SCS ENGINEERS






Zero Waste Strategic Plan for Prince George's County, Maryland

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Table of Contents

List of Tables

No. **Page**

List of Exhibits

No. **Page**

Appendices

1 INTRODUCTION

Zero waste is a change in perspective. It requires rethinking the notion that generating waste is inevitable and instead looks to mirror natural cycles where all outputs are used as inputs to another process. Zero waste encompasses the full life-cycle of the products and materials we use every day. It includes the product design, manufacturing, distribution, and use; and the reuse, recycling, energy recovery, and disposal of the materials. This means everyone – consumers, manufacturers, governments, and businesses – has an important role in facilitating zero waste. Zero waste is a long-term goal that strives to nearly eliminate the need for disposal of wastes generated.

There is no one solution to the zero waste goal. It requires a combination of sustainable practices such as waste reduction, recycling, composting, product stewardship, product redesign, and the latest technologies of recovering materials for their highest and best uses. Striving toward zero waste requires a comprehensive approach to solid waste management. It employs policy, program, educational, and technical solutions to managing wastes generated.

In developing and supporting policies and programs that minimize waste, Prince George's County will reduce waste generation and maximize diversion from disposal options. Moving towards zero waste has a number of important impacts on the County, its residents, and its businesses. The Brown Station Road Sanitary Landfill (BSRSL) is the only facility in the County accepting municipal solid waste (MSW). Minimizing waste will become critical as the BSRSL is expected to reach capacity in 2028.

Striving toward zero waste can have an unprecedented impact on the economy in Prince George's County. The value of recyclable paper and containers disposed of at the BSRSL is estimated to be over $9.7 million annually (see **Table 10**). Recovering these materials as well as compostable and divertible materials from the waste stream and placing them back into the economy will have a significant impact on local revenue, job creation, and business expansion.

Minimizing waste will have an obvious and positive impact on the environment. The more we reduce, reuse, recycle, and recover materials from our waste stream, the fewer virgin raw materials will be needed in order to produce more products and packaging. This in turn reduces the amount of energy consumed and greenhouse gases produced at the beginning of a product's life-cycle. Using EPA's Waste Reduction Model (WARM)[1], SCS Engineers calculated over 66,000 metric tons of carbon equivalents (MTCE) would be reduced by recycling the following materials currently disposed at the BSRSL (annual quantities estimated from the 2015 Waste Characterization Study and presented in **Table 7**):

- Newspaper/print (7,300 tons)
- Corrugated Cardboard (18,600 tons)
- Magazines/Catalogs/Other Books (3,800 tons)
- Office Paper/Junk Mail (18,200 tons)
- PET #1 Bottles (6,300 tons)
- HDPE #2 Bottles (3,100 tons)
- Glass Bottles/Jars (9,900 tons)
- Pallets/Lumber (4,500 tons)
- Carpet/Carpet Padding (4,800)
- Vegetative Food (34,100 tons)
- Non-Vegetative Food (13,900 tons)
- Leaves (6,700 tons)

[1] U.S. EPA Waste Reduction model (WARM), Version 13, accessed via http://www.epa.gov/warm

- Mixed Plastics (12,100 tons)
- Ferrous Cans (2,800 tons)
- Aluminum Cans/Foil (2,700 tons)
- Grass (4,600 tons)
- Brush (6,400 tons)

These reductions equal:

- Removing the annual emissions from over 55,000 passenger vehicles; or
- Conserving nearly 30 million gallons of gasoline; or
- Conserving over 1,400 railcars of coal; or
- Conserving nearly 11 million cylinders of propane used for home barbeques.

Prince George's County has established an infrastructure that is conducive to diverting materials from the waste stream. The County has implemented a number of programs that results in the diversion of hundreds of thousands of tons of materials annually. These programs include residential and commercial recycling, yard waste and food waste composting, educational initiatives to reduce waste and encourage reuse. The County maintains control over most of the residential waste stream through managing materials at the BSRSL and the County owned materials recovery facility (MRF). This positions the County to make decisions that further increase the amount of materials diverted.

STAKEHOLDER INPUT

In order for the Zero Waste Strategic Plan to be successful, the County must have the support from stakeholders impacted by the initiatives outlined. To foster a sense of collaboration within the County, County staff helped identify various groups and individuals interested in the County's actions on zero waste. These stakeholder groups were contacted and SCS Engineers staff interviewed them to obtain their input on the programs and policies the County should pursue in order to achieve zero waste. The following table lists the groups that SCS interviewed and provided input on this plan.

Table 1. Stakeholder Groups Providing Input on Zero Waste Plan

Prince George's Sierra Club Group	Community Research	Zero Waste Prince George's
Community Forklift	Building Materials Reuse Association	Waste Zero
Institute of Local Self-Reliance	City of Greenbelt	Town of University Park

Stakeholders provided input that is included in this plan. Of particular interest to the stakeholders is the need to obtain accurate and reliable data on solid waste management in the County. Data exists on waste tonnages generated, recycled, and disposed, but often these numbers are not defined and it is unclear if this data includes materials imported or exported to the County or how the numbers were calculated. In order for this Strategic Plan to be implemented and its success measured, the County must evaluate how it measures waste and recycling data and be clear as to what the numbers include and do not include.

Stakeholders also agreed that the County must evaluate their existing programs to divert waste. The amount of diversion that results from each program should be measured. Programs that are not effective should be discontinued in favor of more effective programs.

SCS also received several specific recommendations from stakeholders on programs that the County should support or implement. These include:

- Construction & demolition debris diversion ordinance;
- Container deposit legislation;
- Composting infrastructure;
- Rate structures (Pay-As-You-Throw);
- Training and education;
- Technical assistance.

GOALS

Zero waste is an ambitious, long-term goal to nearly eliminate the need for disposal of solid waste. In developing policies, programs and infrastructure to achieve zero waste, the County can both maximize diversion from landfills and reduce generation of waste. Achieving zero waste entails encouraging the County, its residents, businesses, and visitors to reevaluate what is considered waste. Zero waste is not a literal goal like "100 percent recycling"; we will always have some materials that cannot be recycled and cannot be designed out of the system. However, the vision of zero waste is to strive for sustainability through the following key zero waste initiatives:

- **Whole System Approach**. The concept of "zero waste" takes a whole system approach where producers and consumers consider the ultimate disposition of products and packaging. Products and packaging are reduced in toxicity and volume, and designed for recycling or composting For example, many restaurants have eliminated the use of plastic service ware which cannot be recycled nor composted in favor of cups and plates made from paper fiber which can be composted.

- **Reducing Consumption.** To achieve sustainability, producers and consumers must reduce the consumption of natural resources. The County can encourage this by leading by example and through outreach, education and social marketing.

- **Minimize Waste and Maximize Recycling.** Generators in the County can strive for zero waste both by maximizing recycling and minimizing waste generation. The County can encourage this by providing convenient and accessible recycling programs wherever materials are generated. The City can also require haulers to provide recycling to all of their customers.

Ultimately, zero waste contributes to the development of a greener local economy and a more sustainable community. In order to reach true sustainability, the strategies identified in this Zero Waste Strategic Plan must consider "People, Planet, and Profit" as the triple bottom line achieving social, environmental, and economic sustainability.

The Maryland Department of the Environment (MDE) established zero waste goals as part of its legislatively mandated Green House Gas Reduction Plan. These goals are to strive to achieve long-term recycling and waste diversion rates of 80% and 85%, respectively, by 2040. These goals and their interim targets are shown on **Table 2**. Recycling rates for food scraps and yard trimmings are also included as it is expected that composting and anaerobic digestion of organic materials will contribute a large portion of the additional recycling needed to meet the overall goals.

For comparison purposes, zero waste goals for other jurisdictions are shown in **Table 3**.

Table 2. Maryland's Zero Waste Goals

	2015	2020	2025	2030	2040
Overall Waste Diversion Goal	54%	65%	70%	75%	85%
Overall Recycling Goals (includes recycling/composting of food scraps and yard trimmings)	50%	60%	65%	70%	80%
Recycling Goal for Food Scraps	15%	35%	60%	70%	90%
Recycling Goal for Yard Trimmings	73%	76%	80%	83%	90%
Water Reuse	2%	7%	15%	25%	40%

Source: *Zero Waste Maryland*, Maryland Department of the Environment, December 2014

Table 3. Zero Waste Goals of Other Jurisdictions

Jurisdiction (Year Zero Waste Implemented)	Population	Waste Diversion Goal by Year				
		2015	2020	2025	2030	2040
State of Maryland (2014)	5.8 million	54%	65%	70%	75%	85%
New York City, NY (2018)	8.2 million	-	-	-	90%	-
City of San Jose, CA (2008)	952,560	-	-	100%	-	-
City of Austin, TX (2008)	811,458	-	75%	-	-	90%
City of San Francisco, CA (2002)	805,235	-	100%	-	-	-
Boulder County, CO (2010)	294,567	-	-	100%	-	-
City of Pasadena, CA (2014)	137,122	-	-	-	-	87%
City of Fort Collins, CO (2013)	143,986	-	75%	90%	100%	-
Logan County, OH (2007)	45,858		100%		-	-
Teton County, WY (2014)	21,294	-	-		60%	-

*U.S. Census Bureau; 2010 population; www.census.gov

Adopting the State's goal would require extraordinary effort and cost within the confines of current technology capabilities and societal mindset. Assuming 2010 is used as a base year for waste generation[2] and if the County adopts the State's goal of 85 percent diversion by 2040, the

[2] The County generated 1,519,880 tons of waste (including MSW, C&D, and recyclable materials) in 2010 according to "Maryland Solid Waste Management and Diversion Report – 2011 (Calendar Year 2010 Data)"

County would need to maintain current levels of recycling and diversion and recycle and divert additional amounts of waste, including:

- 85 percent or an additional 258,000 tons of waste annually disposed of at the County's Landfill;
- 85 percent or an additional 190,000 tons of construction and demolition debris disposed of annually at private rubblefills inside and outside the County.

Achieving these levels of diversion would require significant time and investment and the right mix of policies and programs. Implementing policies to facilitate reusing, recycling, and diversion are required to divert construction and demolition debris and "other" waste as these materials are not disposed of at the County's Landfill and are controlled by private waste management companies.

Additionally, it is important to define what counts toward achieving zero waste and what does not. For example, some local governments count waste that is incinerated toward their zero waste goal while others do not. SCS suggests that Prince George's County strive to divert materials from disposal in landfills and that only the programs whereby materials are reused, recycled, composted or otherwise processed for their "highest and best use" count towards achieving their goal of zero waste.

It should be noted that anaerobic digestion, a series of biological processes in which microorganisms break down biodegradable material in the absence of oxygen to create biogas that can be combusted for electricity or heat, is also compatible with composting systems. According to the Institute for Local Self Reliance (ILSR), the "digestate" or solids remaining after anaerobic digestion can be composted[3].

Initiatives to move the County toward the zero waste goals are discussed in **Section 4.**

The County views this plan as a "living document" that will require periodic updates as the waste stream and processing technologies continue to evolve. The County will engage stakeholders as this plan is updated on a regular basis.

[3] *Pay Dirt, Composting in Maryland to Reduce Waste, Create Jobs, & Protect the Bay, May 2013*; By Brenda Platt, Bobby Bell, and Cameron Harsh Institute for Local Self-Reliance; Page 3; accessed from http://ilsr.org/wp-content/uploads/2013/05/ILSR-Pay-Dirt-Report-05-11-13.pdf

2 CURRENT CONDITIONS AND EXISTING SYSTEM

Prince George's County is an urbanized County with densely populated areas as well as rural areas. The County is about 485 square miles, located directly east of Washington, DC, and contains 27 incorporated municipalities as well as unincorporated areas. The population of Prince George's County was about 863,420 in 2010, which represented a seven percent increase over 2000[4]. The Metropolitan Washington Council of Governments forecasts the population of the County will grow by about 15 percent between 2010 and 2040. Coupled with the population growth is an estimated 25 percent increase in the number of households in the County during that same time[2]. This growth will have an economic and environmental impact on the County's solid waste management systems.

WASTE DISPOSAL

Prince George's County tracks waste materials managed at the BSRSL. **Table 4** summarizes the waste materials and quantities received at the Landfill in 2014. Most of the waste delivered is residential and commercial MSW, including waste from the County's public schools which is estimated to be about 10,000 tons. Over 1,600 tons of tires, wood waste, and metal are also brought to the site; however, these materials are diverted for recycling. Tires are transported out-of-state for recycling while metal and wood wastes are recycled at other facilities in Prince George's County. No waste received at the Landfill is generated outside the County.

Table 4. Waste Disposal at the Brown Station Road Sanitary Landfill[5]

Generating Sector		Annual Tonnage
Disposed	Residential	204,000
	Commercial	90,000
	Public Schools	10,000
	Subtotal	**304,000**
Diverted	Tires	433
	Wood Waste	756
	Metal	500
	Subtotal	**1,689**
Managed at BSRSL		**305,689**

SOLID WASTE FACILITIES

There are a number of solid waste facilities located throughout Prince Georges County. These facilities serve the citizens of the County for the management of many different types of solid waste. Prince George's County presently relies on the Brown Station Road Sanitary Landfill (BSRSL) as the primary disposal site for solid waste. A number of waste materials are

[4] Metropolitan Washington Council of Governments; Round 8.1 Cooperative Forecasts; July 2012; www.mwcog.org
[5] Prince George's County, Maryland Comprehensive Ten-Year Solid Waste Management Plan, 2012

prohibited from disposal at the Landfill. These materials include vegetative yard waste, household hazardous waste, medical waste, liquids, animal carcasses used in research, and automobiles to name a few. Located at the BSRSL is a drop-off area where residents may bring electronics, tires, household hazardous waste, and recyclables collected by the County curbside program. These materials are properly managed and removed for off-site disposal. The County prefers that residents take yard trimmings directly to the Western Branch composting Facility; however, the BSRSL will accept yard trimmings delivered by residents and transport the material to Western Branch for composting. The following table summarizes the approved solid waste acceptance facilities operating in the County.

Table 5. Solid Waste Facilities in Prince George's County

Facility Type	Public	Private
Material Recovery Facility	Prince Georges County Materials Recovery	Consolidated Waste Industries
		Encore Recycling
		GSS Automotive Recycling
		Metro Re-Uz-It
		World Recycling
Composting Facility	Western Branch Yard Waste Composting Facility	
C&D Recovery		Sheriff Road Processing & Transfer Station Facility
		Recycle One
HHW Acceptance/Storage		Adelphi Laboratories
		University of Maryland
Convenience Center	Brown Station Road Convenience Center	
	Missouri Avenue Convenience Center	
Rubblefill		Ritchie Land Reclamation Limited Partnership Facility
Landfill	Brown Station Road Sanitary Landfill	

WASTE COLLECTION

The County maintains some control over the collection and disposal of municipal solid waste (MSW) by executing contracts and licensing haulers to operate within the County. All solid waste and recycling vehicles operating in the County must obtain a license and permit from the Department of the Environment. There are 101 residential solid waste collection districts in the County that consist of 30 contracts involving 20 private waste collection haulers. These haulers provide service to about 158,000 households.

By contracting with these haulers for collection of residential waste the County can stipulate in their contracts that waste collected must be disposed of at the County Landfill. Contracting and licensing waste haulers to operate and collect waste within the County ensures solid waste is

collected in a standardized way across the County. It also facilitates competition among waste haulers to provide quality service at a reasonable price for the County's residents. The 2016 solid waste collection fee is $240.66 and is appropriately adjusted in accordance with the Consumer Price Index in the Greater Washington Metropolitan Area.

Waste generated by commercial (including industrialized and institutional) and multi-family properties is collected by private haulers on an individual subscription basis. The County does not franchise haulers for the collection of commercial or multi-family waste.

