



FOOD SCRAP RECYCLING

2019 Landscape Assessment Baltimore, Maryland

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EXECUTIVE SUMMARY

The Natural Resources Defense Council (NRDC) estimates that up to 40% of food in the United States is wasted, the impacts of which reverberate across the nation socially, environmentally, and economically. To test potential solutions and develop a model of success for reducing food waste, NRDC, with support from the Rockefeller Foundation, is partnering with the City of Baltimore to pilot policies, programs, engagement, and other efforts to reduce the generation of excess food, rescue food for people in need and recycle any remaining food scraps.

GOAL OF THIS REPORT: NRDC contracted with Resource Recycling Systems (RRS) to assist in a collection of research activities designed to provide NRDC with a better understanding of the current food scrap recycling capacity available in the City and County of Baltimore (including both collection and processing infrastructure), as well as to identify key stakeholder feedback on the needs, opportunities, and barriers related to expanding food scrap recycling. The Institute for Local Self-Reliance (ILSR) also contributed to sections of this report. The results of the research aim to provide guidance for NRDC and City government on how to best work together to support policies and programs to reduce wasted food and more effectively recycle food scraps.

ALIGNMENT WITH CITY FOOD WASTE & RECOVERY STRATEGY: In September 2018, the City of Baltimore released its Food Waste & Recovery Strategy, which was developed over two years in partnership with the Institute for Local Self-Reliance and with a wide variety of stakeholders¹. This document lays out the reasons for rescuing surplus food and recycling food scraps; defines potential local solutions; highlights seven local case studies; and sets ten major goals and 69 short, medium, and long-term strategies around the following topics:

- Commercial & Institutional Food Waste Reduction & Recovery
- Composting At Home & In The Community
- Creating Scalable Composting Infrastructure
- Composting in K-12 Schools

The Baltimore Food Waste & Recovery Strategy is part of the City's Waste-To-Wealth Initiative, which aims to reduce waste and grow businesses in Baltimore City by supporting business initiatives that are making products out of valuable materials captured from our waste stream. By fostering businesses that capture valuable resources before they even enter the waste stream, Waste-To-Wealth will create jobs, combat blight, feed resident-led greening efforts, and revitalize neighborhoods². This Food Scrap Recycling Landscape Assessment is intended to help bolster and provide additional information supporting the Baltimore Food Waste & Recovery Strategy; its recommendations complement and to some extent overlap with those outlined in the Strategy. This report is also part of a larger compilation of NRDC research which includes identifying opportunities related to surplus food rescue as well as food waste prevention.

The Baltimore Office of Sustainability centers racial, economic and geographic equity in their work—mostly recently lifted up in the 2019 Sustainability Plan. Acknowledging racial discrimination is critical to moving forward towards a future that is created by and works for all residents of Baltimore. Food waste is no exception and the City has included equity as a core piece of their Food Waste & Recovery Strategy. The Food Scrap Recycling

¹ Baltimore Food Waste & Recovery Strategy, Baltimore City Department of Planning's Office of Sustainability, September 2018, https://www.baltimoresustainability.org/wp-content/uploads/2018/09/BaltimoreFoodWasteRecoveryStrategy_Sept2018_FINAL.pdf

² <https://www.baltimoresustainability.org/projects/waste-to-wealth/>

Landscape Assessment includes information on how food scrap recycling activities relate to social and racial equity only where that input was provided by stakeholders.

STRUCTURE OF THIS REPORT: In order to provide a comprehensive assessment of the existing and potential landscape for food scrap recycling in the Baltimore area, we conducted research in four primary objective areas: The report is organized by these objective areas as well as a final section for recommendations, as follows :

1. **Processing Capacity:** Identify and map existing food scrap processing (i.e. composting and anaerobic digestion) facilities in the region including materials accepted, throughput, capacity, and potential for expanding processing of food scraps. Include information related to capacity of existing anaerobic digesters at wastewater treatment facilities that either accept food waste or could potentially be retrofitted to include food waste, as well as highlighting opportunities related to small-scale and community organics recycling.
2. **Collection and Policy Review:** Review and assess existing food scrap recycling collection infrastructure in the City and County of Baltimore. Include information on state and local policies relating to food scrap recycling.
3. **Feedstock Analysis:** Create a map of potentially large generators of wasted food in order to identify a consistent source of feedstock available for processing.
4. **Stakeholder Input:** Survey stakeholders (including City staff) to identify barriers and opportunities for expanded food scrap recycling, including where feasible possible expansions of community or other smaller-scale projects as well as identification of potentially affected stakeholders and communities.
5. **Recommendations:** From analysis and stakeholder input, propose prioritized recommendations for action to support food scrap recycling in the Baltimore region.


TASK 1: PROCESSING CAPACITY EVALUATION

In total, 266,453 tons of organic materials (including food waste, yard, wood waste, and industrial and agricultural materials) were processed at Maryland compost facilities in 2017. This represents approximately 6% of the total waste stream generated in the state³, and 12% of the total organic material generated in the state⁴.

