Board (Identify if Chinese Drywall)							
	6.7	Carpet and Carpet Padding							
	6.8	Remainder/Composite Construction and Demolition							

Brown AND Caldwell

Sample Number_____ Date_____ 2016 Wheelabrator WCS

Truck Type & Number_____ Hauler Company_____ Site_____

7.0 HHW	7.1	Ballasts, CFLs, and Other Fluorescents							
	7.2	Batteries – Lead Acid							
	7.3	Batteries – Other							
	7.4	Paint							
	7.5	Bio-Hazardous							
	7.6	Vehicle and Equipment Fluids							
	7.7	Metal, Glass, and Plastic Cont.(cont. toxic materials)							
	7.8	Pesticides and Fertilizers							
	7.9	Other Hazardous or Household Hazardous Waste							
8.0 ELETT	8,1	Computer-related Electronics							
	8.2	Other "brown goods"							
	8.3	Televisions and Computer Monitors							
9.0 OTHER	9.1	Tires and other rubber							
	9.2	Textiles							
	9.3	Bulky materials							
	9.4	Restaurant Fats, Oils and Grease							
	10.0	**OTHER MISCELLANEOUS**							

Bulky Items_____

Brown AND Caldwell

Appendix E:

Permit Approval Class II Recycling Permit

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

September 25, 2009

Mr. Scott Emerson
Wheelabrator North Andover, Inc.
285 Holt Road
North Andover, MA 01845

Re: Wheelabrator North Andover, Inc. BWP SW 16 Permit Modification Class II Recycling Program - Facility ID# 132771 – Final Permit

Dear Mr. Emerson:

Attached is Wheelabrator North Andover's Approved Class II Recycling Program permit modification under 310 CMR 19.300. MassDEP issued a Provisional Permit on August 26, 2009 pursuant to the provisions of Massachusetts General Laws (M.G.L.) Chapter 111, Section 150A and 310 CMR 19.000, and the "Solid Waste Management Facility Regulations". Pursuant to the provisions of 310 CMR 19.037 (4)(a), the MassDEP accepted written comments on this Permit for twenty-one (21) days from the date of issuance. Wheelabrator submitted several comments on the Provisional Permit and below is a summary of how MassDEP addressed these comments.

1. Wheelabrator indicted in its permit modification application and a subsequent e-mail correspondence during the Provisional Permit comment period that the data required for the Electronic Tracking System will be collected to the extent known and provided two specific examples, TIME_OUT and HAULER_ACCOUNT_NUM, of data that may be difficult to collect. MassDEP amended Attachment 1 – Electronic Tracking System Data Specifications to reflect this under TIME_OUT and HAULER_ACCOUNT_NUM. Any other changes in the Electronic Tracking System Data will need approval from MassDEP.
2. Wheelabrator commented that there are no provisions under Condition #11 (D) to allow for standard breaks and lunch. MassDEP amended this condition to allow for breaks in accordance with applicable law.

Other relevant changes to the Provisional Permit modification are listed below.

1. MassDEP added a condition (Condition #4) outlining MassDEP's right to inspect the facility.

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD# 1-866-539-7622 or 1-617-574-6868.

MassDEP on the World Wide Web: http://www.mass.gov/dep
Printed on Recycled Paper

2. An addition to Attachment 2 was made to include analysis by failed material in the Quarterly Comparative Analysis Report.
3. MassDEP amended Condition #12 extending the deadline for submitting a permittee's waste characterization methodology to no later than November 1, 2009, but maintained the deadline of January 1, 2010 for starting the waste characterization study.

MassDEP appreciates Wheelabrator's cooperation during the permitting process. If you have any additional questions, please contact me at 617-292-5988.

Sincerely,

Greg Cooper
Deputy Division Director
BWP - Consumer & Transportation Programs

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

Final Decision Effective Date: September 25, 2009

Scott Emerson
Wheelabrator North Andover, Inc.
285 Holt Road
North Andover, MA 01845

RE: PERMIT MODIFICATION APPROVAL- FINAL DECISION
Application for: BWP SW 16
CLASS II RECYCLING PROGRAM

AT: Wheelabrator North Andover, Inc.
285 Holt Road
North Andover, MA 01845
Facility ID# 132771

Transmittal Number: X228985

Dear Mr. Emerson:

The Massachusetts Department of Environmental Protection, ("MassDEP"), has completed its review of the Permit Modification application ("Application") listed above in regard to participation in the Class II Recycling Program and determined the Application is administratively and technically complete. Accordingly, MassDEP approves this Application subject to the conditions contained herein effective on the date above.