The County uses financial mechanisms to encourage waste disposal at the County Landfill. The County rebates some of the tipping fee for municipal clients to encourage them to use the Landfill. The County can adjust the Landfill tipping fees to cover their costs as needed. The County's Landfill does not accept commercially generated construction and demolition debris.

There are a number of municipalities within the County that take responsibility for collecting solid waste from residents living in incorporated areas. In these instances the municipalities collect solid waste from private residents within their jurisdiction using their own equipment and trucks or contract out the service. Approximately 50,000 single family households receive waste collection in incorporated areas[6].

In the southern more rural areas of the County, residents contract directly with private haulers for the collection of solid waste and recyclables. The County also owns and operates two citizens' convenience areas for residents to drop-off solid waste and recyclables.

RECYCLING

Recycling services are provided to residents through County contracts with private haulers. The County has established 14 recycling collection districts that are serviced by four private haulers under four collection contracts. The County's curbside recycling collection program services about 164,000 households. This is more than trash collection as some municipalities opt to have collection of recyclables under the County's recycling program. Beginning July 1, 2015, the surcharge for recycling collection was $59.73 for the unincorporated areas of the County and $47.79 for participating municipalities. The County does not provide recycling services to commercial, industrial, institutional, or multi-family apartments in the County. Currently, nine municipalities have contracted with the County for recyclables collection, 17 collect recyclables with their own equipment, and one municipality has arranged for its citizens to use the County's drop-off facility. The owners of commercial, industrial, institutional, and multi-family properties are required to contract with private haulers for the collection of recyclables from their properties.

Prince George's County owns and operates a Materials Recovery Facility (MRF). This facility, which was constructed in 1993, was designed to process recyclables that are collected from the County's single-family residences for end-markets. In 2007, the MRF was upgraded with new equipment for processing recyclables using single stream technology[7]. During this same time

[6] Prince George's County, Maryland Comprehensive Ten-Year Solid Waste Management Plan, 2012, page III-4.
[7] Prince George's County, Maryland Comprehensive Ten-Year Solid Waste Management Plan, 2012, page 3

period, the County changed their recyclables collection program from dual stream to single stream. Maintaining ownership of the MRF provides the County with the ability to manage, maintain, and expand their recycling program in order to capture more materials for recycling.

In 2014, the County implemented a mandatory commercial and business property recycling program. The law requires all commercial property owners in Prince George's County to provide their employees, tenants, and customers with the opportunity to recycle materials. Property managers must arrange for separate recycling collection services.

Several privately owned and operated MRFs also operate in the County. These facilities mainly receive recyclable materials that are collected from the commercial and construction and demolition sectors of the County and from entities outside the County. These facilities must receive an annual license from Prince George's County and provide annual tonnage numbers from recyclables received that were generated in Prince George's County.

In May 2013 the County implemented a pilot food waste composting program at the Western Branch Yard Waste Composting and Transfer Station Facility. Clean food scraps from the University of Maryland and the Town of University Park's curbside food collection program, along with food scraps from other sources are brought to the facility for composting.

3 CHARACTERIZATION OF WASTES RECEIVED AT THE COUNTY LANDFILL

SCS Engineers conducted a waste composition analysis of residential, commercial, and public school waste disposed of at the BSRSL. The primary objectives of the study were to:

- Estimate types and quantities of recyclable and compostable waste components in the waste stream;
- Identify opportunities for greater waste stream diversion; and
- Create a baseline waste composition in order to measure the effectiveness of diversion efforts.

This waste characterization project consisted of four sampling events beginning in the fall of 2014 and finishing in the summer of 2015. All sampling and sorting activities were conducted at the BSRSL. The data generated can be used by the County to develop long-term waste management strategies and to evaluate the effectiveness of current diversion programs.

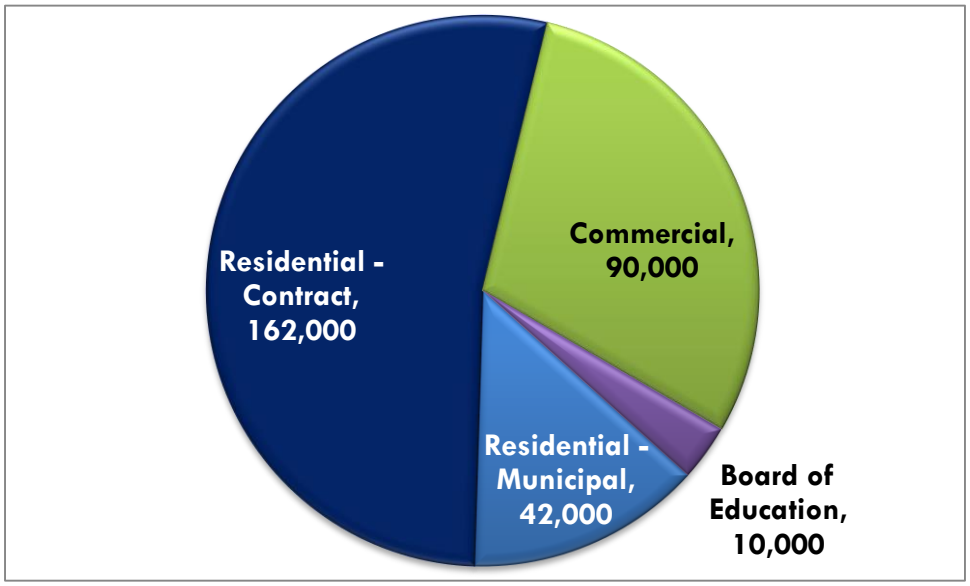
WASTE STREAMS ASSESSED

Different waste streams have the potential to have different types of materials in different quantities. In order to understand the composition of the waste disposed of at the BSRSL, SCS developed a sampling plan based on tonnage reports from 2014. Wastes sampled at the BSRSL come from four source types:

- **Commercial** (Collected by private haulers)
- **Public Schools** (Collected by the County Board of Education)
- **Residential – County Contract** (Collected by private haulers)
- **Residential – Municipal** (Collected by municipal crews or private haulers under municipal contract)

Exhibit 1 presents the distribution of waste by source that is delivered annually to the BSRSL. A total of 50 waste samples were obtained for each of the four seasonal field activities. The number of samples from each source was proportional to the annual tonnage received at the landfill.

Exhibit 1. Distribution of Waste by Source Annually Delivered to the Brown Station Road Sanitary Landfill



MATERIAL CATEGORIES

Table 6 summarizes the material categories into which the waste streams were sorted. The five major categories included:

- **Recyclable Paper** – Materials in this major category are collected from each of the four sources. These materials are also accepted at the County's Material Recovery Facility (MRF).
- **Recyclable Containers** - Materials in this major category are collected from each of the four sources. These materials are also accepted at the County's Material Recovery Facility (MRF).
- **Divertible** – Materials in this major category can be diverted from landfill disposal though special programs.
- **Compostable** – Materials in this major category can be included in the County's composting program.
- **Other** – Materials in this major category do not generally have markets for their recycling or recovery and cannot be composted.

Table 6. Description of Material Categories

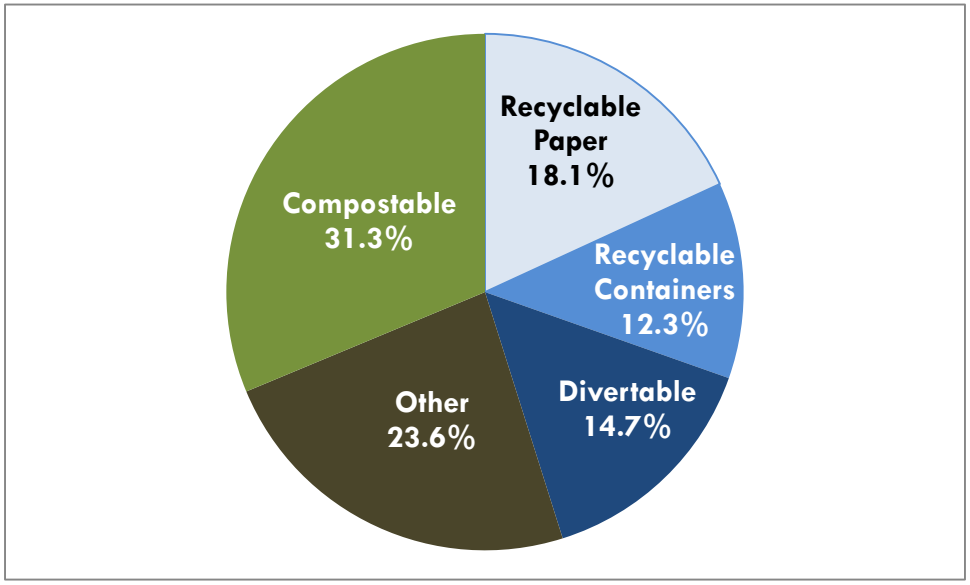
Material Categories		Examples
Recyclable Paper	Newspaper/Print (ONP)	Daily, weekly newspapers
	Corrugated Cardboard (OCC)	Packing/shipping boxes
	Magazines/Catalogs/Other Books	TV Guide, periodicals, journals, hard cover books
	Kraft Paper/Boxboard	Grocery/shopping bags, paper grocery bags, soda boxes, cereal boxes
	Office Paper/Junk Mail/Misc. Paper (Mixed Paper)	Copy paper, computer printouts, envelopes, brochures, flyers, junk mail, receipts, notebook paper
	Aseptic/Wax Coated Paper	Milk and juice cartons, juice boxes
Recyclable Containers	PET (#1) Bottles	Plastic water and soda bottles, marked #1
	HDPE (#2) Bottles	Milk and detergent bottles, marked with #2
	Other (#3-#7) Bottles	Prescription bottles, syrup bottles
	Jars, Jugs, Tubs, Trays	Jars/Jugs/Tubs/Trays marked with #1 through #5.
	Flower Pots	Recyclable flower pots, usually marked #5
	Other Rigid Plastic	Storage totes, furniture, toys, not marked with a #
	Ferrous Cans	Pet food cans, soup cans, fruit cans, aerosols
	Aluminum Cans/Foil	Soda, beer cans, and aluminum foil
	Glass Bottles/Jars	Beer, wine, soda bottles, all colors
Divertible	Electronics	Corded electronics, cell phones, appliances, cathode ray tube monitors (CRTs)
	Paint	Latex and oil-based paint
	Scrap Metal	Copper tubing, clothing hangers, machine parts, etc.
	Pallets/Lumber	Forklift pallets, plywood, 2x4's, dimensional lumber
	Other Wood	Tree stumps, wooden chairs, misc. wooden items
	Concrete/Brick/Rock	Gravel, bricks, stones, broken-up asphalt, concrete
	Dirt	Soil, rocky soil, clay, potting soil, silt, dirt
	Sheet Rock	Drywall or gypsum board
	Carpet/Carpet Padding	Vinyl siding used for exterior house siding
	Shingles	Forklift pallets, and other lumber materials
	Textiles *	Clothing, upholstery, fabrics
	Shopping Bags *	Grocery bags and shopping bags comprised of plastic film
Compostable	Compostable Paper	Tissues, napkins, paper towels
	Vegetative Food	Fruits, vegetables and rinds, breads
	Non-Vegetative Food	Meats, Dairy products
	Leaves	Leaves and pine needles
	Grass	Lawn clippings and hay
	Brush	Branches, brush, small sticks and twigs
Other	Furniture	Tables, chairs, couches, other furniture
	Plastic Film *	Tarps, bubble wrap, cellophane chip bags
	Garbage Bags *	Plastic film bags used to contain trash
	Polystyrene	Expanded/regular clamshells, cutlery, cups
	Other MSW	Materials not otherwise categorized including kitty litter, diapers, ceiling tiles, fines, and indistinguishable/small materials

* Indicates materials sorted in June 2015 only

RESIDENTIAL WASTE COMPOSITION

Exhibit 2 presents a graphic summary of the major material classifications of residential waste estimated from 130 waste samples collected and sorted during the four field activities. Over 75 percent of the residential waste is classified as recyclable, compostable, or divertible.

Exhibit 2. Residential Waste Composition of Major Material Categories



Assessment of Major Residential Waste Categories

Exhibit 3 through **Exhibit 7** presents breakdowns of the major residential waste categories.