Nearly three-quarters (73%) of all permitted compost facilities in the state (16 out of 22) are located within 50 miles from the center of Baltimore, but only 4 of the 16 facilities in that radius are permitted to accept food waste. There are no active stand-alone anaerobic digesters currently operating in the region; however, the BTS BioEnergy anaerobic digester in Jessup, MD is expected to come online in late 2019 and be able to process 100,000 tons per year in food waste, primarily sourced from surrounding food processing operations. The project team identified 8 wastewater treatment plants (WWTPs) in Maryland with operating anaerobic digesters, none of which are currently accepting food scraps. There are more than 50 community gardens in Baltimore City; however, only two privately operated community gardens accept drop-off material.

³ Total waste generated in Maryland estimated from EPA estimates of per capita waste generation rate of 4.48 pounds per person per day (2015) and US Census 2017 Maryland population estimate - 6,052,177.

⁴ Reported by Maryland Department of the Environment:
<https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/foodscraps.aspx>



According to the Maryland Department of the Environment (MDE), 253,560 tons of organics were recycled within the Baltimore region in 2017.⁵, representing 95% of the total organics processed at Tier I or II facilities. Of that total, which includes food waste, yard waste, and industrial and agricultural materials, the project team estimates that 17,400 tons of food waste (7%) were processed in 2017.

The project team estimates that based on permitted capacity, the existing regional processors could process up to 152,650 additional tons of organics, with 29,350 additional tons of food residuals either separated or commingled with yard waste on an annual basis. Looking beyond the currently available capacity, there is an estimated 45,000 tons of additional potential composting capacity.

A summary of the processing infrastructure in the region, by type, is provided in Table 1. The web-based ArcGIS map of the regional facilities data is available on-line: <https://arcg.is/14iy40>.

⁵ Includes all facilities within 50 miles of Baltimore and the Montgomery County Yard Trim Composting Facility

Table 1: Processing Capacity Landscape Summary

Type	Summary
Permitted Composting Facilities	The majority of Maryland's composting capacity is within 50 miles of Baltimore; however, only a few of those facilities accept food waste. Food waste composting in the region has been impacted by the closure of several facilities over the years due to regulation violations, complaints, and other processing issues, and these closures have had long term impacts on community's perceptions of composting. Additionally, many communities and haulers are relying on one facility, Prince George's County, for food waste composting. Although Prince George's County is a well-operated facility unlikely to close in the near future, there remains little resiliency in the processing landscape. The reliance on one processor should be a concern for anyone looking to compost food waste in the region considering the effect facility closures have had on food waste composting in the past.
Potential Facilities	There are two composting facilities within 50 miles of Baltimore that will come online in 2019. The Tolson & Associates facility is a Tier I yard waste facility permitted to accept 25,000 tons per year. The facility operators have no intention of expanding to a Tier II facility in the future. The second facility located in Lothian, MD will be operated by Veteran Compost, a processor already operating a successful Tier II small facility in Anne Arundel, MD. This facility is permitted to accept 20,000 tons per year and will only accept food waste. In addition to these composting facilities, a large AD processor is under construction in Jessup, MD. The AD facility is operated by BTS BioEnergy, a European company with a long track record of operating AD facilities across Europe and the UK. Food processors will be the primary generators using this 100,000 ton-per-year facility.
Transfer Stations	There are 7 transfer stations within 15 miles of Baltimore. One of those transfer stations currently accepts organics for transfer to composting. The nearest composting facility is 15 miles from Baltimore, and the largest food waste composter is 40 miles away. Currently, transfer is not playing a major role in organics composting in the region. At the same time, many haulers expressed a desire for a shorter haul to a large food waste processor.
Natural Wood Waste Recycling Facilities	There are 24 Natural Wood Waste Recycling Facilities (NWWRF) in the Baltimore region. If facilities combine Natural Wood Waste with yard waste, then the facilities need a Compost Facility Permit instead of a NWWRF Permit. Natural wood waste facilities accept, grind and process wood waste but are not allowed to burn wood except as permitted by the Maryland Department of the Environment.
Wastewater Treatment Plants	The project team identified 8 wastewater treatment plants (WWTPs) with AD in the region, yet no facilities in either the region or state currently accept food scraps for processing. The potential multi-million dollar price tag of retrofits and upgrades required to accept food scraps make this an unlikely outlet for significant tons in the near future. There are WWTPs utilizing AD to process biosolids, and the vast majority of the processed biosolids are exported out of state.
Backyard Composting, Drop-Offs, and Community Gardens	<u>Backyard Composting:</u> Currently the City of Baltimore has no program to promote and teach about backyard composting; however, there are non-profits such as ILSR working to promote the activity. <u>Drop-Offs and Community Gardens:</u> The City does not have any publicly available food scrap drop-off locations. Baltimore has more than 50 community gardens and urban farms ⁶ , many of which have composting operations for their own materials on-site. Two privately operated urban farms accept material for drop-off.

