

FINAL REPORT

# Material Recovery Rates Delaware – FY 2016



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Resource Economists  
Environmental Scientists

REPORT TO THE  
DELAWARE SOLID WASTE  
AUTHORITY



December 2016

**MATERIAL RECOVERY RATES DELAWARE – FY 2016  
FINAL REPORT TO THE DELAWARE SOLID WASTE AUTHORITY**

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## INTRODUCTION

DSM Environmental Services, Inc. (DSM) was contracted by the Delaware Solid Waste Authority (DSWA) to conduct the calendar year (CY) 2015 *State of Delaware Assessment of Municipal Solid Waste Recycling* and report to the Recycling Public Advisory Council (RPAC). DSWA also undertook a waste characterization study of waste deliveries to all six DSWA facilities in 2015/16 (See: *Delaware Solid Waste Authority Statewide Waste Characterization Study, FY 2016*). The recycling assessment is completed annually on a calendar year to report on the State's recycling rate. The waste characterization was completed on a fiscal year corresponding with DSWA's fiscal year and sampling occurred between July 1, 2015 and June 30, 2016.

Together these data can be used to calculate Delaware-specific material recovery rates to track progress toward meeting the waste diversion goals contained in the 2010 Statewide Solid Waste Management Plan (2010 Plan).<sup>1</sup> This report presents the results of DSM's recovery rate analysis using data from these two reports.

*Recovery rates* are used measure the percentage of a specific recyclable material (or group of materials, such as printed paper and packaging) generated that is collected for recycling, or sold to end users. Recovery rates differ from recycling rates in that recovery rates are specific to the material type(s), and include only that material or group of materials in the denominator.

In contrast, *recycling rates* measure the amount of material recycled as a percentage of total mixed solid waste generated (both recycled and disposed) and may include many different materials in the numerator (as recycled) as well as in the denominator (including materials that cannot be recycled). Because the definition of what can be classified as recycling differs across jurisdictions, recycling rates are poor comparisons of performance. For example, California and Washington include construction waste in their calculation of a State Recycling/Diversion rate, and many states, including Vermont, include all types of scrap metal. These material inclusions can have a large impact on the recycling rate measured because they are heavy materials and therefore weigh heavily on the rate.

Recovery rates track specific performance by identifying how much of a material (or group of materials) is recycled, and how much more is available for recycling. This, coupled with a per capita MSW disposal rate, can simplify benchmarking and standardize the reporting metric.

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<sup>1</sup> Delaware Solid Waste Authority. *2010 Statewide Solid Waste Management Plan*. Adopted April 22, 2010

## METHODOLOGY

Recovery rates are calculated using the following equation:

$$\text{Material Recycled} / \text{Material Recycled and Disposed}$$

For example, the *Recovery Rate for Newspaper* = *Tons of newspaper set out for recycling / Tons of newspaper set out for recycling + Tons of newspaper disposed in the trash.*

DSM completed the CY 2015 Assessment of Municipal Solid Waste Recycling which contains data on municipal solid waste (MSW) recycling by material type for both the residential and commercial sectors. This served as the basis for the numerator – Material Recycled – of each recovery rate.

For the denominator (disposal), DSM used FY 2016 (July 1, 2015 – June 30, 2016) weigh data for deliveries to all DSWA facilities by waste type and vehicle type to enable DSM to calculate residential and commercial (ICI) MSW disposal in Delaware during this time period. The November 2015 and June 2016 MSW characterization study results for the residential and the ICI sectors (composition by percentage of waste, by weight) were applied to this FY 2016 MSW disposal data to develop tonnages disposed by the residential sector and the ICI sector by material type.

The CY 2015 recycling survey totals by material type and by generator class (residential vs. commercial) were then paired with the disposal tonnages by material type to calculate a recovery rate for each recyclable material in aggregate, and for each material for the residential and commercial sectors separately.

Note that the FY 2016 Waste Characterization did not include construction and demolition waste and therefore material recovery rates could not be calculated for certain materials that were included in the 2010 State Solid Waste Plan. This is discussed in more detail in the findings section of this report.

## RESULTS - RECOVERY RATES 2015

### THE DENOMINATOR

FY 2016 Waste Characterization tonnages for materials disposed at DSWA facilities for which recovery rates can be estimated are shown on the next page in **Table 1**.