Exhibit 3. Residential Recyclable Paper

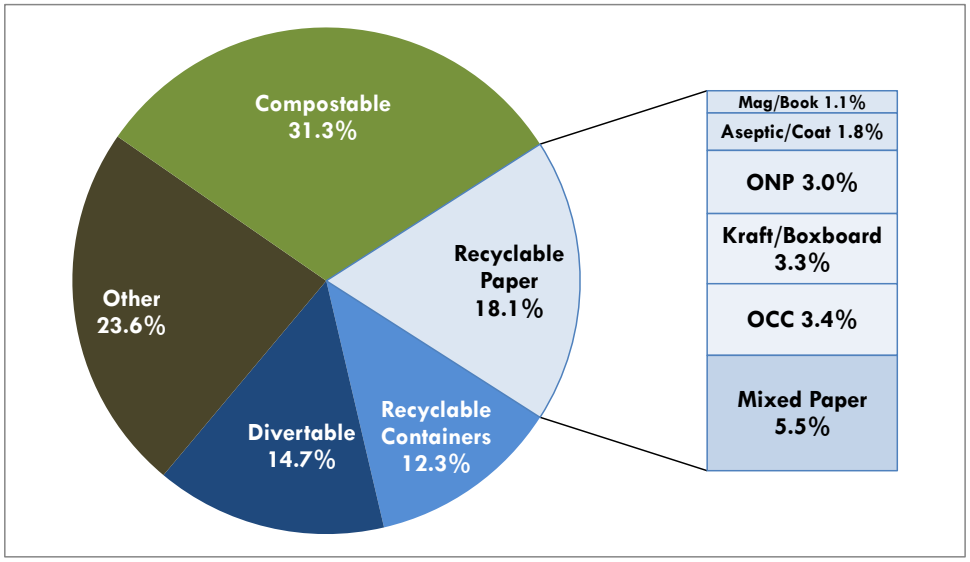


Exhibit 4. Residential Recyclable Containers

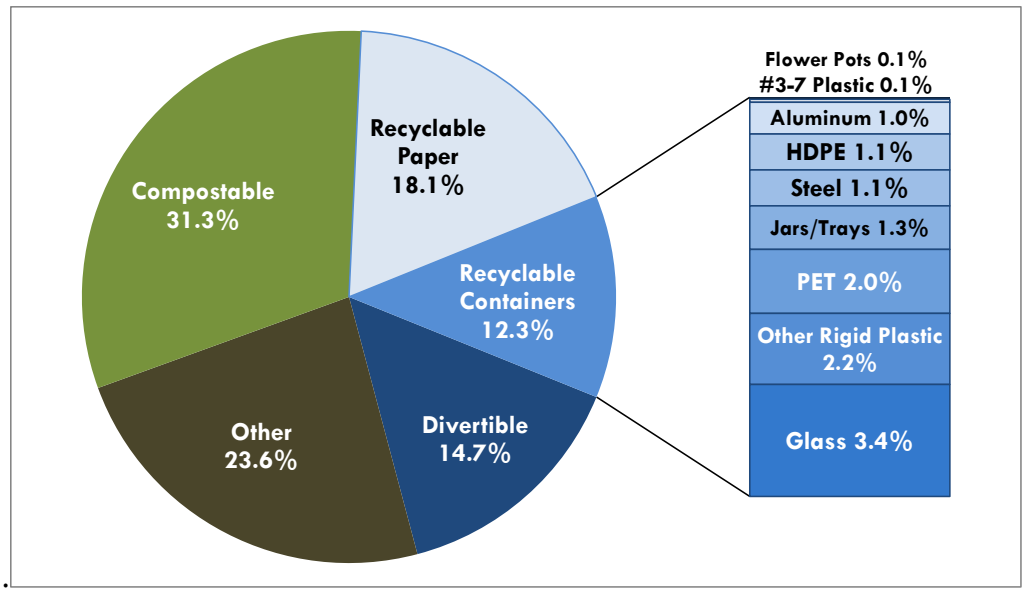


Exhibit 5. Residential Divertible Materials

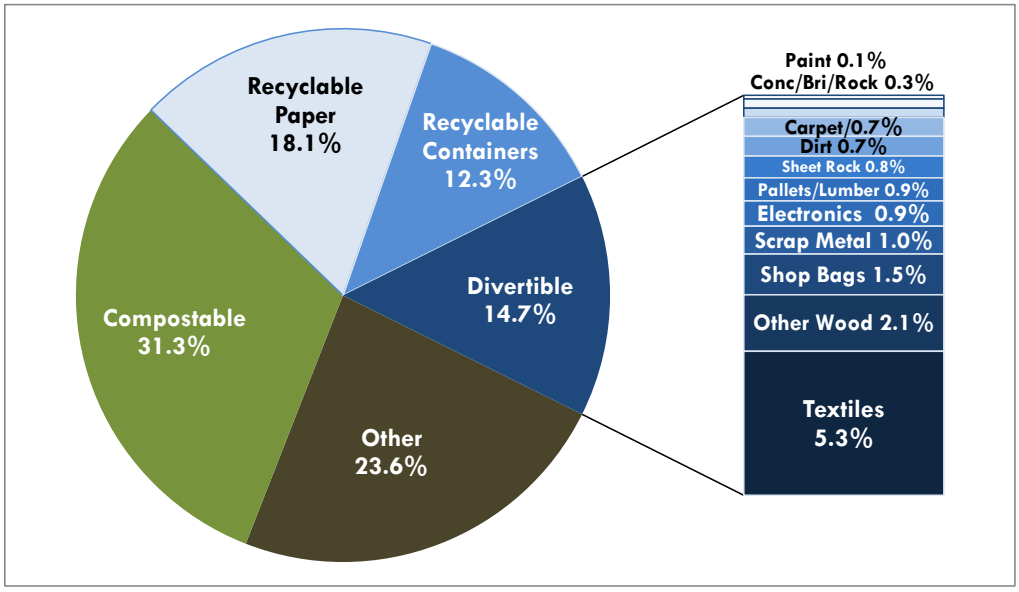


Exhibit 6. Residential Compostable Materials

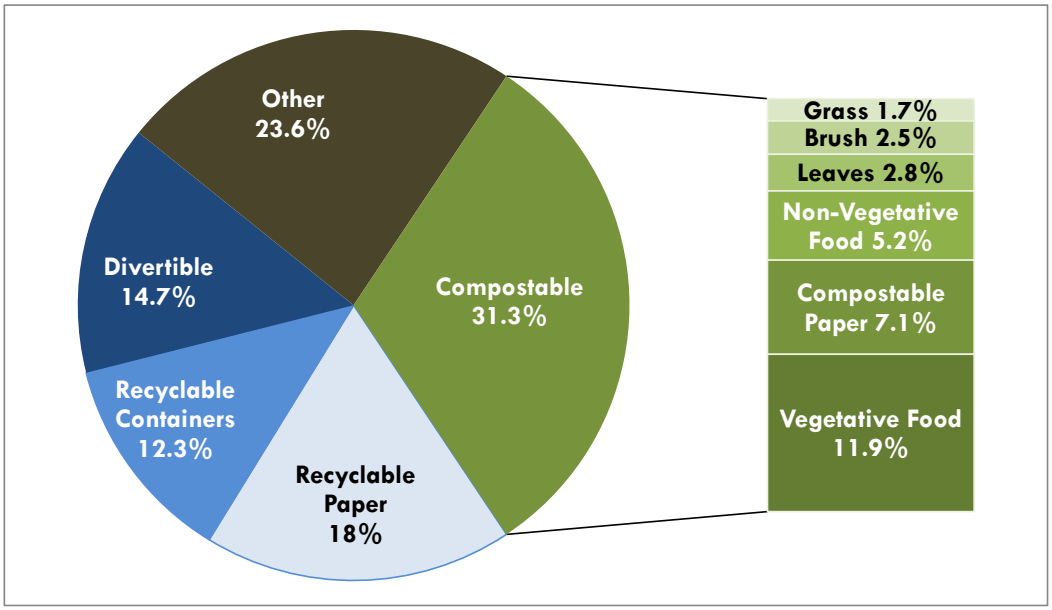
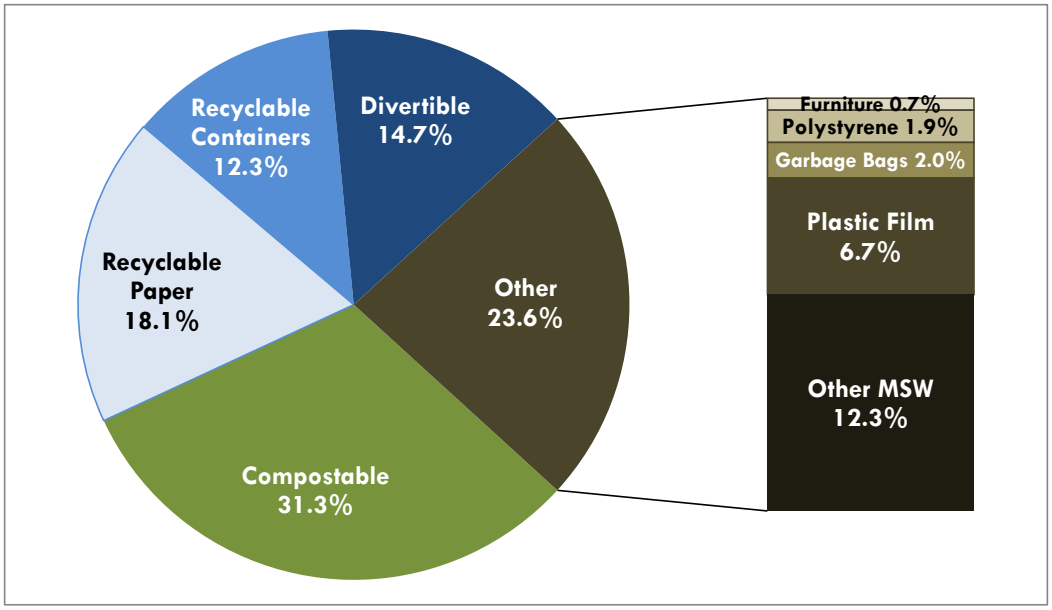


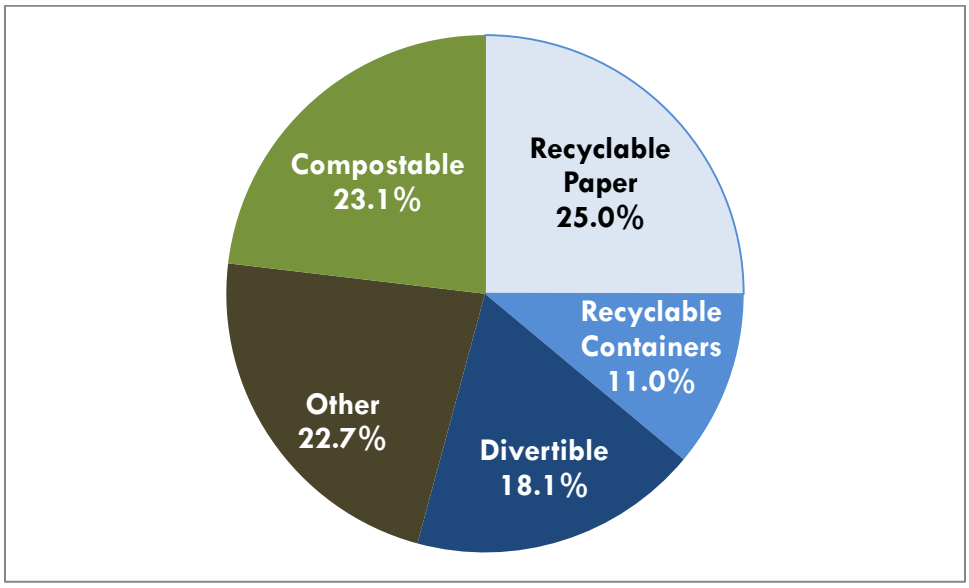
Exhibit 7. Residential Other Materials



COMMERCIAL WASTE COMPOSITION

Exhibit 8 presents a graphic summary of the major material classifications of commercial waste estimated from 63 waste samples collected and sorted during the four field activities. Over 75 percent of commercial waste is recyclable, compostable, or divertible.

Exhibit 8. Commercial Waste Composition of Major Material Categories



Assessment of Major Commercial Waste Categories

Exhibit 9 through **Exhibit 13** presents further breakdowns of the major commercial waste categories.

Exhibit 9. Commercial Recyclable Paper

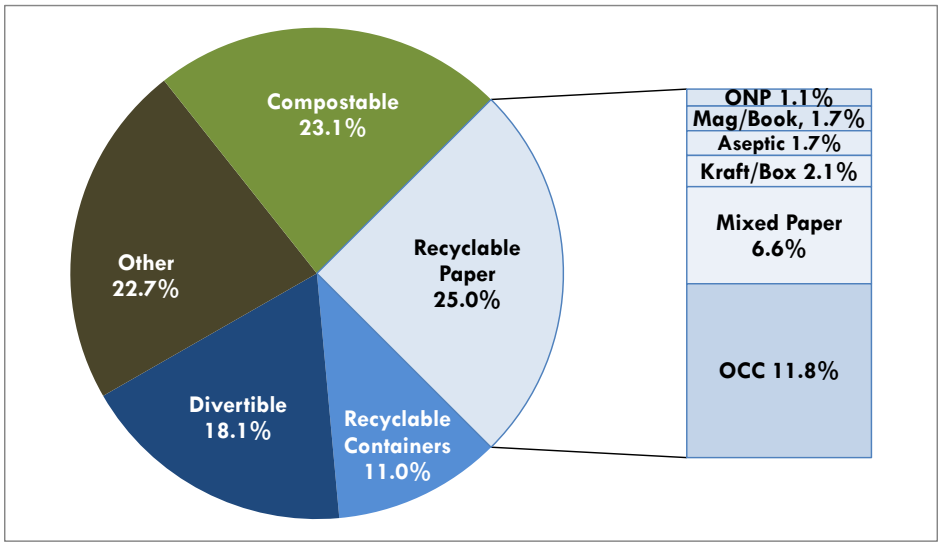


Exhibit 10. Commercial Recyclable Containers

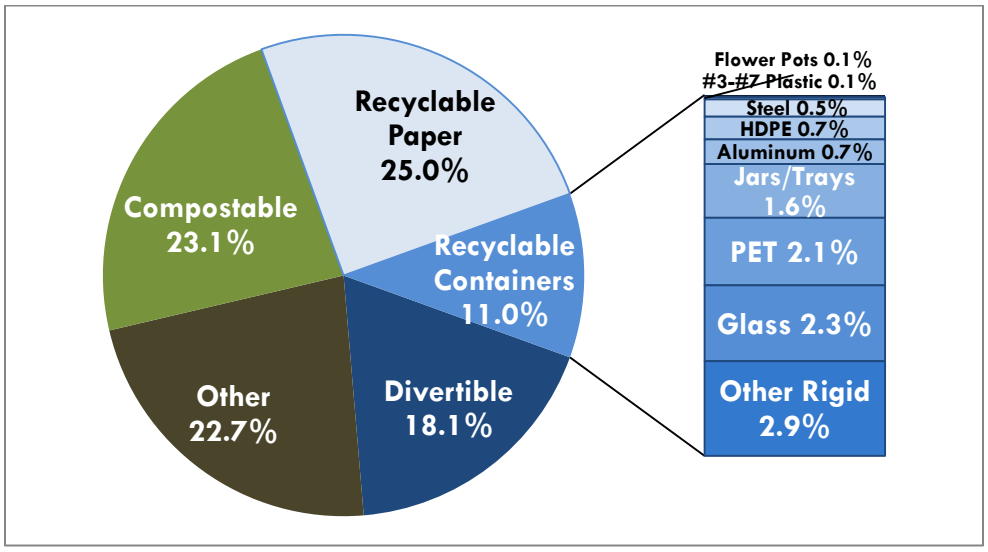


Exhibit 11. Commercial Divertible Materials

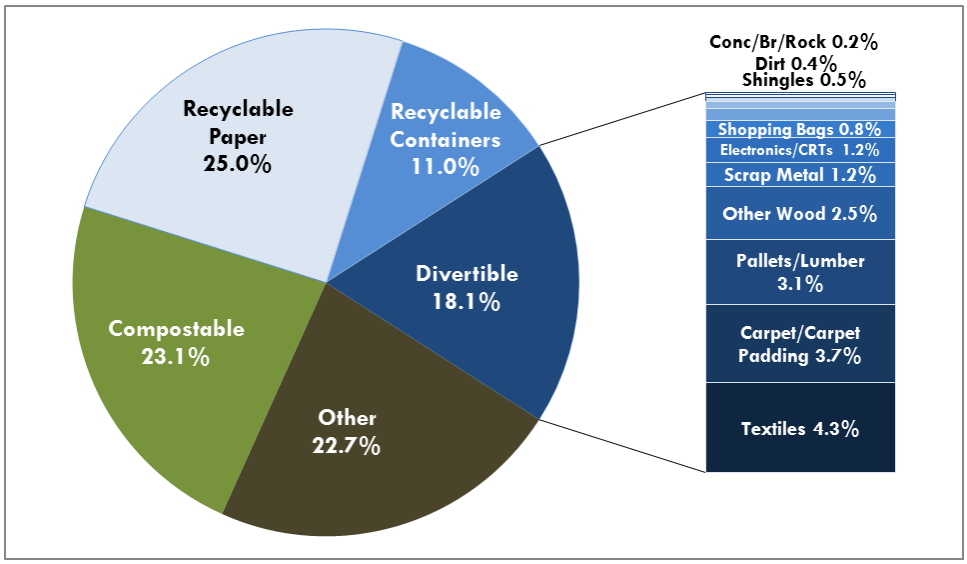


Exhibit 12. Commercial Compostable Materials

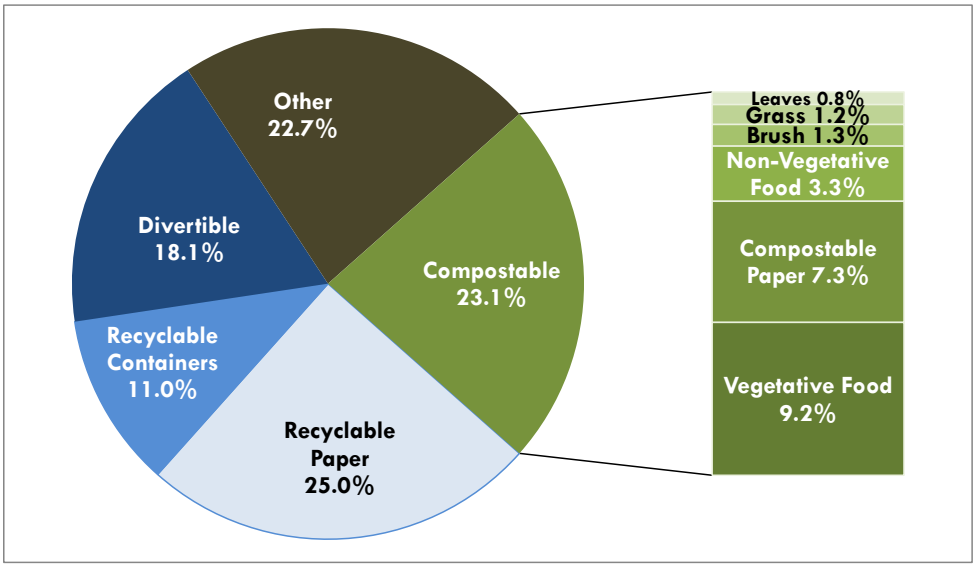
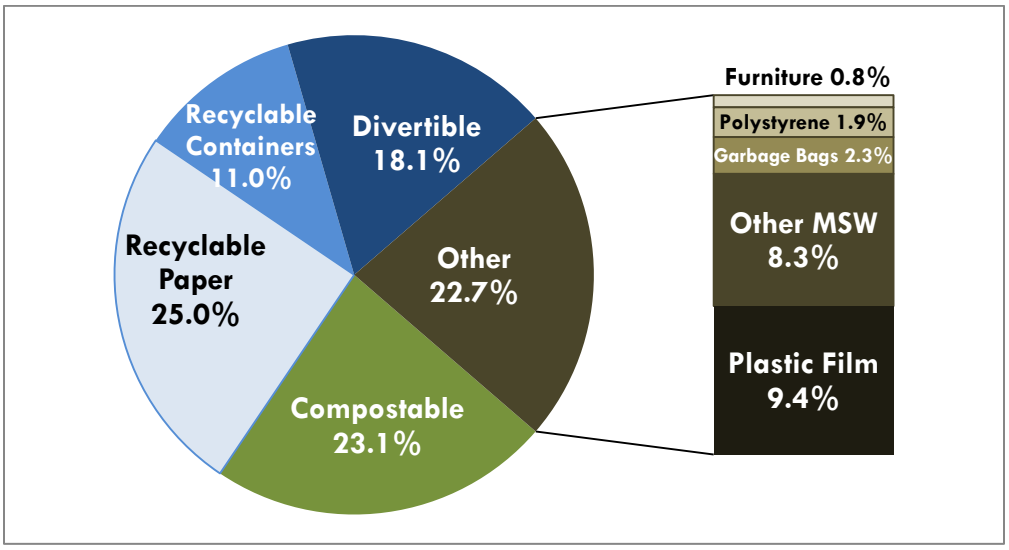