⁶ Estimate of community gardens and farms found through research conducted by ILSR

The key take-aways from the processing capacity research are:

- The 2018 Prince George's County food waste processing capacity expansion was driven by increasing demand for both compost processing and finished compost product. Their compost product Leafgro GOLD sells out each fall, and even with the expanded capacity the facility will not meet demand for processing in the region.
- The food waste processing capacity in the region is growing; however, there remains limited capacity near large population centers such as Baltimore. Additionally, processing is dominated by one large-scale facility, Prince George's County, and while the facility is well-operated and unlikely to close, heavy reliance on one facility results in low resiliency to disruption in the processing network, which is a concern for many stakeholders.
- High disposal fees (Baltimore County charges \$80 per ton for landfill tip fees) and limited landfill capacity are incentivizing many municipalities and counties in the region to seek alternatives to disposal. In the City of Baltimore, however, disposal costs at the Wheelabrator Incinerator are lower (\$67.44 per ton), and the ready access to disposal has made it harder for composting to compete with disposal in Baltimore.
- Siting composting facilities is a challenge in the Baltimore region. The new composting regulations issued in 2015 may have eased this issue by standardizing the permitting process, and the MDE is seeking input through the HB171 process into ways to make siting easier. Some of the challenges with siting include finding a large enough parcel of land near urban centers and addressing concerns of nearby residents.
- Contamination in organic streams that include food scraps is a continuous challenge for processors, but not one that is significantly hindering the growth of composting. Processors expressed the need for ongoing education on contamination and welcome any support in that area.
- There is high likelihood that processing capacity for food waste will continue to increase in the region due to high demand. Several stakeholders expressed interest in siting a facility within Baltimore city limits.
- Community gardens, urban farms, and backyard composting are underutilized in the City of Baltimore. While these activities have a lower impact on total tons diverted, programs to support small-scale and local composting can generate interest and provide needed education on food waste, as well as keeping some materials out of the municipal waste stream entirely.
- Anaerobic digestion at wastewater treatment plants and stand-alone facilities is not being used as a processing solution in the region. The construction of the stand-alone AD facility in Jessup may spur growth in this type of processing, so there is potential for AD to be part of the long-term solution.

TASK 2: COLLECTION AND POLICY REVIEW

Trash and recycling services are provided by the Baltimore Department of Public Works (DPW) to residents as well as to commercial businesses that generate up to 96 gallons of trash per week. Private sector haulers collect waste from multi-family residents and commercial entities generating more than 96 gallons of trash per week. Multi-unit properties of 10 or more units are required to offer recycling services to residents, but property owners with fewer units have the choice to opt out and request service from a private hauler. Organics collection services are provided entirely by the private sector.

There are no state requirements for food scrap or organics composting. However, the Maryland Recycling Law mandates that all jurisdictions with populations greater than 150,000 recycle 35% of their waste. Diversion of

compostable materials such as yard and food waste can be counted towards the recycling rate⁷. The City of Baltimore is not currently meeting that recycling target. In 2018 the City set a goal to reduce commercial food waste by 50% and residential food waste by 80% by 2040⁸.

Based on the assessment, the project team identified the following key take-aways related to collection and policy:

- There are several residential and commercial haulers dedicated to organics recycling in the Baltimore area, so there are existing opportunities to expand food waste collection.
- There are three main policy and collection barriers related to food scrap recycling:
 - 1) Residential disincentive – Residential trash and recycling services provided by the Baltimore DPW are perceived as “free,” whereas residents must seek out organics haulers and pay for the service.
 - 2) Private sector service cost and demand - The cost of service is a barrier to both commercial and residential generators, and on the other side, the lack of customer demand prevents route density and keeps price per stop high.
 - 3) No local policy to support supply – There are no policies in Baltimore that encourage diversion of organics including food scraps. For example, large commercial generators are not required to divert food waste. Without policy to support food waste diversion, reaching the City’s diversion goals may be challenging.
- While there have been several food waste composting pilot studies in schools, there are no policies in place requiring schools to compost similar to state requirements that schools recycle.
- Multi-family properties of fewer than 10 units that generate more than 96 gallons of mixed refuse weekly are at risk of being left out when it comes to convenient diversion opportunities because they fall outside of Maryland’s multi-family recycling law⁹ and property managers are not required to offer recycling services to residents.
- There are a number of composting pilot programs in Maryland ranging from curbside collection to backyard composting that the City of Baltimore could look to as examples of ways to spur food waste diversion.

TASK 3: FEEDSTOCK ANALYSIS

NRDC estimates that 72,348 tons of food waste are generated by large commercial businesses in the City of Baltimore. Using the NRDC-developed estimations for food waste generation¹⁰, the project team created an on-line ArcGIS map of total estimated food waste generated in Baltimore annually. The map is based on NAICS business type and business zip code and is designed to allow users to identify clusters of feedstock availability. A

⁷ Maryland Department of the Environment information page on the Maryland Recycling Law:

<https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/faqs.aspx>

⁸ Baltimore City’s Food Recovery and Recycling Plan: https://www.baltimoresustainability.org/wp-content/uploads/2018/09/BaltimoreFoodWasteRecoveryStrategy_Sept2018_FINAL.pdf

⁹ Maryland Apartment Recycling Bill: <http://mlis.state.md.us/2012rs/billfile/sb0208.htm>

¹⁰ NRDC, “Estimating Quantities and Types of Food Waste at the City Level”, October 2017. Food waste generation estimates were based on different formulas depending on the type of facility. For example, estimates for hospitals were based on number of beds and estimates for hotels, grocery stores, and restaurants were based on number of employees. <https://www.nrdc.org/resources/food-matters-what-we-waste-and-how-we-can-expand-amount-food-we-rescue>

screen shot of the map is included in Figure 1. The online map can be accessed by following the link: <https://arcg.is/yebre>.