Categories highlighted in light blue in Table 1 need to be further aggregated because they are typically collected mixed together and sorted at one of the single stream Materials Recovery Facilities (MRF) processing Delaware recyclables. While individual materials sales from these facilities are reported, the sales data includes non-Delaware material, and therefore only the incoming tonnage data from Delaware can be used – which is reported as single stream material only. These materials include: paper; paper packaging (corrugated containers and boxboard); aluminum and steel cans; glass bottles and jars; and, plastic bottles and containers.

In addition, several organic categories are highlighted in light green and then aggregated in order to match the category of food waste recovered for composting. Highlighted in darker green are the other two organic categories: Leaves, Grass, and Brush; and Branches and Stumps.

In addition, electronics are included in four different disposal material categories: Large Electronics; Other Small Consumer Electronics; Items with CRTs; and, Other Larger Electronics. These are highlighted in orange and then aggregated to create one recovery rate estimate for Electronics.

A key below shows these highlighted categories and the colors assigned:

Single Stream Recyclable Materials	
Food Waste Composting	
Organics Composted, Mulched or Beneficially Used	
Electronics Recycling	

**Table 2** then presents these aggregated material categories for disposal used to estimate the recovery rates by material. The aggregated materials presented in Table 2 represent the denominator of the recovery rate equation.

**TABLE 1 – TONNAGES DISPOSED BY RECYCLABLE MATERIAL TYPE, DELAWARE SOLID WASTE AUTHORITY STATEWIDE WASTE CHARACTERIZATION STUDY, FY 2016**

<b>Municipal Solid Waste Material Category</b>	<b>Residential (tons)</b>	<b>Commercial (tons)</b>
<b>Paper</b>		
Newspaper and Inserts	5,922	4,395
Corrugated Cardboard/Kraft Paper	11,560	25,347
High Grade Office Paper	1,992	3,816
Mixed Recyclable Paper	13,147	9,584
Aseptic Boxes and Gable Top Cartons	445	996
<b>Plastic</b>		
PET #1 Bottles, Jars, or Containers	5,467	5,525
HDPE #2 Natural and Colored Bottles	3,243	2,109
Rigid HDPE #2 Containers	332	178
#3 to #7 Bottles or Jars	372	150
Injection Molded Tubs #2, #4, #5, #6, & #7	736	991
All Other Rigid Plastic Packaging	505	163
White Expanded Polystyrene (Styrofoam)	1,733	2,613
Recoverable Film	2,465	2,730
<b>Organic</b>		
Vegetative Food Waste, Unpackaged	24,342	33,362
Protein Food Waste, Unpackaged	11,184	9,941
Food Waste in Plastic Packaging	25,411	18,339
Food Waste in Other Packaging	3,976	5,446
Leaves, Grass, and Brush	14,709	10,981
Branches and Stumps	1,056	825
Textiles	17,705	14,618
Carpet and Carpet Padding	8,816	14,618
<b>Metal</b>		
Tin/Steel Containers	3,554	1,779
Aluminum Beverage & Cat Food Containers	1,541	1,179
<b>Glass</b>		
Glass Bottles and Jars	9,015	4,421
<b>Other</b>		
Tires	1,988	143
Small Appliances	474	0
Large Electronics	6,079	75
Other Small Consumer Electronics	808	758
Items with CRTs	1,416	441
Other Larger Electronics	14	0

**TABLE 2 – AGGREGATED RECYCLABLE MATERIAL CATEGORIES (FROM TABLE 1), TONNAGES DISPOSED, FY 2016**

MSW Material Category	<i>Residential (tons)</i>	<i>Commercial (tons)</i>	<i>Total (tons)</i>
<b>Packaging</b>			
Single Stream Materials	57,832	60,635	118,468
Styrofoam	1,733	2,613	4,346
Recoverable Film	2,465	2,730	5,196
<b>Organics</b>			
Food Waste	64,913	67,087	132,000
Leaves, Grass, and Brush	14,709	10,981	25,690
Branches and Stumps	1,056	825	1,881
Textiles	17,705	14,618	32,323
Carpet and Carpet Padding	8,816	14,618	23,434
<b>Other</b>			
Tires	1,988	143	2,132
Appliances	474	0	474
Electronics	8,317	1,275	9,592
<b>Subtotal:</b>			
	<b>180,008</b>	<b>175,527</b>	<b>355,535</b>
Other Materials Disposed	140,151	131,228	271,379
<b>Subtotal (1):</b>			
	<b>320,159</b>	<b>306,755</b>	<b>626,914</b>
<b>Other MSW</b>			
Bulky Wastes	19,983	6,661	26,644
MSW Disposal Out of State (2)	0	25,000	25,000
<b>Total MSW Disposal:</b>			
	<b>340,142</b>	<b>338,416</b>	<b>678,558</b>

(1) These subtotals shown match the Total MSW Disposed in the DSWA Statewide Waste Characterization Study, FY 2016 (Table E.1. Allocation of Tonnage by Facility, July 2015 – June 2016) which excludes bulky wastes and out of state waste disposal

(2) Estimated out of state MSW disposal for FY 2016, based on CY 2015 reported figures.