APPLICATION SUMMARY

Permit Application: BWP SW 16 – Permit Modification - Class II Recycling Program
Transmittal No.: X228985
Applicant Name: Wheelabrator North Andover, Inc.
Date: July 29, 2009
Application Prepared By: Scott Emerson
Wheelabrator North Andover, Inc.
285 Holt Road
North Andover, MA 01845
Title of Submission: Class II Recycling Program Application

PROJECT BACKGROUND

Wheelabrator North Andover owns and operates a municipal solid waste (MSW) combustion facility (the "Facility") in North Andover, Ma. The Facility is permitted to combust 1,500 tons per day (TPD) of MSW. The Facility uses MSW as fuel and produces electricity. The Facility operates pursuant to permits issued by MassDEP, most notable the solid waste (310 CMR 19.000) and air quality (310 CMR 7.08(2)) regulations. The Facility was permitted and in operation prior to December 31, 1997.

PROJECT DESCRIPTION

The Green Communities Act (Chapter 169 of the Acts of 2008) identifies a waste-to-energy facility in commercial operation prior to December 31, 1997 that uses conventional municipal solid waste technology to generate electricity as a Class II renewable energy generating source if it "operates or contracts for one or more recycling programs approved by the department of environmental protection." MassDEP regulations at 310 CMR 19.300 et seq. require a solid waste facility permit modification for a waste-to-energy facility to qualify as a Waste Energy Generation Unit under the Department of Energy Resources Renewable Energy Portfolio Standards at 225 CMR 15.00.

APPROVAL AND CONDITIONS

This Application complies with the requirements at 310 CMR 19.300 (Class II Recycling Program), 310 CMR 19.030(4) [permits] and 310 CMR 19.039 [request to modify permit] and was reviewed in accordance with 310 CMR 19.037 (Review Procedure for Permit Modifications, Permit Renewals, and other Approvals). The information contained in the application establishes that the facility complies with the criteria at 310 CMR 19.038(2)(a) 1-12 (Criteria for Review of Applications for a Permit or Permit Modifications).

This document is a permit issued pursuant to Massachusetts General Laws Chapter 111, Section 150A and 310 CMR 19.000, subject to the conditions set forth below. This permit does not convey property rights of any sort or any exclusive privilege.

1. Air Quality Regulations: The owner, operator and permittee shall comply with all applicable state (310 CMR 7.08(2) Air Pollution Control Regulations) and federal air pollution control regulations.

2. Solid Waste Regulations: The owner, operator and permittee shall comply with all applicable state regulations concerning solid waste facilities at 310 CMR 19.000.

3. Duration: This permit modification expires on October 1, 2014. To request a renewal of this permit, the permittee shall submit a BWP SW 16 permit modification application no later than 120 days prior to the date of expiration of this permit to avoid an interruption in qualification as a Waste Energy Generation Unit pursuant to 225 CMR 15.

4. Inspections: MassDEP reserves the right to inspect the Facility during normal working hours without due notice and/or require additional assessment(s) or action(s), including but not limited to modifying appropriate corrective measures in order to maintain the

environment free from objectionable nuisance conditions and/or dangers or threats to the public health or the environment.

5. Conditions of Permits and Authorizations: The owner, operator and permittee of the Facility shall comply with the provisions of 310 CMR 19.043, which standard conditions are already conditions of permittee's facility permit and are not modified by this permit decision in any way.

6. Permit Limitations: This permit modification is limited to the issues as described herein concerning the Class II Recycling Program and does not relieve the Facility and its owners and operators of the need to comply with all other applicable local, state or federal laws, regulations, permits and requirements.

7. Nothing in this permit decision shall modify any term, condition or requirement of the permittee's facility permit or other permits except as specifically set forth herein. If this permit modification approval conflicts with all or parts of prior permits, then this permit modification shall supersede the conflicting provisions of the prior permit approvals.