TASK 4: STAKEHOLDER MEETINGS

Over a period of two months, the RRS project team conducted a series of targeted interviews and meetings with a variety of food scrap recycling stakeholders in the Baltimore region. The 14 total interviews provided in-depth input on the barriers, gaps, and opportunities to improve the local landscape for food scrap recycling. Stakeholders included city and county staff, haulers, non-profits, state regulators, local thought and trend leaders, and regional organics processors. The key takeaways from the stakeholder interviews and meetings include:

- There is not enough food scrap recycling capacity to support growing demand in the region. The region would benefit from the development of a variety of processing methods including backyard composting, community gardens, composting on farms, and both large- and small-scale AD and compost facilities.
- Long transportation distances to organics processing facilities drives cost of hauling up, resulting in higher customer costs for food waste collection services, which makes it challenging for haulers to compete with the cost of Baltimore trash services (most waste generated in Baltimore is going to disposal at the relatively inexpensive incinerator). Since residents do not pay a separate bill for waste collection, the perception is that these services are “free”.
- Obtaining capital, siting facilities, working around zoning requirements, combating NIMBYism, a lack of supporting policies, and uncertain end markets for compost products were all cited by processors as challenges for growing processing capacity in the region.
- Processors would like to see more funding opportunities available for them to engage in education and outreach campaigns, purchase equipment, fund facility upgrades, or other activities to help them expand food waste recycling in the region.
- Labor force training to prepare the workforce for working at a compost processing facility would help composters fill labor needs.
- A farmer’s market food waste drop-off program that is free for residents could be a great way to generate interest in food waste recycling and educate residents, and could be implemented relatively quickly in Baltimore.
- While finished compost is in high demand currently and composters indicate having no difficulty finding buyers, end markets may not be sufficiently developed to support a significantly higher production in finished compost. Revisions to the Department of Agriculture’s definition of compost products so that end markets that are not currently able to accept finished compost due to restrictions – e.g., farmers, golf courses, operations near waterways – could open up new opportunities for more buyers to use finished compost.
- Contamination is an everyday focus for composters, although it was not cited as a significant barrier to food waste processing capacity expansion.
- Assistance, education, and engagement to build support among elected officials in Baltimore County has potential to increase interest in a processing facility nearer to Baltimore.

Education and engagement to help reduce contamination and expand demand for collection service was mentioned as a need by many stakeholders. Although there are organizations and non-profits working to increase food scrap recycling access and outreach, there is opportunity for NRDC and the City of Baltimore to facilitate communication between groups and increase consistency of messaging.

TASK 5: RECOMMENDATIONS

Using a systems-based approach evaluating all facets of materials management from collection to policy to end markets, the project team evaluated Baltimore’s food scrap recycling system and developed a set of prioritized recommendations. The high priority recommendations are those that the project team believes should be considered for action in the near term as they are either low-hanging fruit or are recommendations that can have a large impact on the region. The recommended action steps are presented, by area of engagement, in Table 2.

Table 2: Recommended Action Steps (high priority recommendations are in **Bold**)

Area of Engagement	Action Steps
Collection	<ul style="list-style-type: none"> • Spread awareness of private organics collection companies and other food waste recycling opportunities. • Institute food waste drop-off program at farmer’s markets, community gardens, convenience centers, and other suitable locations. • Explore options for the City to coordinate with private haulers and offer a reduced cost service to residents. • Encourage large grocers already composting (ex: MOM’s) to allow residents to bring food waste for diversion. • The City with the support of NRDC could provide three free months of service to businesses interested in starting food waste diversion programs. • Encourage City of Baltimore to perform a cost-benefit analysis of current system and assessment of potential organics program in Baltimore.
Processing	<ul style="list-style-type: none"> • Provide funding for community gardens and farms in Baltimore to support a distributed composting network. • Support program that provides free or reduced cost backyard/home composting bins to Baltimore residents. • Assess potential for large generators to process food waste on site (ex: Maryland Zoo, correctional facilities, convention centers) • Explore siting and construction of a new composting facility near Baltimore. • Facilitate discussions with wastewater treatment plants and others to investigate anaerobic digestion for targeted streams of food scraps. • The City should perform a vacant lot, open lot, and available properties assessment in relation to a site’s potential for composting activities at all scales.
End Markets	<ul style="list-style-type: none"> • Examine state policies to support market demand for compost products in the region. • Support the adoption of agreements between processors / haulers and municipalities / counties to buy back compost products made from local feedstock. • Coordinate a joint marketing campaign to drive demand for finished compost.