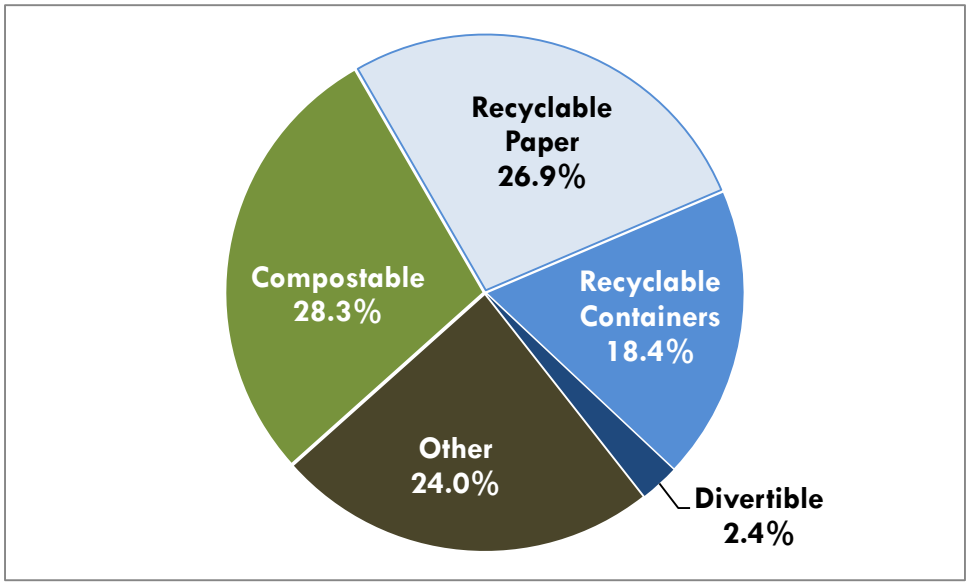
Exhibit 13. Commercial Other Materials



PUBLIC SCHOOL WASTE COMPOSITION

Exhibit 14 presents a graphic summary of the major material classifications of public school waste estimated from seven waste samples collected and sorted during the four field activities. Over 75 percent of the public school waste stream is recyclable, compostable, or divertible.

Exhibit 14. Public School Waste Composition of Major Material Categories



Assessment of Major Public Schools Waste Categories

Exhibit 15 through **0** presents further breakdowns of the major public school waste categories.

Exhibit 15. Public School Recyclable Paper

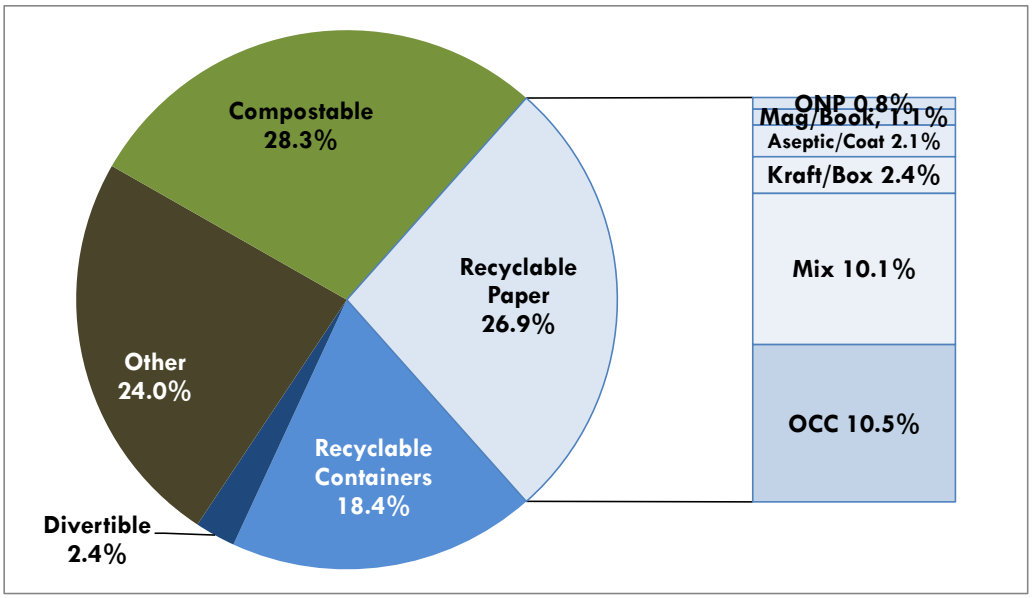


Exhibit 16. Public School Recyclable Containers

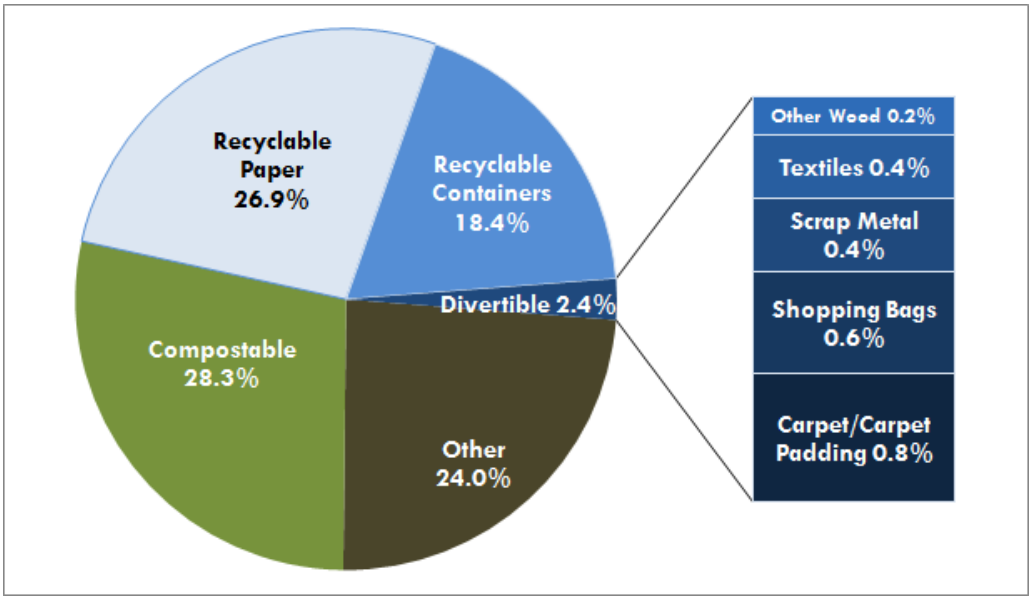


Exhibit 17. Public School Divertible Material

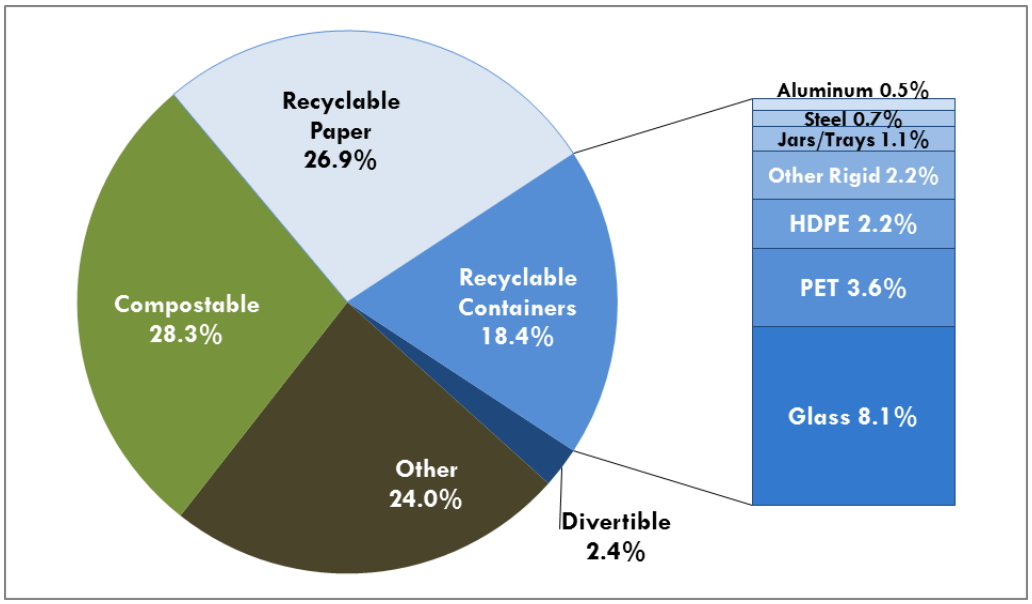


Exhibit 18. Public School Compostable Materials

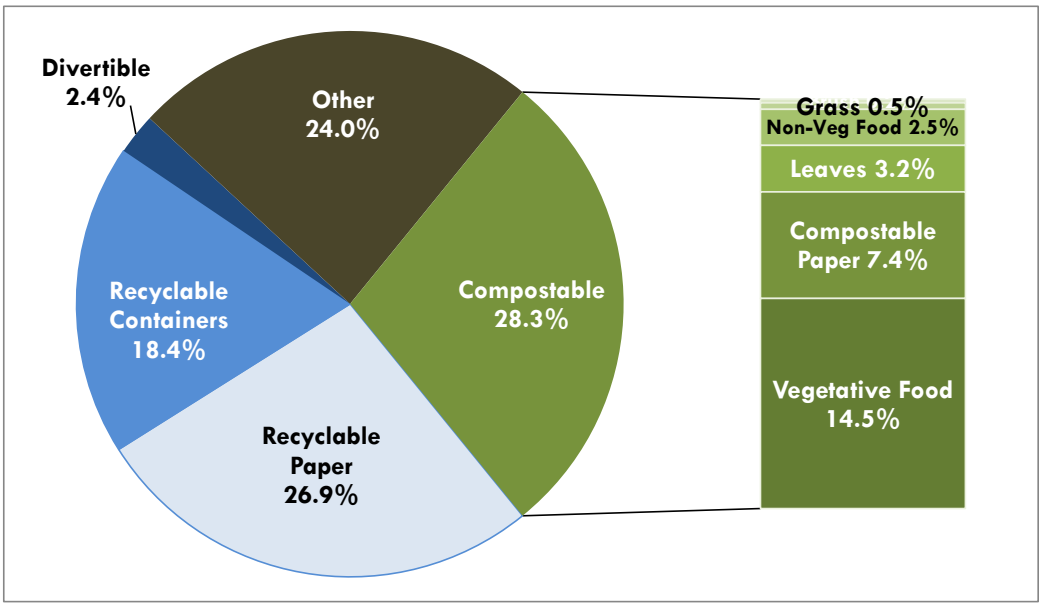
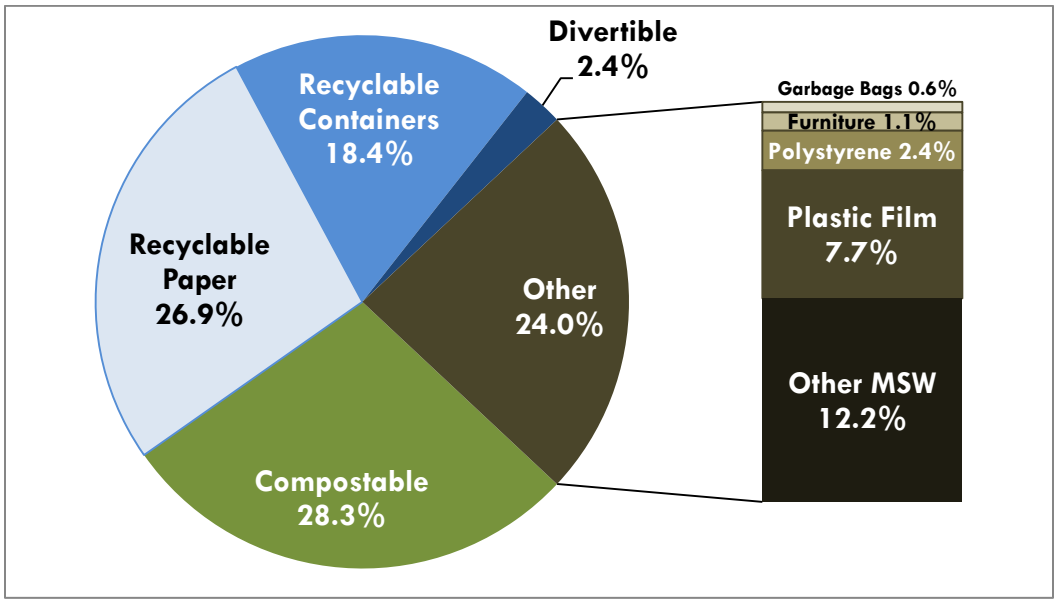


Exhibit 19. Public School Other Materials



ANNUAL WASTE QUANTITIES DISPOSED AT THE BSRSL

Material quantities disposed annually at the BSRSL were estimated from the waste characterization data. These are presented in **Table 7**. Materials for which more than 10,000 tons are disposed annually include:

- **Residential Sources:**
  - Vegetative Food (24,300 tons),
  - Compostable Paper (14,600 tons),
  - Plastic Film (13,600 tons),
  - Office Paper / Junk Mail / Misc. Paper (11,200 tons),
  - Textiles (10,900 tons), and
  - Non-Vegetative Food (10,700 tons).
- **Commercial Sources:**
  - Corrugated Cardboard (10,600 tons).