8. Electronic Tracking System: The permittee's electronic tracking system (described in 310 CMR 19.303) shall be capable of populating the fields and data values as indicated in Attachment 1 – Electronic Tracking System Data Specifications or as otherwise approved by MassDEP. The permittee shall have an electronic tracking system running and tracking all incoming loads at the Facility by October 1, 2009. The permittee shall populate the electronic tracking system for all incoming loads and all failed loads documented by the waste ban compliance professional and through the Facility's own waste ban compliance plan. The permittee shall revise or change the electronic tracking system as instructed by MassDEP to account for changes in the list of waste ban materials or other values deemed critical by MassDEP to ensure proper waste ban compliance information.

9. Reporting and Recordkeeping: The owner, operator and permittee of the Facility shall comply with the provisions of 310 CMR 19.303(4) [reporting] and 19.303(5) [recordkeeping].

10. Revenue from Sale of Attributes: In accordance with M.G.L. c. 25A, Section 11F(d) and 310 CMR 19.303(2)(b) and as indicated in the permittee's application, the permittee shall place 50% of the revenue from the sale of any RPS Class II Waste Energy Generation Attribute into the Sustainable Materials Recovery Program Expendable Trust no later than 30 days after the receipt of funds from any such sale. "Revenue" shall mean gross income not deducting any expenses.

11. Waste Ban Compliance Professional (WBCP):
    A. The permittee shall contract with an independent third party in accordance with 310 CMR 19.303(1)(c) to act as its WBCP by no later than October 1, 2009. The permittee shall send MassDEP evidence of this contract and the resume(s) of the independent third party contractor(s). Should the permittee need to contract with a different third party in the future, the permittee shall, in accordance with 310 CMR 19.039(6), submit a list of qualified independent third parties for MassDEP's approval with a BWP SW 45 permit application, at least 30 days prior to entering into a contract with a new independent third party.
    B. Attachment 2 – Quarterly Comparative Analysis Report is the report template that the permittee shall require the WBCP complete using the electronic tracking system and other relevant data when conducting the quarterly comparative analysis pursuant to 310 CMR 19.303(1)(c)(3). MassDEP reserves the right to modify this report template for subsequent quarters if necessary.
    C. The first quarter of inspections by the WBCP shall begin October 1, 2009 and end December 31, 2009. The permittee shall not allow any WBCP contracted by the permittee to begin monitoring incoming loads at the Facility until such WBCP has attended MassDEP's training for waste ban compliance professionals. MassDEP intends to hold such training no later than October 15, 2009. (Additional training for other WBCPs or permittee staff may be held at a later date.) Any new WBCP shall attend such training.
    D. The WBCP shall monitor all incoming loads for 10 inspection days every quarter, except those loads received by the facility during work breaks taken by the WBCP in accordance with applicable laws. Break periods will be documented by the WBCP and included in quarterly reports submitted to MassDEP. The WBCP's inspection days shall be determined using a random number generator application for selecting 10 dates from the planned operating days of the Facility for each quarter. The WBCP shall ensure that the permittee is not aware of the dates selected for inspection until the WBCP's arrival at the Facility but shall inform MassDEP's Regional Solid Waste Section Chief of the days selected for inspection at the beginning of each quarter. The permittee shall advise MassDEP if it learns of the dates that the WBCP will monitor incoming loads prior to his/her arrival at the Facility. The WBCP shall address routine conflicts between the days generated by the random number generator and the workdays of the WBCP (such as, but not limited to, vacation, holidays, sick or personal days) by using additional trained and contracted WBCPs. If the WBCP cannot otherwise conduct the inspection on the scheduled day due to Facility constraints, the WBCP shall select another day in the quarter using the random number generator application.

12. Waste Characterization Study: MassDEP finalized the waste characterization methodology guidance for all waste-to-energy facilities participating in the Class II Recycling Program on September 22, 2009. The permittee shall submit a waste characterization methodology based on MassDEP's guidance by no later than November 1, 2009. The permittee shall begin to conduct and perform its first waste characterization study beginning on or about January 1, 2010 or within 30 days of MassDEP's approval of

the Facility's waste characterization methodology, whichever is later. Subsequent waste characterization studies shall be conducted every 3 years thereafter. MassDEP may revise the waste characterization methodology for such subsequent studies at any time 120 days prior to the permittee conducting such study. Permittees shall submit a revised waste characterization methodology for MassDEP approval based on the revised guidance within 30 days of issuance of the revised guidance. The first waste characterization study report shall be submitted with the permittee's annual Facility report on February 15, 2011. If the waste characterization study report is not complete at the time the permittee's annual report is submitted to MassDEP, the permittee shall submit a status report of its waste characterization study with the appropriate facility annual report and submit a final waste characterization study report within 30 days after such status report.