## THE NUMERATOR

**Table 3** outlines all reported MSW recycling in Delaware, as found in Table 3 of the CY 2015 Assessment of Municipal Solid Waste Recycling (RPAC Report). Material categories highlighted in light blue are those materials that are typically accepted at MRFs as part of single stream recycling. The category “Mixed Recyclables” accounts for all material reported in Delaware as single stream recycling.

Highlighted in light green is food waste recovered which matches the organic categories aggregated (and highlighted in light green) in Table 2. And the other organic categories – which are composted, mulched or otherwise beneficially used - are highlighted in dark green.

Highlighted in orange are electronics recycled.

Finally highlighted in gray are those material categories recycled but that do not match any material category in the waste characterization and therefore a recovery rate could not be calculated for that specific material recycled.

Some specific materials that are accepted in single stream recycling, such as corrugated and sorted office paper, could be matched with the quantities disposed in those same material categories to report a separate recycling rate for corrugated and for sorted office paper. However because corrugated and office paper are also included as part of the single stream recycling reported, the recovery rate shown would be lower than the actual rate if the corrugated could be disaggregated from single stream materials recycling.

Therefore all single stream materials were grouped together to report a single recovery rate for single stream recyclable materials. Table 4 shows the material categories and associated tonnages recycled that can be matched to Table 2.

A key outlining these categories that are color coded is below.

Single Stream Recyclable Materials	
Food Waste Composting	
Organics Composted, Mulched or Beneficially Used	
Electronics Recycling	
Materials Recycled, but with no matching material category in the Waste Characterization Study	



**TABLE 3 – TONNAGES RECYCLED BY RECYCLABLE MATERIAL TYPE, CY 2015**  
(SOURCE: ASSESSMENT OF MUNICIPAL WASTE RECYCLING CY 2015)

MSW Material Category	RECYCLED (CY 2015)		
	Residential (tons)	Commercial (tons)	Total (tons)
<b>Paper</b>			
Corrugated (OCC)	759	89,526	90,285
Newspaper (ONP)	0	2,733	2,733
Sorted Office Paper	0	25,576	25,576
Mixed Paper	14	6,897	6,911
<b>Subtotal:</b>	<b>773</b>	<b>124,733</b>	<b>125,506</b>
<b>Packaging</b>			
Glass	0	2,136	2,136
Plastic Film / Shrink Wrap	0	3,008	3,008
Retail Bags	228	0	228
Plastic Containers	0	129	129
Polystyrene Packaging	11	97	108
Aluminum Cans	441	49	490
<b>Mixed Recyclables</b>	<b>77,428</b>	<b>29,506</b>	<b>106,933</b>
Mulched Pallets	0	2,940	2,940
<b>Subtotal:</b>	<b>78,108</b>	<b>37,865</b>	<b>115,973</b>
<b>Paper and Packaging:</b>	<b>78,880</b>	<b>162,599</b>	<b>241,479</b>
<b>Green Waste</b>			
Leaf and Yard Waste	99,621	11,069	110,690
Trees and Branches	41,692	41,692	83,383
Clean Wood	0	1,318	1,318
<b>Subtotal:</b>	<b>141,313</b>	<b>54,079</b>	<b>195,392</b>
<b>Food Related Wastes</b>			
Food Waste	0	8,509	8,509
Fats, Oil, Grease	0	3,565	3,565
<b>Subtotal:</b>	<b>0</b>	<b>12,074</b>	<b>12,074</b>
<b>Vehicle Waste</b>			
Tires	1,841	460	2,301
Lead Acid Batteries	2,531	633	3,164
Oil Filters	162	41	203
<b>Subtotal:</b>	<b>4,534</b>	<b>1,134</b>	<b>5,668</b>
<b>Special Wastes</b>			
Textiles	16,687	50	16,737
Electronics	972	459	1,431
Mattresses	183	0	183
Carpet	0	19	19
Florescent Bulbs	0	68	68
Other Batteries	65	7	72
<b>Subtotal:</b>	<b>17,906</b>	<b>604</b>	<b>18,510</b>
<b>Metals</b>			
White Goods	22,116	2,457	24,573
<b>Subtotal:</b>	<b>22,116</b>	<b>2,457</b>	<b>24,573</b>
<b>Mixed Plastics</b>			
Mixed Plastics	0	1,667	1,667
<b>Subtotal:</b>	<b>0</b>	<b>1,667</b>	<b>1,667</b>
<b>Total:</b>	<b>264,750</b>	<b>234,613</b>	<b>499,363</b>