Table 7. Annual Material Quantities Disposed at the BSRSL

Material Components		Source			
		Residential	Commercial	Schools	Total
Recyclable Paper	Newspaper/print	6,200	1,000	<100	7,300
	Corrugated Cardboard	7,000	10,600	1,000	18,600
	Magazines/Catalogs/ Other Books	2,200	1,500	100	3,800
	Kraft Paper/Paperboard	6,800	1,900	200	9,000
	Office Paper/Junk Mail/Misc. Paper	11,200	5,900	1,000	18,200
	Aseptic/Wax Coated Paper	3,600	1,500	200	5,400
	Subtotal	**37,000**	**22,500**	**2,700**	**62,200**
Recyclable Containers	PET (#1) Bottles	4,000	1,900	400	6,300
	HDPE (#2) Bottles	2,300	600	200	3,100
	Other (#3-#7) Bottles	100	<100	<100	200
	Jars, Jugs, Tubs, Trays	2,700	1,500	100	4,300
	Flower Pots	200	<100	<100	300
	Other Rigid Plastic	4,500	2,600	200	7,300
	Ferrous Cans	2,300	500	<100	2,800
	Aluminum Cans/Foil	2,000	700	<100	2,700
	Glass Bottle/Jars	7,000	2,100	800	9,900
	Subtotal	**25,100**	**9,900**	**1,800**	**36,800**
Divertible	Electronics	1,900	500	<100	2,400
	CRTs	<100	600	<100	600
	Paint	300	<100	<100	400
	Scrap Metal	2,100	1,100	<100	3,200
	Pallets/Lumber	1,700	2,800	<100	4,500
	Other Wood	4,200	2,200	<100	6,500
	Concrete/Brick/Rock	700	100	<100	800
	Dirt	1,500	300	<100	1,800
	Sheet Rock	1,600	200	<100	1,800
	Carpet/Carpet Padding	1,400	3,400	<100	4,800
	Shingles	700	500	<100	1,200
	Textiles	10,900	3,900	<100	14,800
	Shopping Bags	3,100	700	<100	3,900
	Subtotal	**30,100**	**16,300**	**200**	**46,600**
Compostable	Compostable Paper	14,600	6,600	700	21,900
	Vegetative Food	24,300	8,300	1,500	34,100
	Non-Vegetative Food	10,700	3,000	200	13,900
	Leaves	5,700	700	300	6,700
	Grass	3,400	1,100	<100	4,600
	Brush	5,100	1,200	<100	6,400
	Subtotal	**63,800**	**20,800**	**2,800**	**87,500**
Other MSW	Furniture	1,400	700	100	2,200
	Plastic Film	13,600	8,400	800	22,800
	Garbage Bags	4,100	2,100	<100	6,300
	Polystyrene	3,800	1,700	200	5,700
	Other MSW	25,200	7,500	1,200	33,900
	Subtotal	**48,100**	**20,400**	**2,400**	**70,900**
TOTAL		**204,000**	**90,000**	**10,000**	**304,000**

4 ZERO WASTE INITIATIVES

Prince George's County has positioned itself as a leader in the management of solid waste. The County has already established a number of programs and policies that encourage the reduction and recovery of solid waste. In 2013, the latest data available, the County's recycling rate was 59.5 percent, the second highest in the State behind Washington County with a recycling rate of 61.89 percent.

Also in 2013, the County's waste diversion rate, which is the recycling rate plus the source reduction credit (based on programs and activities reported to MDE), was the highest of all counties in the State at 64.53 percent.

With these commendable recycling and waste diversion rates it is not a surprise the County wants to continue to raise the bar and pursue zero waste. Moving to zero waste will require the enhancement of many existing programs along with the establishment of new policies and programs to further reduce waste and increase recovery across all generating sectors. These can be generally classified into the following:

- **Upstream** – Policies and programs to support re-design strategies to reduce the volume and toxicity of discarded products and materials, and promote low-impact or reduced consumption lifestyles.

- **Downstream** – Policies and programs to address reuse, recycling and composting of end-of-life products and materials to ensure their highest and best use.

The following discussion looks at initiatives the County could evaluate and consider implementing in order to move toward zero waste in each of the waste generating sectors in the County, including residential, commercial, industrial, institutional, and County-owned facilities. Many of the initiatives discussed in this plan are complementary of each other and must be implemented together in order to achieve success. For example, the County would need to develop or facilitate the development of composting infrastructure before requiring food waste collection from commercial sources.

The County has the authority to implement programs that can facilitate moving toward zero waste. Subtitle 21 of the County Code specifically addresses solid waste management and recycling. It includes requirements for establishing a voluntary recycling program, mandatory requirements for apartment owners to provide recycling opportunities for their tenants, implementation of a pilot food waste composting program, and establishment of material bans such as polystyrene for food packaging.

INCORPORATE THE ZERO WASTE PLAN INTO THE 10-YEAR SOLID WASTE MANAGEMENT PLAN

The County could establish an incremental timeline in order to track the County's progress in working toward the zero waste goal. One timeline to achieving zero waste mirrors the State's goal of 85 percent waste diversion by 2040. Achieving zero waste will take time and require the participation of all stakeholders across Prince George's County.

The County Council's endorsement of this plan and the incorporation of it into the 10-Year Solid Waste Management Plan will serve two very important purposes. First, it provides the policy support for the Solid Waste Division to make decisions regarding solid waste management that support zero waste goals. Revisions to existing policies and program and development of new programs and policies will be needed to move the County toward zero waste. Second, it demonstrates to the community that the County is serious about zero waste. When residents and business owners in Prince George's County see the County's leadership making a commitment to zero waste it will facilitate Solid Waste Division staff's work to achieve this goal. The County Council could provide funds to allow the Solid Waste Division to hire staff and expand programs to work toward zero waste.

PRIORITIZE SOURCE REDUCTION AND REUSE PROGRAMS

Source reduction and reuse are the highest priority initiatives in minimizing waste. These programs can often be overlooked because measuring the impact they have on the waste stream can be challenging as they are geared toward avoiding waste generation.

Promote Source Reduction

Source reduction is an important initiative to move the County towards zero waste. Source reduction is often overlooked because it is fundamentally different than other waste management strategies – it seeks to prevent waste generation. Source reduction strives to change the way products are produced, manufactured, distributed, transported, sold, and/or consumed in order to avoid waste generation in the first place.

The County has implemented several programs that highlight the importance of source reduction to residents and businesses. Source reduction ideas are included in the County's public education material, including on displays, in presentations, and on the County's Facebook page and website. The Waste Management Division's staff is available to give source reduction presentations, and coordinate with other County departments to inform residents and businesses on where they can donate used materials to avoid disposal.

The County takes source reduction seriously and is leading by example in their own offices and facilities. In 2007 the County implemented the "Going Green Initiative" whereby the County established goals for expanding green building practices in the County. The County has also developed an energy policy for reducing energy consumption and increasing the amount of renewable energy used in County facilities[8].

The impact of source reduction has on eliminating waste is often challenging to measure. The State of Maryland requires all counties to complete a source reduction checklist to indicate their involvement in activities that are considered source reduction. The MDE awarded the County a five percent "credit" on their diversion rate based on the number of source reduction programs/activities the County. Prince George's County's 2014 source reduction checklist listed 17 source reduction activities, including:

[8] Prince George's County, Maryland Comprehensive Ten-Year Solid Waste Management Plan, 2012, page IV-20.

- **Management of Yard Trimmings (Part 1 of the source reduction checklist)**

  1. Ongoing, multi-faceted, public education program - grasscycling and/or home composting

  2. Within the past 3 years, distributed publications to at least 30% of single-family households in the County

- **General Education (Part 2 of the source reduction checklist)**

  3. Staffed a source reduction display

  4. Hosted a source reduction event for the general public

  5. Incorporated source reduction information into the County website

  6. Promoted source reduction in schools on an ongoing basis

  7. A source reduction curriculum or ongoing activity in schools

  8. Integrated source reduction into ongoing County employee training and education programs

  9. Within the past 3 years, distributed source reduction materials to at least 30% of residents

  10. Within the past 3 years, distributed source reduction materials to at least 30% of businesses

  11. Within the past 3 years, developed/updated a solid waste reuse directory

  12. Developed/maintained a system for providing materials to a reuse center

  13. Conducted a source reduction training session, workshop, or presentation at a business, institution or community event

  14. Operated a program to promote pallet reuse

  15. Within the past 3 years, conducted source reduction site visits to 3 or more of the businesses with the most employees or the most waste

  16. Within the past 3 years, conducted a source reduction waste audit or survey of county facilities where at least 10 percent of county employees worked

  17. Held team meetings, a least quarterly, that included representatives from major county departments, in which source reduction was discussed as a formal part of the agenda

Encourage Reuse Programs

Supporting and encouraging reuse programs is one way that the County can bring together residents that would like to discard unwanted items residents who are looking for used items in good condition. Reuse aims to extend the life of products by using them over and over again. According to the Institute of Local Self-Reliance, for every 10,000 tons of materials that are managed through reuse programs, 75 to 250 jobs are created[9] . These programs have a twofold benefit:

- Provide residents with low-cost materials in good condition;
- Keep these materials from ending up in landfills or incinerators.

There are a number of organizations engaged in reuse in Prince George's County. Community Forklift is a non-profit reuse center for home improvement supplies. They collect unwanted building materials throughout the DC Metro Region and make these materials available to the public at low-cost. They also distribute free supplies to residents in need and non-profits. Community Forklift has recovered over $12 million of building materials from the DC Metro Region and has provided supplies to 20,000 homeowners, non-profits, businesses, and artisans[10]. There are also a number of thrift stores in Prince George's County that provide low-cost clothing and home goods to residents.

Other municipalities host repair stations that aim to fix materials that are broken to extend their life. For example, the City of Santa Monica, California hosts regular Repair Cafés. The City arranges for volunteer "fixers" to help residents repair items such as lamps, toasters, clothes, toys, bikes, and hair dryers. Residents are encouraged to bring items needing repair to the café, and the volunteers will attempt to fix them. Repair services are offered for free, and customers pay for replacement parts.

Repair Revolution in Oakland, California follows a similar model. Their repair "salon" consists of skilled artisans and repair professionals that give new life to broken materials. They educate and inspire the community around repairing items and make it easy for people to fix the things they love. Repair Revolution repairs or fixes anything from bicycles, shoes, clothes, knives, furniture to many other household goods that are too good to throw away.

Other local governments provide opportunities for reuse and donation onsite at their disposal facilities. The Metro Regional Government in Portland, Oregon owns two regional transfer stations. The private companies that operate the facilities have partnered with local non-profits which are allowed to stage their equipment at the transfer station for customers to donate the materials onsite. One non-profit even provides staffing at the transfer station to recover materials for resale. In 2015, over 270 million tons of materials were diverted to reuse markets in Portland[11].

[9] Waste to Wealth; Recycling Means Business, 10 December 2008. Institute for Local Self-Reliance. http://www.ilsr.org/recycling/recyclingmeansbusiness.html

[10] Community Forklift, 2015. www.communityforklift.org

[11] Erickson, Penny, Transfer Stations Operations Supervisor, Metro Regional Government. Email communication February 18, 2016

The County could consider implementing the following initiatives to support reuse programs:

- Identify materials that can be reused, but are not currently accepted as part of any established reuse programs; explore ways to start recovery of these items for reuse.
- Host a "repair café" that features local artisans and repair professionals offering their services to the public. Such events may be held in conjunction with community events throughout the County.
- Develop a comprehensive database of reuse programs, repair services, and donation centers in the County so residents have easy one-stop access to opportunities to extend the lives of their materials.
- Provide grants or subsides to individuals and businesses to develop businesses in the County for reuse and donation of materials.

SUPPORT AND IMPLEMENT PRODUCER RESPONSIBILITY PROGRAMS

Engaging producers and other entities involved in the development of products and packaging by encouraging or requiring them to take responsibility for the products that they produce will minimize waste and reduce the burden on Prince George's County to manage waste materials.

Promote Extended Producer Responsibility (EPR) Policies

EPR aims to internalize the environmental costs of goods into the market price of the product. This model places a shared responsibility on the end-of-life management of goods to product manufacturers and all parties involved in the product supply chain. It also focuses on redesigning products to minimize the negative impact a product might have during its life cycle. This "upstream" initiative shifts the responsibility from consumers and local governments to product manufacturers to produce products that can more easily be recycled or reused and secondarily to retailers. There are a number of different types of EPR programs that can be implemented for various products (**Table 8**).

There are a number of products in the County's waste stream that EPR programs can be applied to, including:

- Electronics – 0.7 percent (2,400 tons disposed at the BSRSL annually)
- Paint – 0.1 percent (400 tons disposed at the BSRSL annually)
- CRTs – 0.2 percent (600 tons disposed at the BSRSL annually)
- Carpet/carpet padding – 1.7 percent (4,800 tons disposed at the BSRSL annually)

Other products entering the waste stream that can be covered by EPR initiatives include pharmaceuticals, medical sharps, tires, computers, toner cartridges, and mattresses. The State of

Maryland has committed to establishing an EPR program for mattresses and investigating the potential for establishing other EPR programs for more materials[12].

Table 8. Types of Extended Producer Responsibility Programs and Examples

Type of EPR or Stewardship Approach	Methods	Examples
Product Take-Back	- Mandatory take-back - Voluntary or negotiated take-back	-- Sony Electronics national take-back and recycling program
Procurement/Consumer	- Procurement guidelines and policies - Information disclosure programs - Product specifications that require environmental performance standards	-- Prince George's County internal green purchasing requirements
Regulatory Approaches	- Disposal bans - Mandatory recycling - Product or material prohibitions	-- Prince George's County ban on use of expanded polystyrene -- State of North Carolina disposal bans on tires, aluminum cans, white goods, and yard waste among others
Voluntary Industry Practices	- Public/private partnerships - Voluntary codes of practice - Leasing or "servicing" of products	-- Call2Recycle battery stewardship program -- Caterpillar Cat REMAN program to disassemble products and reuse parts
Economic Instruments	- Advanced recycling/disposal fees - Deposit/refund schemes - Product charges - Subsidies or tax credits for environmentally preferred products - Differential fees based on product's health or environmental impact	-- Electronic waste recycling fee in California -- Beverage container deposit laws in CA, OR, HI, IA, MI, CT, MA, NY, VT, ME

Source: California Product Stewardship Institute. http://www.calrecycle.ca.gov/EPR/About.htm

The County could take an active role in advocating for legislation that requires product manufacturers, retail establishments, wholesale distributors and other appropriate entities to take back certain products or packaging that currently are difficult to recycle, contain toxics or otherwise pose problems when they are discarded as waste. As part of internal procurement requirements, the County can preferentially support product manufacturers and businesses that have implemented EPR for their products.

[12] *Zero Waste Maryland, Maryland's Plan to Reduce, Reuse and Recycle Nearly All Waste Generated in Maryland by 2040,* Maryland Department of the Environment, December 2014, page 48, accessed via http://www.mde.state.md.us/programs/Marylander/Documents/Zero_Waste_Plan_Draft_12.15.14.pdf

Support Container Deposit Legislation

The County can support efforts at the State level to implement a container deposit program. A container deposit program (or bottle bill as it is commonly known) seeks to increase the recovery and recycling of containers (mainly aluminum beverage cans and plastic and glass beverage bottles) by requiring refundable deposits be paid on containers when they are originally purchased. When consumers bring the empty containers back to retailers or redemption centers the deposit originally paid is refunded. Ten states currently have bottles bills with deposits of five cents up to 15 cents depending on the size of the container. States that have bottle bills report high recycling rates of the covered containers, from 70 percent to 95 percent.