RIGHT TO APPEAL

This approval has been issued pursuant to M.G.L. Chapter 111, Section 150A, and 310 CMR 19.037. Pursuant to 310 CMR 19.037(5), any person aggrieved by the issuance of this decision, except as provided for under 310 CMR 19.037(4)(b), may file an appeal for judicial review of said decision in accordance with the provisions of M.G.L. Chapter 111, Section 150A and M.G.L. Chapter 30A not later than thirty days following receipt. The standing of a person to file an appeal and the procedures for filing such appeal shall be governed by the provisions of M.G.L. c. 30A. Unless the person requesting an appeal requests and is granted a stay of the terms and conditions of the permit by a court of competent jurisdiction, the permit decision shall remain effective or become effective at the conclusion of the 30 day period.

NOTICE OF APPEAL

Any aggrieved person intending to appeal the decision to the superior court shall provide notice to MassDEP of the intention to commence such action. Said notice of intention shall include the MassDEP File Number X228985 and shall identify with particularity the issues and reason (s) why it is believed the approval decision was not proper. Such notice shall be provided to the Office of General Counsel and the Bureau of Waste Prevention. The appropriate addresses to send such notices are:

Office of General Counsel
Department of Environmental Protection
One Winter Street
Boston, MA 02108

Assistant Commissioner
Bureau of Waste Prevention
Department of Environmental Protection
One Winter Street
Boston, MA 02108

No allegation shall be made in any judicial appeal of this decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in those regulations, provided that matter may be raised upon showing that it is material and that it was not reasonably possible with due diligence to have been raised during such procedures, or that

matter sought to be raised is of critical importance to the public health or environmental impact of the permitted activity.

If you have any questions or comments regarding this approval letter, feel free to contact me at 617-292-5988 or at the letterhead address.

Sincerely,

Greg Cooper
Deputy Division Director
BWP - Consumer & Transportation Programs

cc. John Carrigan, Solid Waste Section Chief, DEP/NERO
Dr. Thomas Trowbridge, Chairman, North Andover Board of Health

ATTACHMENT 1 – ELECTRONIC TRACKING SYSTEM DATA SPECIFICATIONS

Specification for electronic record source
1 Data Requirements

1.1 Data File Format – data recorded in the electronic tracking system must be made available to the MassDEP in comma separated value format, CSV.

1.2 Data Fields – data recorded in the electronic tracking system must meet the field names and data types, and be stored in the following order:

Field Order	Field Type	**Field Name**	**Description**	**Data Format**
1	F	FAC_NAME	Name of the solid waste facility where loads are observed	text
2	F	FAC_DATE	Date of Receipt	mm/dd/yyyy
3	F	SCALETICK_NUM	Scale House Ticket Number, also known as the Tare sheet, a receipt recording the vehicle's weight upon entering and departing the solid waste facility.	integer value number, #######
4	F	TIME_IN	Time of arrival at Facility	hh:mm:ss
5	F	TIME_OUT	Time of departure from Facility if recorded by scale	hh:mm:ss
6	F	HAULER_ACCT_NUM	Account number of the waste hauler delivering load or customer subcontracting to waste hauler	number
7	F	HAULER_NAME	Name of the waste hauler delivering load	text
8	F	TRUCK_TYPE	Description of the Truck Type delivering waste, to be assigned by the solid waste facility	text; values must include the following: "Roll-off - open top", "Roll-off - closed top", "Roll-off - compactor", "Rear loading packer", "Front loading packer", or "Transfer Trailer".
9	F	FAC_TRUCK_NUM	Number of the hauler vehicle, as assigned by the solid waste facility. This number usually is assigned for account management purposes such as billing.	number
10	F	FAC_TRAILER_NUM	Number of the container, if any, with materials being transported for disposal, as assigned by the solid waste facility	number
11	F	FAC_GEN	Name of the generator that has contracted for the disposal of materials, as identified by the facility, if available	text
12	F	FAC_GEN_ID	Customer number, if any, specified by facility	number
13	F	WASTE_TYPE	Type of waste delivered, to be assigned by the solid waste facility	text
14	F	WASTE_TON	Tonnage of waste delivered (short tons)	decimal