Education and Engagement	<ul style="list-style-type: none"> • Pursue a community education campaign on food waste recycling and voluntary waste audits. • Support internal city operations for education and outreach to commercial sectors. • Support urban master composter training program. • Encourage the launch of a pilot food scrap recycling programs at target K-12 public schools as models for others. • Support commercial and institutional food waste recycling by providing access to worker training and waste audits. • Study HB171 recommendations and work towards implementation of food scrap recycling recommendations applicable to the Baltimore metro region. • Review Baltimore Food Waste & Recovery Strategy Report and engage the City on ways to achieve those goals. • Aid composter in finding and training labor. • Work with Baltimore City Department of Health so that rodent control aligns with City's food waste reduction goals.
Supporting Policies	<ul style="list-style-type: none"> • Investigate City and County level policies to drive food scrap diversion. • Encourage the City to clarify policy on composting at community gardens and urban farms. • Support Baltimore Home Composting Legislation. • Support adoption of Baltimore City pay-as-you-throw or other variable rate program. • Examine different definitions and regulations on finished compost between state departments to assess consistency. • Explore possibility of an exemption or reduced requirements for small composters to distribute or sell compost. • Explore policy options to create a funding mechanism for processor to purchase equipment and site development.
Public / Private Coordination	<ul style="list-style-type: none"> • Establish local partnerships with like-minded non-profit entities to expand reach of marketing and build support for food scrap recycling. • Continue building Baltimore cross-departmental coordination between the Department of Public Works and Office of Sustainability. • Explore coordination with Maryland Environmental Services.

TASK 1: PROCESSING CAPACITY EVALUATION

The aim of Task 1 was to provide NRDC with an understanding of the processing capacity for food scraps today and into the future in the Baltimore metro region. To complete the task, the project team conducted the following activities:

- **Facility Identification and Survey:** Developed a complete listing of all larger processing facilities located within a 50-mile radius (drive distance) of Baltimore. In addition to permitted compost sites, the listing included stand-alone anaerobic digestion (AD) facilities and those co-located at wastewater treatment plants, large community or on-site composting opportunities, natural wood waste recycling facilities, and transfer stations. A summary of the facilities is included in the narrative below.
- **ArcGIS Map:** Created a dynamic web-based ArcGIS map of the regional facilities. For each identified location, the interactive map includes site-specific details. The map is available on-line: <https://arcg.is/14iy40>.
- **Identification of Small-Scale Composting Opportunities:** Assessed current home composting and community-oriented composting efforts at community gardens, urban farms, schools, and vacant lots. Composting at home and at the community scale can reduce the need for larger-scale processing capacity and help build a culture of composting know-how that will help support citywide food waste recycling programs when they are rolled out. The Institute for Local Self-Reliance conducted a survey of community gardens and urban farms to assess current composting activities and needs for expanding in the future.
- **Evaluation of Processing Capacity:** Provided a review of the overall landscape for food scrap processing infrastructure in the region including an evaluation of the annual throughput and both the currently available and potentially available capacity in the region.

SUMMARY FINDINGS

The processing facility landscape in Maryland and the Baltimore metro area has changed markedly over the last 10 years and remains in flux today. Interest in food scrap recycling has grown in the region since 2010.¹¹ In that year, Howard County, located southeast of Baltimore, became the first county in Maryland to offer residential curbside food scrap collection through a small pilot, composting the material at the Howard County Alpha Ridge composting facility. In 2011, the town of University Park started collecting food scraps from households, followed by the city of Takoma Park in 2013. Also in 2013, the Prince George's County compost facility located in Upper Marlboro began accepting food scraps in addition to yard waste. Recently, Prince George's County piloted a residential curbside food scrap collection program. Food waste composting capacity in the region continues to grow, yet demand still outpaces composting capabilities. Despite these successes, the region has faced major disruptions to food scrap recycling in the past several years. Between 2011 and 2015, three food waste composting facilities have closed: Recycled Green Industries in Carroll County, Wilmington Organics Recycling Center in Delaware, and the Chesapeake Compost Works in Baltimore. The closure of these facilities was due to a combination of factors including regulation violations, complaints, inadequate siting/location, size issues,

¹¹ Based on conversations with the MDE, processors and haulers in the area

contamination, and other infrastructure challenges, and has had long term impacts on residents' and government officials' perception of food scrap composting.¹²

Today, there are 4 operating or planned commercial organics recycling facilities accepting food scraps within 50 miles from Baltimore, and no industrial scale facilities operating within the City. Half of Maryland's current capacity comes from one facility in Prince George's County, which has greatly expanded its capacity for food waste composting, from 4,500 tons per year in 2013 to 32,000 tons per year in 2018.¹³ Maryland Environmental Services (MES), the facility operators, have little doubt that the added food waste composting capacity will be fully utilized quickly.¹⁴ Some stakeholders have expressed concern that the region is now so reliant on the Prince George's County composting facility, acknowledging that if the facility was shut down or turned away haulers they would have few other options for recycling food scraps. Additionally, the Prince George's facility is 40 miles one-way from Baltimore, and several stakeholders expressed the desire to have a large-scale facility closer to Baltimore.

A consistently mentioned barrier to growing capacity in the region was siting a composting facility, particularly near larger cities such as Baltimore. New composting regulations were passed in 2015 to address the lack of guidelines in Maryland's solid waste requirements, which had previously led to confusion and ambiguity for composters. The new regulations were designed to outline exactly what is required for any composting site and streamline the permitting process for sites that meet these requirements.