Past efforts have sought to implement a bottle bill in the State of Maryland, but they have not been successful. Earlier versions of bills sought to establish a statewide container recycling refund program whereby distributers of beverages covered by the bill would be required to pay the per container deposit to the State the month after the beverages are sold. Retailers then pay the distributors the deposit when they accept the beverages. Consumers pay the deposit on the containers at the point of sale. When consumers return the empty containers to designated "redemption centers," the consumer is returned their deposit. The State then reimburses the redemption centers for each container the deposit plus a one cent per container handling fee. Previous efforts to establish a bottle bill sought to alleviate concerns expressed by entities impacted by such a program. The most recent version of the bill included language that the State would reimburse local recycling programs for lost revenues that resulted from establishment of such a program.

According to the Waste Characterization Study conducted 2015, beverage containers make up 6.3 percent (16,155 tons) of Prince George's County's waste stream in the BSRSL, including:

- 2.0 percent #1 PET bottles;
- 0.9 percent aluminum cans and foil (90 percent assumed to be beverage cans); and,
- 3.4 percent for glass containers.

For purposes of evaluating the impact of a container deposit in Maryland, SCS' observations indicate about 75 percent of glass containers are beverage containers that would be covered by the program. If a five cent deposit were enacted, SCS estimated the value of the containers disposed at the Landfill. SCS also calculated the energy value wasted and the greenhouse gas generation impact of the containers buried in the landfill. **Table 9** summarizes the calculations and results. Overall, with a deposit program the containers disposed of at the landfill have a value of over $18.1 million. The energy required to produce the same amount of containers from virgin raw materials is estimated to be 903 billion Btus (equivalent to the annual energy use of 9,500 homes). The greenhouse gas emissions prevented by recycling these materials instead of manufacturing from virgin materials are estimated to be nearly 13.6 billion tons (equivalent to the emissions of 9,100 cars annually).

Table 9. Impact of Bottle Bill on Prince George's County

Economic Impacts and Environmentla Benefits	Beverage Package Type			
	Aluminum Cans [1]	#1 PET Plastic Bottles	Glass Bottles [2]	Total
Number of Containers				
Percent of Waste Disposed at BSRSL	0.9%	2.0%	3.4%	6.3%
Annual Tonnage	2,430	6,300	7,425	16,155
Number of Containers/Ton [3]	68,420	26,505	4,000	22,466
Number of Containers Disposed Annually (millions)	166	167	30	363
Economic Impact of Supporting Maryland Bottle Bill				
Annual Revenue (assuming 5 cents per container)	$8.3M	$8.3M	$1.5M	$18.1M
Environmental Benefits				
Energy Saved by Recycling instead of Wasting				
Energy Saved per Ton (Mbtu/ton) [2]	207	53.4	8.6	55.9
Annual Energy Savings (Mbtu)	503,010	336,420	63,855	903,285
Equivalent to Annual Energy Use by This Number of Homes	5,300	3,500	700	9,500
Greenhouse Gas Reductions by Recycling instead of Wasting				
Million Tons of Carbon Equivalent per ton (MTCE/ton) [2]	3.96	0.54	0.08	0.84
Annual Greenhouse Gas Savings (MTCE)	9,600	3,400	600	13,600
Equivalent to Annual Emissions by This Number of Cars	6,400	2,300	400	9,100

1 Approximately 90 percent of Aluminum disposed are beverage cans

2 Approximately 75 percent of glass bottles would be covered under a statewide bottle bill.

3 Source: The Container Recycling Institute

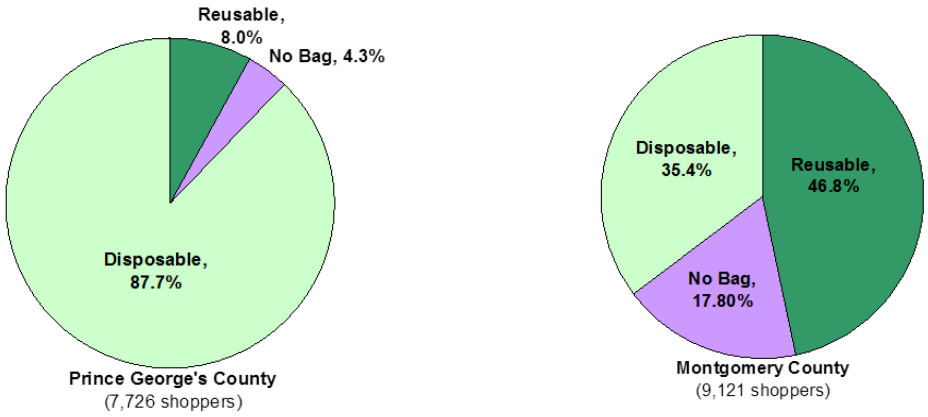
Limit Single-Use Disposable Bags

Shopping bags comprise 1.5 percent of the waste stream in Prince George's County and it is estimated that 3,900 tons of shopping bags are disposed of at the County's Landfill annually. While shopping bags do not comprise a large portion of the waste stream by weight, they provide an opportunity for the County to implement a source reduction policy that would reduce the amount of shopping bags used and entering the waste stream. Both Montgomery County and the District of Columbia Government have implemented programs that place a five cent fee on all single-use bags dispensed in their jurisdictions. Limiting single–use disposal bags, either through a fee or a ban, would provide consistency in the region.

The Prince George's Sierra Club conducted a survey in early 2014 that observed about 17,000 shoppers leaving the stores of five major grocery store chains in Prince George's and Montgomery counties. Volunteers recorded the number of shoppers using reusable bags, disposable bags, or a mix of reusable and disposable. The shoppers in Montgomery County (which has a five cent fee on bags) were seven times more likely to use reusable bags than shoppers in Prince George's County (**Exhibit 20**). Shoppers in Montgomery County were also four times more likely than in Prince George's County to hand-carry their merchandise out of the

store with no bag. Placing a small fee on single-use carry-out bags has significantly changed shopper behavior in Montgomery County and result in a cleaner environment.

Exhibit 20. Comparison of Disposable Bag Use Among Shoppers in Prince George's County vs. Montgomery County



There are several different ways to limit the use of single-use disposable bags, through various fee structures or bans. In conjunction with single-use disposable bag ban, the County could continue its efforts to educate the public on alternatives to using single-use carry out bags and make available for free reusable bags for residents.

REINFORCE PUBLIC EDUCATION AND OUTREACH

Develop Communication/Outreach Plan for Marketing Zero Waste

To increase waste diversion the County must have the buy-in and support of various groups in the County – residents, business owners and employees, multi-family property managers and tenants, policy-makers, institutions, and other stakeholders. The County has a long history of engaging residents and organizations in decision-making processes to improve the community. Indeed, it was a group of citizens and businesses that pushed the idea of Prince George's County adopting a zero waste plan.

The value of recyclable paper and containers disposed of at the BSRSL is estimated to be over $9.7 million annually as presented in **Table 10**. Recovering these materials as well as compostable and divertible materials from the waste stream and placing them back into the economy will have a significant impact on local revenue, job creation, and business expansion.

With a zero waste goal the County could review all existing solid waste promotional materials to ensure they conform to zero waste. The County could also evaluate promotional materials and consider different media for their distribution. The overarching goal is to make sure residents of Prince George's County know about the County's goal and motivated to change their purchasing, consuming, and disposing habits to achieve this goal. Zero waste is likely to be met with skepticism from stakeholders, and having clear and consistent messaging about the program, how to get there, and why the County needs each stakeholder's support will be paramount. Section 8.2 of MDE's Zero Waste Maryland plan establishes an initiative to "Provide funding to

local governments for outreach activities." The County could take advantage of any grants or funding MDE makes available to assist local governments with their outreach activities.

Table 10. Value of Material Commodities Disposed of at the Brown Station Road Sanitary Landfill in 2015

	Material Components	Annual Tons [1]	Average Market Price ($/ton) [2]	Annual Revenue
Recyclable Paper	Newspaper/print	7,300	$43	$310,250
	Corrugated Cardboard	18,600	$101	$1,882,448
	Magazines/Catalogs/ Other Books	3,800	$101	$384,586
	Kraft Paper/Paperboard	9,000	$49	$441,466
	Office Paper/Junk Mail/Misc. Paper	18,200	$158	$2,877,483
	Aseptic/Wax Coated Paper [3]	5,400	$28	$149,018
	Subtotal	**62,200**	**$97**	**$6,045,250**
Recyclable Containers	PET (#1) Bottles	6,300	$233	$1,467,851
	HDPE (#2) Bottles	3,100	$520	$1,610,581
	Other (#3-#7) Bottles	200	$21	$4,104
	Jars, Jugs, Tubs, Trays	4,300	$21	$88,245
	Flower Pots	300	$21	$6,157
	Other Rigid Plastic	7,300	$36	$265,929
	Ferrous Cans	2,800	$42	$118,300
	Aluminum Cans/Foil	2,700	$63	$170,610
	Glass Bottle/Jars	9,900	$0	$0
	Subtotal	**36,800**	**$101**	**$3,731,777**
TOTAL		**99,000**	**$99**	**$9,777,027**

1 Based on estimated tons disposed annually from Table 7.
2 Based on average price index for 2015 from RecyclingMarkets.net for NE USA
3 Based on national average price index for 2015 from RecyclingMarkets.

The County already has a well-developed communication and outreach plan for promoting existing solid waste programs and services. Evaluating/auditing the current communication/outreach plan is a good base for crafting the zero waste communications plan to residents and businesses. The County will want to evaluate/audit the communications plan on a regular basis to ensure the messaging remains clear and effective.

The County could consider expanding its use of social media in order to promote zero waste. The use of Facebook, Twitter, You Tube, and Instagram are all social media outlets that can be utilized to reach stakeholders.

The County could establish a well-designed website dedicated to the zero waste goal. This website can serve as the go-to place for all information about the County's programs and initiatives to minimize waste. The website is a resource for stakeholders in the County providing them with information on how to manage materials that they generate. The County can link their

website to local organizations, such as Community Forklift, that can help residents and businesses reduce, reuse, or recycle materials.

Develop Education Curriculum in the Schools

Educating the youngest stakeholders in the County – schoolchildren – could be a top priority of the County to minimize waste over the long term. Prince George's County already has adopted a recycling plan for the schools and facilities under the jurisdiction of the County's Board of Education. The recycling program diverts many tons of materials annually from these facilities. With nearly 130,000 children[13] in these schools, having a curriculum that complements the existing diversion program in the schools and educates them on waste minimization is important.

A comprehensive, hands-on learning experience whereby students' formal classroom education includes information on source reduction, waste diversion, and the County's zero waste goal could change the current mindset in the County. Complementing the classroom instruction, students could continue to take trips to various County solid waste facilities so they can see first-hand what happens to materials generated in the County.

Active Participation

Part of the hands-on experience with this curriculum is for students to take an active role in managing the recycling and waste reduction efforts at their school. Students can take turns collecting recyclables from classrooms and depositing them in centralized collection containers. Students can identify opportunities for reducing or eliminating waste in their school as well. While such an experience and curriculum might look different from one school to the next, providing a framework and structure for formal education would afford students the opportunity to learn about zero waste and why the County is pursuing such a goal. Waste Management Division staff could meet with educators in the school system to discuss ideas for expanding education on resource management and work to develop a curriculum that could be used across schools in the County.

The County could also consider establishing a program whereby schools are honored for their waste reduction and recycling programs. Such a program could have a competitive element to it whereby schools compete against each other to receive an award or recognition for their success. The County could also encourage schools to participate in PepsiCo Recycling's Recycle Rally, which encourages students in K-12 schools to recycle through incentives and resources that are provided.

Technical Training

At the high school or college level, the County could consider partnering with schools and the Building Materials Reuse Association to establish a program that trains students in building deconstruction practices and design for disassembly. As recommended in this plan, establishing a diversion ordinance for construction and demolition debris will require more careful deconstruction and disassembly of structures in order to increase reuse and recovery of these

[13] Prince George's County Public Schools (PGCPS), student enrollment 128,937, accessed vis http://www1.pgcps.org/factsandfigures

materials. This may boost the need for professionals with expertise in building deconstruction. Facilitating an educational program whereby students are educated about building disassembly and demolition will provide skilled professionals that specialize in this trade.

TARGET ORGANICS FOR DIVERSION

The organic fraction of the waste stream represents a significant opportunity to increase diversion and achieve zero waste. According to data from the Waste Characterization Study conducted in 2015, approximately 87,500 tons of compostable materials are buried at the BSRSL annually which includes:

- 48,000 tons of food scraps
- 21,900 tons of compostable paper, and
- 17,700 tons of leaves, grass, and brush (disposed mostly by residents in trash collected curbside).

The County has been composting yard trimmings at their Western Branch Composting Facility for about 25 years. Under an intergovernmental agreement, the Maryland Environmental Service (MES) operates the Western Branch Composting Facility as well as the composting facility for Montgomery County. Compost produced through these two facilities is sold as Leafgro™. Demand for the product is high as the County sells out of Leafgro every year[14]. Between 45,000 and 50,000 tons of yard trimmings from Prince George's County are composted annually.

In May 2013, the County initiated a food scraps composting pilot program using the Gore® cover technology. Food scraps are mixed with yard waste in a 1:1 ratio and then ground to three inches or less. The mix is placed over aerated channels on a concrete pad and wrapped in a Gore® cover; the same material used in Gore-Tex outdoor apparel, and monitored daily using a computerized system. The curing process using this technology takes about eight weeks from start to finish instead of the current eight month cycle time currently used to compost yard trimmings[15].

Once finished, the compost is screened and sold in bulk as "Leafgro Gold." It is a little higher in nitrogen than Leafgro[16].

The County received a $12,000 grant from the US EPA which covered about eight percent of the startup costs. Up to 45 tons per week of separated food scraps from both residential and commercial sources are processed along with soiled or waxed corrugated cardboard and some paper products. The pilot project included food delivered from the University of Maryland (UMD), the cities of University Park and Takoma Park, and several commercial haulers with specialized food collection routes (Apple Valley, Progressive Waste Solutions and Compost Crew).

[14] "Turning food scraps into 'gold'", Washington Post, August 22, 2015.

[15] "Prince George's County & MES Cut Ribbon on New Food Scrap Composting Project at Western Branch Yard Waste Composting Facility", MES Wave, the official blog of Maryland Environmental Service, October 2013.

[16] "Food Scraps Composting At County Yard Trimmings Site", BioCycle May 2015, Vol. 56, No. 4, p. 21

Expand Organics Recovery and Foster Infrastructure Development

The County's pilot food scrap composting program has been successful as revenue from the sale of compost has covered the costs of operations[17]. The County could consider expansion of the Western Branch Composting Facility to accommodate increasing interest from institutions, businesses, and residents that want to compost their food scraps.

In addition to expanding capacity for additional composting at the Western Branch Composting Facility, the County could consider establishing a network of smaller composting sites, often referred to a decentralized composting network. Decentralized composting networks can reduce the carbon footprint of collection and transportation and can be customized to localized situations without requiring large capital investment in equipment. The City of Austin, Texas has recognized the value of a decentralized composting network and as a result, the City has adopted a highest and best use philosophy for city collection programs of residential food scraps to guide its planning and has initiated the following new programs:

- Expanding its home composting incentive program to encourage the development of home and onsite composting; and

- Establishing composting trainings at community gardens and implementing a junior composter and master composter training program[18].

Decentralized composting networks tend to be smaller and less mechanized. A comparison of centralized and decentralized composting programs is presented in **Table 11**.