15	W	FAC_INSP_FNAME	First Name - either the Waste Ban Compliance Professional or Facility observer	text
16	W	FAC_INSP_LNAME	Last Name - either the Waste Ban Compliance Professional or Facility observer	text
17	W	HAUL_TRUCK_NUM	Number of the hauler vehicle, as assigned by the hauler dispatch location. This number is usually located on the front quarter panel, door, over the cab, and is the hauler's vehicle number on record	number
18	W	HAUL_CONTAIN_NUM	Number of the roll-off container (if any), with materials being transported for disposal, as assigned by the hauler dispatch location or container leassor	number
19	W	WB_BATT	Number of lead acid batteries observed in the load	count
20	W	WB_CRT	Number of CRTs observed in the load	count
21	W	WB_WHITEGOOD	Number of white goods observed in the load	count
22	W	WB_RECYC_PAPER	volume of paper or cardboard observed in the load, as a percentage of the total volume of the load *note: field order number 28, "COMMENTS" contains provisions for clarification of values recorded in this field	percentage
23	W	WB_GMP_CONT	volume of Glass (G), Metal (M), and/or Plastic (P) containers observed in the load, as a percentage of the total volume of the load *note: field order number 28, "COMMENTS" contains provisions for clarification of values recorded in this field	percentage
24	W	WB_LEAFYARD	volume of leaf and yard waste observed in the load, as a percentage of the total volume of the load	percentage
25	W	WB_ABCM	volume of asphalt pavement, brick, concrete, and metal observed in the load, as a percentage of the total volume of the load *note: field order number 28, "COMMENTS" contains provisions for clarification of values recorded in this field	percentage
26	W	WB_PHOTOS	Number of pictures taken documenting the failed load, to be formatted as number. ***Note: WBCP must record all pictures with a filename that must include first the value from the SCALETICK_NUM field (see above) and then the numerical order in which the photo was taken, separated by an hyphen, "-". e.g., SCALETICK_NUM 234567 was a failed load, and the WBCP took 4 pictures of that load. The WBCP would then save each picture as filenames 234567-1, 234567-2, 234567-3, 234567-4. The WBCP must provide a digital copy of all photos in a format to be approved by MassDEP Failed loads observed through the Facility's Waste Ban Monitoring Plan need not include photos.	number

27	W	COMMENTS	Comments: General comments, if any, with respect to the failed load observed. ***Note: If a value is recorded in either field order number 22, 23 or 25, ("WB_RECYC_PAPER", "WB_GMP_CONT" or "WB_ABCM", respectively) the comments field must specify the predominant material observed for each field. For example, text saved in the "COMMENTS" field would indicate a failed load for 40% plastic containers and 10% glass containers as: Plastic. The percentage value in field "WB_GMP_CONT" in this example would be 50. The same rule applies to the fields, "WB_RECYC_PAPER" and "WB_ABCM". In cases with multiple reasons for failure, the predominant material for each field with percentage values recorded shall be specified.	text

NOTE: Should MassDEP add new materials to the existing list of materials under 310 CMR 19.017 these materials types will be incorporated into the electronic tracking system and be documented accordingly.

ATTACHMENT 2 – QUARTERLY COMPARATIVE ANALYSIS REPORT

This document describes the Comparative Analysis to be reported to the MassDEP pursuant to 310 CMR 19.300 for the first quarter of Waste Ban Compliance Professional Activity (October 1, 2009-December 31, 2009) and subsequent quarters unless otherwise modified by MassDEP.