To further address compost siting barriers, a coalition of stakeholders including the MD-DC Compost Council, the Institute for Local Self-Reliance, the Maryland Horse Council, the MD Sierra Club, the Montgomery County Food Council, the American Biogas Council, and others worked to pass MD House Bill 171, "Yard Waste and Food Residuals Diversion and Infrastructure Act." The bill, signed into law by the Governor in May 2017, requires the Maryland Department of the Environment (MDE) to

Maryland Regulations and Facility Designation

Commercial compost sites in Maryland are designated as Tier I, II-Small, or II-Large, based upon the types and amounts of feedstock composted.

Feedstock: *There are two types of feedstock defined in the state regulations that the compost facility (CF) permit regulates:*

Type 1: *Yard waste*

Type 2: *Food residuals, non-recyclable paper, compostable products, animal manure and bedding (by dept. approval), industrial food processing materials (by dept. approval), and animal mortalities.*

Classification: *Tier I facilities take and compost Type 1 feedstock, regardless of facility size. Tier II-Small are facilities that compost only Type 1 and Type 2 feedstocks and which produce less than 10,000 cubic yards of compost per year. Tier II-Large are facilities that compost only Type 1 and Type 2 feedstocks and which produce over 10,000 cubic yards of compost per year.*

Exemptions: *Facilities exempt from the CF permit include:*

- *Backyard composting if all feedstock is generated on-site and resulting compost is used on-site*
- *Facility is under 5,000 sq. ft., with max feedstock pile height 9' and compost pile height 12'.*
- *Animal mortality composting managed by govt.*
- *On-farm if on-site feedstock and compost use*
- *On-farm if facility uses less than 40,000 sq. ft. in support of composting.*

¹² <https://www.delawareonline.com/story/news/local/2015/01/29/compost-plant-shutdown/22540935/> & topics at Metropolitan Washington Council of Governments (MWCOC) meeting. Also see ILSR's December 2014 article, *Failure of the Wilmington Compost Facility Underscores Need for a Locally Based and Diverse Composting Infrastructure*, at <https://ilsr.org/failure-wilmington-compost-facility-underscores-locally-based-diverse-composting-infrastructure/>

¹³ <https://wamu.org/story/18/05/15/prince-georges-breaks-ground-largest-composting-facility-east-coast/>

¹⁴ Input from Steven Birchfield and Denice Curry of the Maryland Environmental Services at Metropolitan Washington Council of Governments (MWCOC) meeting.

study and report on existing organics recycling infrastructure in Maryland, as well as laws in other states that divert food scraps and organics, and to then recommend how to improve infrastructure and funding opportunities to expand organics recycling in Maryland. HB171 specifically calls for the Department to investigate ways to encourage a decentralized and diverse infrastructure, and to reduce generation of organic waste.¹⁵ MDE recently convened a “study group” to address meeting the requirements of HB171, and the final report of this group’s findings will be available July 2019¹⁶.

REGULATORY FRAMEWORK

Growing interest in composting combined with little State attention on permitting and promoting food scrap and other organics recycling prompted the Institute for Local Self-Reliance to approach State legislators to pass legislation to encourage composting in the state. In 2011, the passage of HB 817 Environment - Composting served as an important catalyst, requiring the state to evaluate its current organics recycling policies and make recommendations to the legislature¹⁷. MDE submitted a report to the Maryland General Assembly, “Composting Workgroup Final Report” (January 2013), which led to the enactment of new regulations in 2015 for composters, including the creation of a new type of permit specific to composting facilities (CF Permits).¹⁸ In addition to issuing CF Permits, the MDE oversees water discharges and air pollution. Compost facilities in Maryland are also regulated by the Department of Agriculture (MDA), which oversees compost operators and compost product registration.¹⁹

For regulatory purposes, composting facilities are limited to those that conduct “composting defined as the controlled aerobic biological decomposition of organic waste material”; the definition does not include facilities that shred or grind material without composting it nor anaerobic decomposition. Facilities are classified as Tier I, Tier II-Small, or Tier II-Large, as discussed in the sidebar. Tier II facilities that can accept food waste are allowed to take in “source-separated organics from residential curbside or drop-off programs and non-residential sources, including but not limited to pre-consumer and post-consumer food scraps and non-recyclable paper”. State statutes define “compostable products” as containers or food service items composed of vegetable matter, paper, cardboard, or compostable plastics meeting the standards from the Secretary of Agriculture. “Yard waste” is defined as organic plant waste derived from gardening, trimming, or landscaping activities, and includes leaves, weeds, garden waste / trimmings, lawn cuttings, as distinguished from “natural wood waste,” which consists of tree and natural vegetative refuse, primarily large branches, stumps, tree trunks, roots and wood chunks.²⁰

¹⁵ <http://mgaleg.maryland.gov/2017RS/bills/hb/hb0171e.pdf>. See also ILSR’s May 2017 press release, *Maryland Governor Hogan Signs ILSR-led Bipartisan Bills to Advance Composting*, available at <https://ilsr.org/press-release-maryland-governor-hogan-signs-ilsr-led-bipartisan-bills-to-advance-composting/>.