**TABLE 4 - AGGREGATED RECYCLABLE MATERIAL CATEGORIES (FROM TABLE 3), TONNAGES RECYCLED, CY 2015**

MSW Material Category	RECYCLED (CY 2015)		
	Residential (tons)	Commercial (tons)	Total (tons)
<b>Packaging</b>			
Single Stream Materials	78,641	156,553	235,195
Styrofoam	11	97	108
Recoverable Film	228	3,008	3,236
<b>Organics</b>			
Food Waste	0	8,509	8,509
Leaves, Grass, and Brush	99,621	11,069	110,690
Branches and Stumps (1)	41,692	41,692	83,383
Textiles	16,687	50	16,737
Carpet and Carpet Padding	0	19	19
<b>Other</b>			
Tires	1,841	460	2,301
Appliances	22,116	2,457	24,573
Electronics	972	459	1,431
<b>Subtotal:</b>	<b>261,809</b>	<b>224,374</b>	<b>486,183</b>

## RECOVERY RATES

Tables 2 and 4 are then combined and a recovery rate is calculated for each material category shown above. **Table 5**, on the next page, presents the calculated material recovery rates for FY 2016.<sup>2</sup>

The recovery rates in Table 5 can be compared with the estimated 2008 recovery rates (as shown in Table 6) as reported in the “*Statewide Solid Waste Management Plan for Delaware: Moving Toward Zero Waste*” (2010 Plan). Single stream materials that were separately reported in the 2010 Plan have been combined in **Table 6** to create a single rate for this group of materials to be consistent with the FY 2016 data presented in Table 5.<sup>3</sup>

<sup>2</sup> Note that disposal (denominator of the rate) is for FY 2016 and recycling (numerator) is for CY 2015.

<sup>3</sup> The base year for the 2010 Plan was CY 2008 although data was taken from the 2006/07 characterization and the CY 2008 recycling survey.

TABLE 5 – ESTIMATED MATERIAL RECOVERY RATES FOR DELAWARE, FY 2016

MSW Material Category	RECYCLED (CY 2015)			DISPOSED (FY 2016)			RECOVERY RATES (FY 2016)		
	Residential (tons)	Commercial (tons)	Total (tons)	Residential (tons)	Commercial (tons)	Total (tons)	Residential (%)	Commercial (%)	Total (%)
<b>Packaging</b>									
Single Stream Materials	78,641	156,553	235,195	57,832	60,635	118,468	58%	72%	67%
Styrofoam	11	97	108	1,733	2,613	4,346	1%	4%	2%
Recoverable Film	228	3,008	3,236	2,465	2,730	5,196	8%	52%	38%
<b>Organics</b>									
Food Waste	0	8,509	8,509	64,913	67,087	132,000	0%	11%	6%
Leaves, Grass, and Brush	99,621	11,069	110,690	14,709	10,981	25,690	87%	50%	81%
Branches and Stumps	41,692	41,692	83,383	1,056	825	1,881	98%	98%	98%
Textiles	16,687	50	16,737	17,705	14,618	32,323	49%	0%	34%
Carpet and Carpet Padding	0	19	19	8,816	14,618	23,434	0%	0%	0%
<b>Other</b>									
Tires (1)	1,841	460	2,301	1,988	143	2,132	48%	76%	52%
Appliances	22,116	2,457	24,573	474	0	474	98%	100%	98%
Electronics (2)	972	459	1,431	8,317	1,275	9,592	10%	26%	13%
<b>Total:</b>	<b>261,809</b>	<b>224,374</b>	<b>486,183</b>	<b>180,008</b>	<b>175,527</b>	<b>355,535</b>	<b>59%</b>	<b>56%</b>	<b>58%</b>

(1) The recovery rate for Tires is under reported for two reasons: First, standard operation practices at DSWA facilities are to remove tires on the tip floor or landfill face after a load is tipped. However the sampling protocol took random sample before tire removal could occur from a tipped load **therefore showing the tires as disposed at DSWA facilities which is not the case**. Second, some tire handlers and recyclers did not report, including (DSM assumes) those that **may** use waste to energy facilities.