There is significant support at the State level for increased composting through House Bill 817 entitled *Environment – Composting* (Chapter 363, Acts of 2011). As a result, MDE convened a Composting Workgroup that included representatives from the Maryland Department of Agriculture (MDA), MES, the composting industry, local governments and other stakeholders. The final report from this workgroup included recommendations to reduce barriers to responsible composting at the state level; however, some of these recommendations are appropriate for County involvement such as:

- **Financial Assistance** – The County could help secure financing for local businesses interested in providing services to increase composting of organics, including[19]:
  - Private haulers that specialize in food scrap collection
  - Equipment to mitigate odors (the reason many composting facilities are closed)
  - Testing services for finished compost that many small sites cannot afford
  - Collection bins

- **Training and Staff** – Smaller neighborhood composting systems need staff to process organics and turn windrow piles as well as training of staff to make quality compost.

[17] "Turning food scraps into 'gold'", Washington Post, August 22, 2015.
[18] City of Austin, Resource Recovery Department, The Austin Resource Recovery Master Plan, December 2011.
[19] Brenda Platt, Institute for Local Self Reliance, "State of Composting in the US: What, Why, Where & How", presented at the 2015 Annual Conference of the Maryland Recycling Network

ECO City Farms is an educational, non-profit organization located in the County designed to serve as a prototype for sustainable local urban farming. At their Edmonston Farm, they accept local food scraps for composting and vermicomposting in addition to providing training on composting at the beginner, advanced, and master composting levels. The County could work with other local farms to expand a composting network and use ECO City Farms as its model.

Table 11. Centralized versus Decentralized Compost Programs[20]

	Centralized	Decentralized
Labor and Technology	• Less manual labor • Higher skill level required	• Lower startup costs • More labor intensive
Operation, Maintenance, and Transportation Costs	• Higher operations and maintenance costs • Higher transportation costs to deliver and to distribute	• Could be difficult to find land in urban areas • Lower transportation costs
Citizen Involvement and Employment	• Job opportunities for higher skilled professionals	• More neighborhood involvement and interaction with compost process • Finished compost more accessible for residents • Job opportunities for low-skilled, low-income residents
Compost Quality	• Professional management more likely to avoid problems such as odor, leachate, or vectors	• More pre-screening of materials leads to less contamination • More labor intensive

Encourage Diversion of Food Waste from Commercial Properties

Efforts to encourage commercial generators within the County to separate food waste from the materials they generate at their business could potentially divert over 12 percent of the commercial waste stream. To effect this change, the County could develop a targeted education campaign and program that encourages and/or incentivizes waste generators to source separate food waste from other waste, and set the organics out for collection. Consideration could also be given to provide for the composting of soiled paper products which has the potential to divert an additional 7.3 percent of the commercial waste stream.

In order for such a program to be enacted, the County must first establish the infrastructure to accommodate increased composting. The relative lack of existing infrastructure to support composting in the Region means significant time and money will be required. Such infrastructure is required in order to divert the compostable portion of the waste stream. Once the infrastructure is established and the resources have been allocated to successfully manage compostable materials, the County could target the source separation and diversion of food waste from commercial generators.

[20] Grace Grimm, "Centralized vs. Decentralized Composting", SFGate.com (sister-site of the San Francisco Chronicle)

Jurisdictions have implemented disposal bans for commercially generated food waste. The Massachusetts Department of Environmental Protection (MassDEP) instituted a statewide ban in 2014 of food waste for businesses and institutions that dispose of one ton or more of these materials per week. In conjunction with the ban, the MassDEP launched an education and outreach program that provides guidance for entities impacted by the ban. Businesses are encouraged to reduce and donate excess food as a starting point. The State also assists in setting up a diversion program by providing food waste best management practices and tips on finding haulers and facilities where food waste may be disposed.

Encouraging reuse programs is another important component of this plan. The County could identify major food waste generators and seek to pair them with organizations/charities for food donation or local farmers that can use food waste in livestock production. Information on food waste generators and potential donation and reuse opportunities could be listed on the County's website.

Residential Food Waste Collection Programs

Once the commercial food waste diversion and composting programs are implemented, the County may consider implementing residential food waste collection and composting. It would involve residents separating organic materials from other waste they generate at their homes, and place it in a container for separate collection. According to a 2014 survey by BioCycle, 198 communities have a curbside food waste collection program[21]. Of the three communities in Maryland with such a program, the Town of University Park is the only one in Prince George's County.

The Town of University Park's curbside food waste collection program began in 2011 and has expanded to serve nearly 20 percent or 200 households in the Town. The Town provides residents with a kitchen pail, compostable bags, and a five-gallon bucket for the food waste. Food waste is collected weekly and delivered to the County's Western Branch Composting Facility. The Town collects the bagged food waste in dump-body trucks. The initial program was funded through a $15,000 federal energy grant. Equipment and labor expenses for operating the program are paid for by the Town's Public Works Department. According to Mickey Beall of the Town of University Park, interest in the program continues to grow, and the program has diverted about 88 tons of food waste in the last four years[22].

Food waste comprises over 17 percent of the residential waste stream in the County. If the program were to include compostable paper, an additional seven percent of the waste stream could be diverted, making nearly a quarter of the residential waste stream eligible for capture as part of a residential organics collection program. As discussed above, there needs to be adequate composting infrastructure to accommodate the diversion of these materials.

The County could support the existing Town of University Park municipal food waste collection by providing a reliable long-term composting facility for the management of food waste and organics. Once additional composting capacity has been established, the County could encourage other incorporated municipalities to establish residential food waste collection

[21] BioCycle Nationwide Survey: Residential Food Waste Collection in the U.S., 2015. www.biocycle.net
[22] Beall, Mickey, Town of University Park, MD. Personal communication, February 22, 2016.

programs and possibly provide grants, equipment, and staff to assist in the implementation of such programs. Also, the County could implement a full-scale program whereby food waste is collected with yard waste as part of existing County contracts with waste haulers.

PROMOTE RECYCLING OF CONSTRUCTION & DEMOLITION DEBRIS ORDINANCE

Construction and demolition (C&D) debris represents a significant portion of the County's waste stream. About 31 percent of the waste disposed in the County is considered C&D debris[23]. These materials are disposed at multiple private facilities in and outside the County. Diversion of these materials through recycling and reuse programs represents a significant opportunity for the County to reduce disposal of these materials. Policies and programs that promote the economic and environmental benefits of recycling these materials will encourage increased waste diversion.

Cooke County Illinois, recognizing the significant amount of waste generated from C&D projects, has established an ordinance to divert materials from the waste stream. Under their ordinance, applications for a demolition permit are subject to two requirements:

1) Any residential building is subject to a reuse requirement of five percent by weight and a diversion requirement of 70 percent by weight; and

2) Any non-residential building is subject to a 70 percent by weight recycling requirement with reuse encouraged whenever possible.

The Cooke County ordinance necessitates the completion of a demolition debris diversion plan for each project. The plan must outline how the requirements of the ordinance will be met and include diversion estimates, transportation means, and the destination(s) of the demolition debris.

The County could establish an annual goal to recycle a minimum percent of the waste tonnage generated from C&D projects. The goal could be promoted to particular types of construction, demolition, and renovation projects based on project size and cost. The County could lead by example by following the same requirements and meet the same standards they set as part of this ordinance.

Entities seeking construction and demolition permits from the County could be encouraged and or incentivized to complete a waste management plan as part of their application process. The waste management plan could include the following:

- Estimated volume or weight of waste generated from the project by material type;
- Estimated volume or weight of materials that can be diverted for reuse or recycling;
- Vendor the applicant will use to haul the materials;
- Facility(s) the materials will be brought to;
- Estimated volume or weight of materials that will be disposed.

[23] Prince George's County Maryland Comprehensive Ten-Year Solid Waste Management Plan, 2012

A set period of time could be established from when an applicant receives the approved demolition permit from the County to when demolition may actually begin. Such a requirement will give entities the opportunity to recover the maximum amount of recyclable and reusable materials prior to demolition.

To hold entities accountable for complying with their waste management plan, the County could establish a "diversion deposit." The amount of the deposit could be based on the size of the project. The deposit could be returned to the applicant upon proof that no less than the required amount of waste diverted was recycled or reused. An applicant would only receive a portion of their deposit back that is proportional to the amount of material diverted below the set required level. An applicant who fails to comply with the diversion requirements would forfeit their deposit completely.

IMPLEMENT PAY-AS-YOU-THROW (PAYT)

In Pay-As-You-Throw (PAYT) programs, residents pay directly for waste collection services based on the amount of waste they throw away, similar to the way they pay for electricity, gas, and other utilities. When consumers pay for every bag or can of waste they dispose, they are motivated to recycle more and look for ways to prevent waste in the first place.

PAYT programs are not new. The United States Environmental Protection Agency (US EPA) reported in 2006 that over 7,100 US communities use PAYT programs, including 30 percent of the largest US cities[24].

PAYT Program Structure

PAYT program can be used with bags, stickers, or waste collection containers. The type of PAYT program chosen is generally dependent on local conditions. There are generally three main types of PAYT programs.

- **Full-Unit Pricing** – residents must purchase bags or stickers in advance and only waste in approved containers will be collected;
- **Partial-Unit Pricing** – residents are provided a certain number of bags or stickers for their waste that is included for collection with their taxes. Additional bags or stickers must be purchased if the resident produces more waste than is covered.
- **Variable-Rate Pricing** – residents choose a particularly-sized cart based on the amount of solid waste generated. The smaller the cart the cheaper the disposal cost. When implementing such a variable-rate system, the per unit cost should not be reduced for larger volume carts.

Larger communities and urban and suburban communities tend to use carts especially if they have automated collection. Smaller communities and more rural communities are more likely to

[24] Skumatz, L. A. and Freeman, D. J. (2006). Pay As You Throw (PAYT) in the US: 2006 Update and Analyses. Prepared for U.S. EPA by Skumatz Economic Research Associates, Superior, CO.

use bag and sticker programs. The structure of PAYT programs for U.S. communities of varying sizes and geographies are presented in **Table 12**.

Table 12. US Communities with PAYT Programs

Community	Population	Year PAYT Initiated	Structure of PAYT Program
Attleboro MA	43,837	2005	Hybrid Bag System
Dubuque IA	58,155	2002	Hybrid Bag/Tag System
Boulder CO	101,800	2001	Variable Cart System
Minneapolis MN	392,880	1989	Hybrid Cart/Bag System
Oakland CA	400,740	1985	Variable Cart System
Sacramento CA	475,526	1995	Variable Cart System
Fort Worth TX	777,992	2003	Variable Cart System with Private Haulers
Austin TX	842,592	1992	Variable Cart System
San Jose CA	982,765	1993	Variable Cart System

PAYT Benefits

In 2006, the EPA reported that on average, communities that implement PAYT programs reduce their solid waste disposal by 17 percent. About one-third of this decline is attributed to increased recycling, one-third is attributed to increased composting, and one-third attributed to residents reducing the quantity of waste generated. More recently, EPA highlighted the results of a study conducted by Green Waste Solutions titled, "Unit Based Garbage Charges Create Positive Economic and Environmental Impact in New England States" in their PAYT Summer Bulletin. This study found that when residential waste is actually isolated and measured on a per capita basis, PAYT communities generate about 49 percent less waste than those leaving the cost of trash in the tax base or in a fixed fee. Communities with a PAYT program disposed an average of 467 pounds per capita per year compared to 918 pounds per capita in the non-PAYT communities.

Based on the range of waste disposal reductions reported by these two studies, implementation of a PAYT program in Prince George's County could reduce waste disposal between 35,000 and 100,000 tons per year, Environmental benefits of PAYT are an annual reduction in greenhouse gases between about 83,000 and 95,000 metric tons of carbon dioxide equivalent. This equates to greenhouse gas emissions of between about 22,000 and 63,000 vehicles annually (see **Table 13**).

PAYT Service Fees

Most communities structure rates so that higher waste volumes result in higher monthly fees to the residential households. Proportional or linear rates charge customers for each bag or each gallon of trash capacity used. For example, a municipality that offers a proportional rate may charge $20 a month to collect trash from a 32-gallon cart and $40 a month to collect trash from a 64-gallon cart – each rate is the equivalent of $1 per gallon. A variable rate structure does not charge a uniform cost per bag or gallon. For example, Oklahoma City, OK contracts trash collection for 117,000 households and charges $19.73 per month for one or two 96-gallon carts – there is no additional charge for using two carts instead of one. Some communities escalate the fee sharply for households that dispose greater quantities of trash. For example, Austin, TX charges its residents a base fee of $13.05 per month for collection in addition to $0.16 per gallon. However, residents using a 96-gallon cart for trash collection are charged $0.30 per gallon. In general, a proportional rate structure or a variable rate structure that increases as the volume of trash increases is more likely to reduce the quantity of trash disposed.

Table 13. Estimated Waste Reduction, Disposal Cost Savings, and Greenhouse Gas Emission Reductions from PAYT in Prince George's County

Economic Impacts and Environmentla Benefits	Residential Waste Disposal			
	Current	17% Reduction [1]	35% Reduction	49% Reduction [2]
Annual Residential Waste Disposal Quantity				
Landfilled Tons	204,000	169,320	132,600	104,040
Waste Reduction		34,680	71,400	99,960
Number of Households Serviced by County Contractors	158,000	158,000	158,000	158,000
Per Capita Disposal (lbs/person/year) [3]	922	765	599	470
Economic Impact of PAYT				
Avoided Landfill Tipping Fees		$2M	$4.2M	$5.9M
Environmental Benefits				
Greenhouse Gas Reductions by Recycling instead of Wasting				
Annual Greenhouse Gas Savings (MTCE) [4]		32,800	67,600	94,700
Equivalent to Annual Emissions by This Number of Cars		21,900	45,100	63,100

1 Average residential waste reduction according to EPA (2006)

2 Average residential waste reduction according to "Unit Based Garbage Charges Create Positive Econoic and Environmental Impact in New Englad States" by Green Waste Solutions.

3 Assumes an average household size of 2.8 persons, US Census Bureau, State and County Quickfacts

4 Greenhouse gas estimates based on one-third of waste reduction tonnage diverted for recycling instead of landfil. According to EPA's Clean Energy website, each ton of waste recycled saves 2.87 metric tons of CO2

The cities of San Jose and Oakland, CA and Austin, TX distribute the entire cost of the solid waste program (administration, public education, collection, and disposal) by the size of the trash collection cart as shown in **Table 14**.

Table 14. Example Communities with Proportional or Escalating PAYT Rate Structures

City	Monthly Cost per Household	
	96-gallon Cart	32-gallon Cart
San Jose, CA	$89.85	$29.95
Oakland, CA	$98.44	$29.30
Austin, TX*	$41.85	$18.15

* Both 96-gal and 32-gal fees include base fee of $13.05 in addition to $0.16 per gallon for 20-, 32- and 64-gal carts but $0.30 per gallon for 96-gallon carts.

Develop a PAYT Implementation Plan

Because PAYT charges more for increased waste disposal, some residents will be assessed a smaller fee for service but others will be assessed a larger fee for service. Suggesting a change to the current system could be met with strong public opposition, especially from those who will be required to pay increased fees. Therefore, the public may need to be involved in the process that ultimately structures the new system. The County could provide residents with information about the purpose of the change, what the County hopes to achieve through the change, and how the new program will work. Implementation involves the following actions:

1. **Assess set-out rates** – The County could estimate how much trash is currently set-out per household on average. This could be the number of bags or cans per household.

2. **Work with contract haulers to identify PAYT program structure** – The County could meet with their contracted haulers to get their input on the type of PAYT program that would work best for the County (bags, stickers, carts, or a mix).

3. **Decide on fee structure** - The fee structure will need to cover the cost of the waste and recycling collection system including administration, collection, public education, and disposal. Additionally, the number and sizes of containers will need to be decided. For example, will all residents be offered a choice of a 32-, 64-, or 96-gallon containers,

4. **Develop public education campaign** – The new PAYT structure will need to be promoted to the residents. Residents could be kept informed of the need for the PAYT program and how it will operate. The County could use a multitude of media to promote the new PAYT program (social media, website, signs, brochures, letters or presentations to civic groups and HOAs, etc.).