¹⁶ Link to the HB 171 Group Meeting Notes and White Papers:

<https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/composting.aspx>

¹⁷ Link to HB 817 Environment – Composting: <https://www.legiscan.com/MD/bill/HB817/2011>

¹⁸ [https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Publications/composting_workgroup_final_report_1-2013000%20\(1\).pdf](https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Publications/composting_workgroup_final_report_1-2013000%20(1).pdf)

¹⁹ Title 26 Subtitle 04 Chapter 11, Code of Maryland Regulations, Office of the Secretary of State, Division of State Document.

<http://www.dsd.state.md.us/COMAR/SubtitleSearch.aspx?search=26.04.11.%2a>

This chapter is focused on commercial facilities that manage yard waste, food residuals, compostable products and select other materials. Feedstocks not covered under the Compost Facility Permit include trees / other natural vegetative refuse (under Natural Wood Waste Recycling facility permit), sewage sludge / biosolids (under Sewage Sludge Utilization permit) and mixed municipal solid waste (under Refuse Disposal permit).

²⁰ Permitting Guidance for Maryland Composting Facilities, Maryland Department of the Environment, June 12, 2015

<https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Permitting%20Guidance%20-%20Final%206.12.15.pdf>

STATE SUMMARY

The first CF permits were granted in 2016 to 16 composting facilities. By 2018, the number of permitted composting facilities in the state of Maryland had grown to 22, with 18 in operation and 4 in the planning phase. Only seven of these facilities were permitted to accept food waste (Tier II); five of these are currently operating and four of are within a 50 mile radius of Baltimore (Table 3). Regulators anticipate the number of Tier II facilities to grow over time due to increasing interest in food waste diversion.

In 2017, 266,453 tons of organic materials (including food scraps, yard waste, and industrial and agricultural materials) were composted in Maryland, representing approximately 6% of the total waste stream generated in the state²¹, and 12% of the total organic material generated in the state²². This was nearly double the tonnage composted in 2016 (143,282 tons). Veteran Compost in Ann Arundel County more than doubled the amount of material they processed from 2016 to 2017. Prince George's also nearly doubled their composted totals.

Table 3 displays compost processing facilities within a 50-mile radius of Baltimore along with total number of tons composted in 2017 and 2018 permitted capacity. Facilities bolded and italicized are permitted to accept food scraps. (Note that some facilities use more than one organics processing method, but the table below lists only composted tons.)

Table 3: Baltimore Area Compost Processing Facilities: Composted Tons and Permitted Tons²³

Jurisdiction	Facility Name	Facility Tier*	2017 Tons Composted	2018 Tons Permitted
Anne Arundel	Millersville Landfill & Resource Recovery Composting Facility	Tier 1	5,213	35,000
Baltimore County	Eastern Sanitary Landfill	Tier 1	17,650	20,000
Carroll	Harvest RGI	Tier 1	37,092	50,000
Cecil	Cecil County Central Landfill	Tier 1	11,351	10,000
	<i>West Coast Mushrooms Facility</i>	<i>Tier 2</i>	<i>16,220</i>	<i>16,120</i>
	Reichs Ford Site B Landfill	Tier 1	10,726	25,000
Harford	Harford Mulch and Compost Facility	Tier 1	7,153	40,000
	<i>Veteran Compost Facility – Aberdeen</i>	<i>Tier 2</i>	<i>3,901</i>	<i>20,000</i>
Howard	<i>Composting Facility at Alpha Ridge Landfill</i>	<i>Tier 2</i>	<i>6,646</i>	<i>12,000</i>
	Level Land Lisbon Mulch Yard	Tier 1	563	6,250
Montgomery	Montgomery County Yard Trim Composting Facility*	Tier 1	60,093	77,000
	ACME Biomass Reduction Facility	Tier 1	10,650	19,000
	Aspen Nursery	Tier 1	1,400	1,250
Prince George's County	City of College Park Composting Facility	Tier 1	3,905	5,600
	<i>Prince George's County Organics Composting Facility</i>	<i>Tier 2</i>	<i>61,003</i>	<i>69,000</i>
TOTAL			253,566	406,220

*Facility is located 65 miles from Baltimore but included because of significant throughput.

²¹ Total waste generated in Maryland estimated from EPA estimates of per capita waste generation rate of 4.48 pounds per person per day (2015) and US Census 2017 population estimates of Maryland.

²² Reported by Maryland Department of the Environment:

<https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/foodscraps.aspx>

²³ Composting data from Maryland Department of the Environment (MDE). 2018 permitted capacity is available online at https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKewiWna2U0bbfAhU15oMKHYwpBM0QFjABegQICRAC&url=http%3A%2F%2Fwww.mde.state.md.us%2Fprograms%2FLAND%2FRecyclingandOperationsprogram%2FDocuments%2FComposting%2520Facilities%2520with%2520Capacities%25202018.xlsx&usq=AOvVaw3Hd379S4nQAgn_VcGN6nrrn and the 2017 composted tonnages are available upon request from the Maryland Department of Environment in accordance with the Maryland Public Information Act.