(2) The recovery rate for Electronics is much lower than in CY 2008 for two reasons: First, large electronics were not separately accounted for in the CY 2008 waste characterization. Second, large organizations are likely to have their own management programs for discarded electronics to ensure data security and proper handling, and not all of them are reporting to DSM as part of the annual recycling survey.

**TABLE 6 – ESTIMATED MATERIAL RECOVERY RATES FOR DELAWARE, CY 2008**

MSW Material Category	RECYCLED (CY 2008)			DISPOSED (FY 2007)			RECOVERY RATES (CY 2008)		
	Residential (tons)	Commercial (tons)	Total (tons)	Residential (tons)	Commercial (tons)	Total (tons)	Residential (%)	Commercial (%)	Total (%)
<b>Packaging</b>									
Single Stream Materials (1)	35,800	102,300	138,100	107,100	126,000	233,100	25%	45%	37%
Styrofoam				<i>Not Available</i>					
Recoverable Film	0	2,000	2,000	4,100	9,600	13,700	0%	17%	13%
<b>Organics</b>									
Food Waste	0	5,700	5,700	44,400	57,000	101,400	0%	9%	5%
Leaves, Grass, and Brush	60,000	7,200	67,200	53,400	8,400	61,800	53%	46%	52%
Branches and Stumps	49,100	6,100	55,200	1,500	0	1,500	97%	100%	97%
Textiles	3,310	0	3,310	16,900	6,300	23,200	16%	0%	12%
Carpet and Carpet Padding	45	20	65	5,600	6,300	11,900	1%	0%	1%
<b>Other</b>									
Tires	7,100	1,800	8,900	400	800	1,200	95%	69%	88%
Appliances	23,600	120	23,720	1,500	2,500	4,000	94%	5%	86%
Electronics	1,430	450	1,880	3,800	2,100	5,900	27%	18%	24%
<b>Total:</b>	<b>180,385</b>	<b>125,690</b>	<b>306,075</b>	<b>238,700</b>	<b>219,000</b>	<b>457,700</b>	<b>43%</b>	<b>36%</b>	<b>40%</b>

(1) May include a few types of plastic containers not accepted in the single stream mix but counted in the denominator.

## DISCUSSION

### FINDINGS

**Table 7** below illustrates the recovery rates calculated in Tables 5 and 6. This provides an instructive comparison in tracking the changes in materials recovery in Delaware over the last 8 years.

**TABLE 7 – RECOVERY RATES FROM CY 2008 COMPARED WITH FY 2016 RECOVERY RATES**

MSW Material Category	RECOVERY RATES (CY 2008)			RECOVERY RATES (FY 2016)		
	Residential (%)	Commercial (%)	Total (%)	Residential (%)	Commercial (%)	Total (%)
<b>Packaging</b>						
Single Stream Materials (1)	25%	45%	37%	58%	72%	67%
Styrofoam	<i>Not available</i>			1%	4%	2%
Recoverable Film	0%	17%	13%	8%	52%	38%
<b>Organics</b>						
Food Waste	0%	9%	5%	0%	11%	6%
Leaves, Grass, and Brush	53%	46%	52%	87%	50%	81%
Branches and Stumps	97%	100%	97%	98%	98%	98%
Textiles	16%	0%	12%	49%	0%	34%
Carpet and Carpet Padding	1%	0%	1%	0%	0%	0%
<b>Other</b>						
Tires	95%	69%	88%	48%	76%	52%
Appliances	94%	5%	86%	98%	100%	98%
Electronics	27%	18%	24%	10%	26%	13%
<b>Total:</b>	<b>43%</b>	<b>36%</b>	<b>40%</b>	<b>59%</b>	<b>56%</b>	<b>58%</b>

From this comparison and the tonnages shown in Tables 5 and 6, the following findings can be made:

- Recycling of single stream materials has grown significantly, particularly for the residential sector, which was the goal of universal recycling. Residential single stream recovery has from 25 percent to a 58 percent recovery rate with the volumes more than doubling in FY 2016 from CY 2008. And commercial single stream materials recovery has increased from 45 percent to 72 percent, resulting in a statewide rate of 67 percent for single stream recycling.
- A statewide recovery rate of 58% for residential single stream materials (FY2016) is evidence of strong recycling programs throughout the state. The highest performing programs that DSM has measured have rates in the high 70's to low 80's, but these high rates have been measured from a single program (and often one that does not serve the whole community), not from a statewide program that accounts for the entire population. Achieving a statewide average rate of 58 percent means that some areas of the State are likely to be achieving rates in the high 70's to low 80's.