A	B	C	D	E
1	Facility Name			
2	Date			
3	Prepared by			
4				
5	Total Loads			
6		**Total Number of Loads**	**Number of Failed Loads**	%
7	**Facility Waste Ban Compliance Plan Data**	Total number of loads received by the facility on days when the WBCP was not present	Number of failed loads observed by the on-going monitoring process observed on days when the WBCP was not present	=D7/C7
8	**Waste Ban Compliance Professional**	Total number of loads received by the facility on the 10 quarterly inspections when the WBCP was present	Number of failed loads observed by the WBCP	=D8/C8
9	**TOTAL**	=C7+C8 This will equal the total of all loads received by the facility during the reporting period	=D7+D8 This will equal the total number of failed loads received by the facility during the reporting period	
	Note: please include a narrative with your report if necessary to explain the data			
10				
11	Analysis by Truck Type			
12		**Total Number of Loads**	**Number of Failed Loads**	%
13	**Facility Waste Ban Compliance Plan Data**	[Note: all values in C14 through C20 should be a subset of C7]	[Note: all values in D14 through D20 should be a subset of D7]	
14	Roll-off open top			=D14/C14
15	Roll-off closed top			=D15/C15
16	Roll-off compactor			=D16/C16
17	Rear loading packer			=D17/C17
18	Front loading packer			=D18/C18
19	Transfer Trailer			=D19/C19
20	Unknown		[Note: this cell should always be zero. All observed failed loads should be classified by truck type]	

21	**TOTAL**	Sum of C14 thru C20. This total should be the same as C7	Sum of D14 thru D20. This total should be the same as D7	
22				
23	**Waste Ban Compliance Professional**	[Note: all values in C24 through C29 should be a subset of C8]	[Note: all values in D24 through D29 should be a subset of D8]	
24	Roll-off open top			=D24/C24
25	Roll-off closed top			=D25/C25
26	Roll-off compactor			=D26/C26
27	Rear loading packer			=D27/C27
28	Front loading packer			=D28/C28
29	Transfer Trailer			=D29/C29
30	Unknown		[Note: this cell should always be zero. All observed failed loads should be classified by truck type]	=D30/C30
31	**TOTAL**	Sum of C24 thru C29. This total should be the same as C8	Sum of D24 thru D29. This total should be the same as D8	
32				
33	Analysis of Failed Loads by Material			
34			**Number of Failed Loads**	%
35	**Facility Waste Ban Compliance Plan Data**		[Note: all values in D36 through D42 should be a subset of D7]	
36	Lead-acid Battery			=D36/C36
37	CRT			=D37/C37
38	White Good			=D38/C38
39	Paper (incl OCC)			=D39/C39
40	Containers (glass, plastic, metal)			=D40/C40
41	Leaf & Yardwaste			=D41/C41
42	C&D (incl asphalt, brick, concrete, C&D metal)			=D42/C42
43	**TOTAL**		Sum of D36 thru 426. This total should be the same as D7	
44				
45	**Waste Ban Compliance Professional**		[Note: all values in D46 through D52 should be a subset of D8]	
46	Lead-acid Battery			=D46/C46
47	CRT			=D47/C47
48	White Good			=D48/C48
49	Paper (incl OCC)			=D49/C49

50	Containers (glass, plastic, metal)			=D50/C50
51	Leaf & Yardwaste			=D51/C51
52	C&D (incl asphalt, brick, concrete, C&D metal)			=D52/C52
53	**TOTAL**		Sum of D46 thru D52. This total should be the same as D8	

From: Hughes, Matt
Sent: Monday, March 24, 2014 9:29 AM
To: Malerba, Dawn
Subject: FW: Wheelabrator Class II Recycling Program Permit Extensions 2014

Please post this email to OBOX permit for the three plants.

Thanks.

From: Cooper, Greg (DEP) [mailto:greg.cooper@state.ma.us]
Sent: Monday, March 24, 2014 9:24
To: Hughes, Matt
Subject: Wheelabrator Class II Recycling Program Permit Extensions 2014

The initial Class II Recycling Program Permit issued on September 25, 2009 to Wheelabrator Millbury Inc., Wheelabrator North Andover Inc., and Wheelabrator Saugus Inc. qualify for the Massachusetts Permit Extension Act. The Permit Extension Act was created by Section 173 of Chapter 240 of the Acts of 2010 and extended by Sections 74 and 75 of Chapter 238 of the Acts of 2012. The purpose of this act is to promote job growth and long-term economic recovery and the Permit Extension Act furthers this purpose by establishing an automatic four-year extension to certain permits and licenses concerning the use or development of real property. With limited exceptions, the Act automatically extends, for four years beyond its otherwise applicable expiration date, any permit or approval that was "in effect or existence" during the qualifying period beginning on August 15, 2008 and extending through August 15, 2012.