5. **Develop a campaign to prevent illegal dumping** – An increase in waste collection fees could increase illegal dumping. Procedures could be developed to identify and report and prevent illegal dumping.

6. **Develop method to annually assess impact of PAYT program** – The County may want to benchmark the quantity of trash collected and disposed of at the BSRSL from county-contracted haulers, the average annual quantity of trash generated per household serviced,

the quantity of recyclable material collected from households in the PAYT program, and the average annual quantity of recyclables generated per household serviced.

Implementation Costs

Capital costs for PAYT implementation were estimated based on a variable-size cart program structure. Assuming that 20 percent of current households receiving county-contracted waste collection services will want a second cart, the capital investment in the program is estimated in **Table 15**.

Table 15. Estimated Capital Cost for Variable Sized Cart PAYT Program

Number of Households Serviced by County-Contracted Haulers	158,000
Number of Carts [1]	189,600
Cost per Cart	$40
Total Cost	$7.6M
Monthly Cost per Household [2]	**$0.51**

1 Assumes one cart per household with up to 20% of households receiving a second cart

2 Monthly cost per household based on amortization of capital costs at 5 percent interest over 10 years.

Similar to variable sized cart programs, costs for bag programs will need to assess type and size of pre-printed bags, retail distribution of bags, administrative and public education programs.

Implementation Schedule

The County could work with its municipalities initially to encourage small scale PAYT pilot programs. Based on the results of these pilot programs, the municipalities may choose to expand their waste collection programs to be full-scale PAYT programs. The next step could be to research experience with other similarly-sized counties that have implemented PAYT collection programs, particularly through contracted collection services. Experiences of these other jurisdictions will help the County develop the framework for their own PAYT pilot program.

EXPAND EXISTING RECYCLING REQUIREMENTS

The County has adopted a number of requirements that increase recycling in different generating sectors. While these initiatives are important for diverting waste materials, there remain opportunities to expand and tighten these requirements to minimize waste materials and measure their success.

Assess Single-Family Residential Recycling Programs

Prince George's County manages 30 waste collection contracts involving 20 private waste collection haulers for service to about 158,000 households. The County could track quantities of

trash and recyclables collected in each of its contracts to assess areas where increased education and outreach are needed. The City of Sioux Falls, SD, rewards waste collection haulers that exceed their recycling goal with rebates and penalizes haulers that fail to recycle enough by applying surcharges to their waste loads tipped at the County landfill. The City also publishes the recycling rates of its licensed haulers on its website[25].

Encourage Multi-Family Recycling

The State of Maryland and Prince George's County require owners of multi-family rental facilities and condominiums to provide facilities that allow tenants to voluntarily recycle designated materials. The County identified 232 apartment buildings and 97 condominium buildings that are impacted by the law[26]. The County could provide continual guidance and assistance on:

- **Convenient Placement of Recycling Collection Containers** – Residents of multi-family dwellings will recycle greater quantities more often if the collection containers are conveniently located. For example, high rise apartments could have a recycling collection container on each floor and garden apartments could have recycling collection containers in the basement or near their building (less than 200 feet from the building's door).

- **Adequate Collection Container Capacity** – Residents of multi-family dwellings are more likely to recycle if the recycling collection containers have adequate capacity. Since the County is striving for high diversion, the capacity of the trash and recycling containers could reflect the County's goals. For example, recycling capacity could be at least the same or more than trash capacity, which would reflect a recycling rate of 50 percent or more

- **Signage** – The transient nature residents in multi-family dwellings means that continual education about recycling is required. The County could help develop consistent signage for multi-family residents on items allowed in the recycling collection containers.

Montgomery County developed a document titled *Property Manager's Guide to Recycling and Waste Reduction at Multi-Family Properties* to provide specific guidance on how to set-up an effective multi-family recycling program. Prince George's County could consider developing a similar document to assist with setting up diversion programs at multi-family properties. The document could also contain information and tips on how residents can reduce the amount of waste they generate.

The County requires owners of multi-family properties of 100 or more units to submit a plan for the separation and collection of recyclable materials[27]. Lowering the threshold for requiring a plan to 25 units would increase the quantities of recycling and facilitate the County's opportunity to track recycling programs at multi-family buildings. County staff could review each plan and

[25] https://www.siouxfalls.org/public-works/environmental-recycling-hazardous/hauler-recycle-rates.aspx
[26] Prince George's County Maryland Comprehensive Ten-Year Solid Waste Management Plan, 2012
[27] Prince George's County, Maryland Comprehensive Ten-Year Solid Waste Management Plan, 2012, Appendix E.

conduct follow-up site visits to ensure the plans are being properly implemented and whether there are opportunities for improvement.

The County requires property owners to submit an annual report to document the collection methods, quantities, and disposal location of recyclables diverted from the waste stream as well as waste removal quantities. The County could track this data and use it to develop mandatory diversion requirements that incrementally increase for multi-family properties. Likewise, enforcement of these mandatory recycling requirements is needed.

Since 2011, Arlington County, Virginia requires multi-family properties with three or more units to submit a recycling plan to the County with an updated plan every three years. The City of Austin, Texas passed the Universal Recycling Ordinance which requires that all multi-family properties submit an Annual Diversion Plan between October 1 and February 1.each year. The reporting requirements are being phased in: larger properties first followed by smaller properties. Multi-family properties with 50 or more units were required to file an Annual Diversion Plan by February 1, 2014. Eventually all multi-family properties will be required to report diversion by February 1, 2018[28].

Expand Commercial Recycling

Similar to the recycling requirements at multi-family residents, owners of commercial and industrial properties must provide facilities to allow employees, tenants, and customers to voluntarily recycle. The County's law requires the owners of these covered properties to complete and submit annual reports identifying the quantities and types of recyclable materials collected through the program. County staff needs to use this data to track the progress of the commercial recycling program. It is recommended that the law be modified to require recycling of materials rather than simply requiring property owners provide employees and tenants facilities to voluntarily recycle. Owners would still be required to submit reports on quantities of materials generated and diverted. By obtaining and tracking this information, the County can direct resources and staff to provide assistance to businesses that are not meeting diversion requirements. Other municipalities with mandatory commercial recycling include:

- Montgomery County, MD
- City/County of Sacramento, CA
- City of Austin, TX\
- City of Philadelphia, PA
- City of Portland, OR

The County's current commercial recycling ordinance indicates that owners of properties may request technical assistance or grant funding from the County. It is recommended that the County's outreach and support services become more proactive to businesses rather than relying on businesses approaching the County for assistance first.

The County could take the following steps to increase recycling in the commercial sector:

[28] http://www.austintexas.gov/uro

1. **Mandatory Recycling –** The County could require mandatory commercial recycling through updated ordinances and increased enforcement. In 2012, the City of Austin's Universal Recycling Ordinance (URO) went into effect. Initially, commercial properties such as office buildings, medical facilities, religious buildings, and private education facilities were required to recycle according to the following phased in approach:

    - 2012 - Properties with >100,000 square feet;
    - 2013 - Properties with >75,000 square feet;
    - 2014 - Properties with >50,000 square feet; and
    - 2015 - Properties with >25,000 square feet

2. **Outreach and Education Specific to Business -** Each year, the City of Napa, CA determines its 25 largest commercial trash generators and automatically audits their waste composition in an effort to reduce trash and increase recycling. These businesses receive an in-depth analysis of what could be recycled and how to set up a system to capture all recyclables on-site[29]. Other municipalities that offer audit services to their businesses include Whitman County, WA and Los Angeles County, CA.

3. **Grants –** In Hennepin County, MN, commercial buildings that generate four cubic yards or more of trash per week must recycle at least three materials by 2016. The County offers grants, signage, technical assistance and case studies to help business and organizations start or improve recycling programs[30].

4. **Reduce Financial Burden** – When Montgomery County, MD identified the cost for recycling collection services as a major obstacle for increased recycling in the commercial sector, they assisted smaller businesses in urban settings develop cooperative collection programs. For these programs, groups of small businesses within close proximity share a single contract for both trash and recycling collection services; thus removing the financial burden of recycling. Prince George's County could identify businesses without recycling collection services and assess if a cooperative program would help them establish a recycling program.

Increase Special Event Diversion Opportunities

The County could work to expand reuse, recycling and composting at all special events that meet the criteria listed in Maryland General Assembly Senate bill 781. A special event organizer is required to provide recycling opportunities at events that meet the following criteria

- Temporarily use public streets, facilities, or parks;
- Serve food and beverage;
- Host more than 200 people.

There appears to be little information on the effectiveness of the recycling requirement at special events. In order to get a better handle on waste diversion at special events, the County could

[29] Institute for Local Governance website, www.ca-ilg.org/post/napa-audits-business-waste-boost-recycling
[30] Hennepin County, MN website, www.hennepin.us/businessrecycling

require event organizers to submit documentation of waste generation and diverted. This requirement will help the County better understand waste management at special events and allow them to require additional actions in order to divert more materials.

The County could also expand on this state law to address recycling and diversion from vendors that sell goods or services at these events. Vendors and suppliers attending special events often produce materials that are discarded "behind the scenes" of special events. This is usually cardboard, but can include recyclable containers, mixed paper, and food waste. The County could require large containers for recycling that are easily accessible to vendors at the special events.

The law currently states that the event organizer may assess the availability of food scraps recycling services for the event. Special events that meet the above criteria could be required to separate compostable food waste from recyclables and trash streams at the event. Food waste can represent a significant portion of the waste stream of special events.

The City of Greenbelt hosts two large special events, the Labor Day Festival and Fall-Fest, where waste reduction and recycling initiatives are promoted. The City has recently experimented with a limited program for diverting food waste from these events. Volunteers staff recycling and composting stations to assist the general public in placing their materials in the right container. The logistics and staff requirements needed to reduce waste generation from special events are substantial. To support special event organizers with the recovery of food waste, the County could provide technical assistance, bins, and staff to help recover food waste.

LEAD BY EXAMPLE

Strategies for County Facilities

One of the most effective ways the County can demonstrate the importance of minimizing waste is by leading efforts to minimize waste from County facilities. Pursuing zero waste in County-owned facilities will highlight the importance of the goal to the community. It will also better position the County to assist businesses and residents in implementing their own waste minimization strategies, as they will be able to rely on their own experience in reducing waste. The initiatives undertaken and the results the County achieves in reducing solid waste can be used in educational materials and presentations to enhance their message to the community.

There are a number of ways in which the County could lead the charge in nearly eliminating waste:

- Conduct waste audits of County facilities.
- Recycle and compost all acceptable materials generated at the County's facilities.
- Identify County facilities where composting can occur on-site to minimize the transport of materials to other facilities.
- Use compost in all county landscaping and beautification projects.

- Expand County purchasing requirements with preference to products that contain recycled content or composted materials. Programs can incorporate specifications for Countywide building permits and contracts, and provide a preference to zero waste businesses for County, including green caterers and suppliers. Where no such green products exist or it is cost-prohibitive, the County could evaluate alternative products.

- Establish policy of purchasing locally-produced products whenever possible.

- Track and document the progress the County is making in eliminating waste and post the results on their website and communicate the results to the public.

- Properly recycle special waste materials such as electronics, florescent bulbs, used oil and other automotive products.

- Implement a rewards program for County employees and/or departments that minimize waste.

- Form an inter-departmental "green team" to provide leadership and support for zero waste across all County departments and facilities.

Port Towns EcoDistrict

Port Towns of Bladensburg, Colmar Manor, Cottage City, and Edmonston form the Port Towns EcoDistrict. The EcoDistrict project has two chief goals:

- To be a regional leader in recycling, reuse and repurposing of building and organic waste by transforming industrial space and creating a leading edge facility and

- To help incubate and accelerate the development of green and

EcoDistricts strive for sustainable development and encourage energy and water conservation, health and well-being to its residents and businesses, and optimized materials management or zero waste strategies. Ways to incorporate zero waste goals into the development to the EcoDistrict include:

- **Minimizing use of virgin materials and toxicity of new products.** The EcoDistrict could encourage salvaged building materials in its development.

- **Maximize use of products made with recycled content.** This creates a market for recycled materials. Optimally a business in the EcoDistrict can use a waste product of a neighboring business in its process.

- **Compost organic wastes.** The County could locate a small composting facility or neighborhood farm that composts food scraps, yard trimmings, and compostable paper generated in the EcoDistrict. A composting operation will create jobs also.

5 DIVERSION ANALYSIS

Implementing the initiatives discussed in this plan will require time and resources. Each initiative is assigned a timeframe for implementation, according to the following schedule:

- **Short** – one to three years;
- **Medium** – four to eight years;
- **Long** – nine to fifteen years.

The initiatives were also evaluated on the potential diversion of materials disposed of at the County's Landfill. **Table 16** summarizes the affected waste sectors and categories impacted by the implementation of these initiatives. Based on waste generation and disposal data, SCS also estimated the tonnage of materials that could be diverted through these programs. In order to achieve the State's goal of 85 percent diversion from landfills by 2040, these initiatives could strive to divert 85 percent of the waste categories impacted by the initiative.

Table 16. Zero Waste Initiatives Diversion Analysis

Initiative	Objective	Affected Sectors	Affected Waste Categories	Annual Diversion Maximum (tons)[1]	Timeframe
Adopt the Zero Waste Plan and Resolution	Formally support/adopt goal of achieving zero waste	--	--	--	Short
Prioritize Source Reduction and Reuse Programs	Promote Source Reduction	Residential Commercial Institutional	All	--	Short
	Expand Reuse Programs	Residential Commercial Institutional	All	--	Short
Support and Implement Producer Responsibility Programs	Promote Extended Producer Responsibility Policies	Residential Commercial Institutional	All	--	Medium
	Support Container Deposit Legislation	Residential Commercial Institutional	Aluminum cans Plastic bottles Glass bottles	18,900	Short
	Require Fee for all Single-Use Disposable Bags	Commercial	Shopping bags	3,900	Short
Reinforce Public Education and Outreach	Develop Communication/Outreach Plan for Marketing Zero Waste	Residential Commercial Institutional	All	--	Short
	Develop Education Curriculum in the Schools	Institutional	All	10,000	Medium
Target Organics for Diversion	Develop Composting Infrastructure	Residential Commercial Institutional	Food waste Yard waste Compostable paper	87,000	Medium
	Mandatory Commercial Food Waste Diversion	Commercial	Food waste	11,300	Medium

Initiative	Objective	Affected Sectors	Affected Waste Categories	Annual Diversion Maximum (tons)[1]	Timeframe
	Support Existing and Develop New Residential Food Waste Collection Programs	Residential	Food waste	35,000	Long
Establish Construction and Demolition Debris Ordinance	Require diversion of construction and demolition debris	Residential Commercial Institutional	Construction & Demolition Debris	112,000	Short
Implement Pay-As-You-Throw	Shift the residential rate structure so that residents' trash fees are based on generation	Residential	All	--	Long
Expand Existing Recycling Requirements	Assess Single-Family Recycling	Residential	Recyclable	62,100	Short
	Encourage Multi-Family Recycling	Residential	Recyclable	--	Medium
	Expand Commercial Recycling	Commercial	Recyclable	32,400	Medium
	Increase Special Event Diversion Opportunities	--	Recyclable Compostable	--	Medium
Lead by Example	County operations and facilities could demonstrate that zero waste is obtainable and the County could serve as an example to residents and businesses that minimizing waste is important.	Commercial Institutional	All	--	Short

[1] Annual Diversion Maximum tonnages based on results of the 2015 Waste Characterization Study and presented in Table 7 of this report.