- However, it is important to note that the recovery rates reported in Table 5, 6 and 7 includes residue. It is not possible to report a definitive residue rate for Delaware-only material, because the MRFs in Delaware accept material from out-of-state and only report an aggregate residue rate and because some of the material included in the single stream category was source separated corrugated, mixed paper and sorted office paper, which typically have low residue rates. In addition, there were at least four different entities reporting single stream materials recycled, some of which were sent out of state.
- The rate of recycling of Recoverable Film has also more than doubled, while the generation has decreased. This may be due to expanded markets for clean film. However not all film packaging is included in this category, only clean recoverable film.
- Food waste recovery growth has been very small despite some increase in collection programs from 2011 – 2014 when Peninsula Compost was operating. Food waste generation overall has also increased.
- Leaf and yard waste recovery has increased with recovery measured at over 80 percent. Trees and branches are rarely disposed and continue to be recovered at very high rates.
- The rate of textile recovery has nearly tripled (from 12 percent to 34 percent) but textile generation has also grown significantly, with 32,000 tons disposed in FY 2016 and 23,000 disposed in FY 2007 (rounded).<sup>4</sup>
- Delaware’s calculated recovery rate for tires is 52% which is higher than the national average of 41% (EPA, 2014). While Delaware’s rate has decreased from 2008, tires disposed and total generation (as measured by recycling plus disposal) has also significantly decreased, helping to verify DSM’s assumption that tire recycling and generation is underreported in Delaware. The high volume and rate of tire recycling in 2008 included demand for shredded and properly sized rubber (from tires) to be used as construction materials in landfill closure and construction projects. This use did not continue and so some tires may continue to be diverted (from disposal) but sent out of state for other uses, including tire derived fuel and waste to energy.

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<sup>4</sup> Textile generation has grown roughly 41% between 2005 and 2014 nationally, and the national recovery rate was measured at 12.4% in 2014, according to the EPA (Advancing Sustainable Materials Management: 2014 Tables and Figures, Assessing Trends in Material Generation, Recycling, Composting, Combustion with Energy Recovery and Landfilling in the United States, December 2016).

- Finally, the recovery rate for electronics has decreased significantly. This drop in the rate is mainly due to the increase in electronics generated. While DSWA continues to operate a successful program, the breadth of electronic products produced has led to a need for much more comprehensive and expensive recycling programs, which are not available from most retailers and for some electronic products.

In summary, material recovery in Delaware has increased significantly since 2008 due primarily to enactment of the Universal Recycling law and the associated development of single stream processing facilities together with the ban on yard waste disposal at DSWA landfills. As a result, the State has met the 2015 diversion goals for recyclables and yard waste established in the 2010 Plan.

## ROLE OF CONSTRUCTION AND DEMOLITION WASTE

This report only tracks materials that are part of the MSW stream. A wider assessment of materials recovery across total solid waste would require a more comprehensive assessment of disposal among non MSW materials. These are primarily C&D materials, as illustrated by Table A.1 of the 2010 Plan.

While the 2006/07 waste characterization study included characterization of C&D waste deliveries at all 6 facilities, the FY 2016 study excluded separate C&D waste deliveries and only characterized C&D waste that was delivered as part of residential and commercial loads of municipal solid waste. Therefore direct comparison of the recovery rates of some specific C&D and other non MSW materials using *the All Materials Recycling Study: Total Solid Waste*<sup>5</sup> and comparing with the 2010 Plan would not be accurate.

An analysis of C&D deliveries to the Jones Crossroads landfill was carried out by DSM in 2014. Theoretically it would be possible to assume that reported deliveries of C&D to the other DSWA landfills would be similar in composition. However, this may not be accurate for New Castle County because of the Revolution Recovery facility which accepts C&D materials for recycling that might otherwise have gone to the Cherry Island Landfill. Typically C&D processing facilities attract C&D loads rich in recoverable materials, leaving those loads without as much recoverable material to be landfilled.

Because Sussex County does not have a C&D processing facility, it is therefore likely that the mix of C&D material delivered to the Jones Crossroads landfill differs from that delivered to the Cherry Island landfill.

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<sup>5</sup> DSM Environmental Services, Inc. *All Materials Recycling Study: Total Solid Waste*. Prepared for the Delaware Solid Waste Authority. October 2015.