As a result, the Wheelabrator Millbury Inc., Wheelabrator North Andover Inc., and Wheelabrator Saugus Inc. Class II Recycling Program Permits are automatically extended until October 1, 2018. No permit modification is necessary and all requirements, commitments, and obligations contained in the original permits will remain in effect.

Greg Cooper
Division Director - BWP Business Compliance
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Appendix F:

Calculation for Number of Samples

Objective:

Calculate the number of samples to achieve 90-percent (%) confidence level and 10-percent (%) precision.

Methodology:

The number of samples was calculated using ASTM D5231-92 (2008) for a typical sample size of 200 to 300 lb (91 to 136 kg).

Therefore, the number of sorting samples (One sample per vehicle loads) (n) required to achieve a desired level of measurement precision is a function of the component(s) under consideration and the confidence level. The governing equation for *n* is as follows:

$$n = (t^* \; s / e . \bar{x})^2 \qquad (1)$$

Where:

t^* = student *t* statistic corresponding to the desired level of confidence,
s = estimated standard deviation,
e = desired level of precision, and
$\bar{x}$ = estimated mean,

All numerical values for the symbols are in decimal notation so for a precision value (e) of 10 %, 0.1 was used.

For one sorting sample per vehicle load and for corrugated cardboard as the selected governing component:

$t^*(n=\infty)$ = 1.645 (from table 4)
s= 0.06 (from table 3)
e= 0.10 (or 10%)
$\bar{x}$ = 0.14 (from table 3)

As required by MassDEP Waste Characterization Protocol at 90% confidence level and 10% precision the number of samples calculated using equation (1)

$$n = \left[\frac{1.645(0.06)}{0.1(0.14)}\right]^2 = 50 \qquad \text{Therefore, } n_o = 50$$

Referring again to Table 4, for n=50

$$t^*_{90}(n=50)=1.677$$

$$n=\left[\frac{1.677(0.06)}{0.1(0.14)}\right]^2=52 \qquad 52=n'$$

Table 3 Values of Mean ($\bar{x}$) and Standard Deviation (s) for Within-Week Sampling to Determine MSW Component Composition[A]

Component	Standard Deviation (s)	Mean ($\bar{x}$)
Mixed Paper	0.05	0.22
Newsprint	0.07	0.10
Corrugated	0.06	0.14
Plastic	0.03	0.09
Yard waste	0.14	0.04
Food waste	0.03	0.10
Wood	0.06	0.06
Other organics	0.06	0.05
Ferrous	0.03	0.05
Aluminum	0.004	0.01
Glass	0.05	0.08
Other inorganic	0.03	0.06
Total		1.00

[A]. *The tabulated mean values and standard deviations are estimates based on field test data reported for MSW sampled during weekly sampling periods at several locations around the United States.*

Table 4 Values of t Statistics (t*) as a Function of Number of samples and Confidence Interval

Number of Samples, *n*	90
2	6.314
3	2.920
4	2.353
5	2.132
6	2.015
7	1.943
8	1.895
9	1.860
10	1.833
11	1.812
12	1.796
13	1.782
14	1.771
15	1.761
16	1.753
17	1.746
18	1.740
19	1.734
20	1.729
21	1.725
22	1.721
23	1.717
24	1.714
25	1.711
26	1.708
27	1.706
28	1.703
29	1.701
30	1.699
31	1.697
36	1.690
41	1.684
46	1.679
51	1.676
61	1.671
71	1.667
81	1.664
91	1.662
101	1.660
121	1.658
141	1.656
161	1.654
189	1.653
201	1.653
∞	1.645

Results:

Since 52 (that is, n') is within 10 % of 50 (that is, n_o), 52 samples should be selected for analysis to provide 90% confidence level.

Similar calculations was performed for the following recyclable waste components and the results of the calculations are listed Table A-1.

Table A-1 Number of samples required for sorting at 90% confidence level.

Component	Standard Deviation (s) s	Mean ($\bar{x}$)	Number of Samples, n at 90% confidence level	Number of Samples, n' at 90% confidence level and 10% precision
Mixed paper	0.05	0.22	14	16
Corrugated Cardboard	0.06	0.14	50	52
Plastic	0.03	0.09	30	32
Food waste	0.03	0.10	24	26
Aluminum	0.004	0.01	43	45