REGIONAL THROUGHPUT, AVAILABLE, AND POTENTIAL CAPACITY

Starting with the permitted compost sites and active utilities with wastewater treatment and discharge permits, and followed by interviews with state and regional stakeholders, the project team created an exhaustive list of sites in the region currently or potentially recycling food scraps. The project team next conducted online research and follow-up phone interviews with facility staff to confirm the status of each facility, understand what materials are accepted for composting, and identify current throughput and capacity. The interviews and data research were used to determine three key levels of information for *all organics* (including all compostable materials such as manure, biosolids, animal mortalities, yard waste, and food residuals) as well as *food only* (pre- and post-consumer, residential yard waste mixed with food scraps). The three key pieces of information are described below:

- **Annual Throughput:** Estimated tons of material processed on an annual basis.
- **Available Capacity:** Current available capacity without significant facility expansions or upgrades. Available capacity is not necessarily an indication of the likelihood that facilities would utilize the capacity.
- **Potential Capacity:** Capacity available only with significant expansion or facility upgrades. As with available capacity, the potential capacity data is not an indication of the likelihood that the expansions or upgrades would occur.

Findings:

Nearly three-quarters (73%) of all permitted compost facilities in the state (16 out of 22) are within a 50-mile radius from the center of Baltimore. Only 3 facilities are located within a 25-mile radius of the City's center; 2 are operational and 1 is planned. The largest composter in the region, Prince George's County, is 40 miles one way from Baltimore.

Of the facilities in the region, 50% (11 facilities) are permitted Tier I, 9% (2) are Tier II-Small, and 14% (3) are Tier II-Large. There is currently an active anaerobic digester (AD) at a USDA site for research purposes. Another AD facility, currently under construction in Jessup, MD, will process up to 100,000 tons per year of food waste. The project team identified 5 wastewater treatment plants (WWTPs) with operating anaerobic digesters in the region, none of which are currently accepting food waste.

Based on MDE reported tonnages, the project team estimates that 253,560 tons of organics are processed within 50 miles of Baltimore²⁴; this represents 95% of the total residential and commercial organics (not including industrial / agricultural) materials processed in the state. Of that total, approximately 87,770 tons are estimated to include food residuals,²⁵ with approximately 7% of those tons coming from food waste alone.²⁶

Current estimates place the annual regional composting capacity at up to 152,650 additional tons of organics, including 29,350 additional tons of mixed food residuals. Another 45,000 tons of capacity will become available at 2 new facilities currently permitted in the Baltimore region as of 2017; approximately half of this planned capacity will be at Tier II facilities. Finally, Prince George's increased food waste capacity alone will increase to 33,000 tons per year (from 12,000 tons per year) in fall 2018 with the opening of their expanded facility. The potential capacity for food scraps includes an evaluation of expanded backyard/home and community composting in Baltimore, the Jessup anaerobic digester, exempt agricultural composting operations, and WWTPs. Table 4 displays the estimated totals.

²⁴ Includes Montgomery County tonnage

²⁵ This includes food mixed with yard waste.

²⁶ Estimate of composted food waste calculated based on food waste accepted at Veteran Compost facility, Prince George's Facility, and number of households serviced by Howard County's curbside program (15,000 households estimated to generate estimated 322 lbs/HHLD/year (US EPA 2015 food waste generation rate - https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf - and assuming 60% capture rate)

Table 4: Estimated Throughput, Capacity, and Potential in Baltimore Region

Category	Type	Estimate (Tons)
Annual Throughput (All)	All organics	253,566
	Food only or commingled	87,770
Remaining Permitted Capacity at Facilities Currently Operating	All organics	152,650
	Food only or commingled ²⁷	29,350
Additional Permitted Capacity at New Facilities or with Expansions	All organics	45,000
	Food only or commingled (no WWTP) ²⁸	20,000
	Food only or commingled (WWTP included)	33,000
	Stand-alone anaerobic digester	100,000

CAPACITY BY FACILITY TYPE

The remainder of this chapter provides a narrative summary of the data contained within the associated data set and ArcGIS map by facility type.

Permitted and Operating Compost Facilities

Current Capacity: 406,220 tons all organics, 87,770 tons food only or commingled.

Potential Additional Capacity: 152,650 tons all organics, 29,350 tons food only or commingled.²⁹

Likelihood of Expanded Capacity: High.

Summary: One-quarter of permitted compost facilities in the Baltimore region accept food residuals (4 out of 16). Of these facilities that accept food residuals, half of the feedstock is processed through Prince George’s facility and the other half is processed through two different facilities: Veteran Compost, and Alpha Ridge Landfill (West Coast Mushrooms is currently not accepting food scraps). According to MDE, a facility currently only accepting yard waste is planning to submit a permitting plan to accept food waste in 2018. Several stakeholders expressed their appreciation for the well-run Prince George’s facility, but also expressed concern that in the unlikely event Prince George’s closes, the region would lose a large portion of food waste composting capacity.

TIER ONE FACILITIES

ACME Biomass Reduction, Inc. 21601 New Hampshire Ave, Brookeville, MD, 20833. The ACME Biomass Reduction facility is in Montgomery County about 30 miles one-way from Baltimore. The facility is owned by Pogo Trees, which is a tree care and landscaping company that accepts tree waste from other landscapers and contractors. In addition to the Tier I Compost Facility Permit, the facility also has a NWWRF permit for grinding and mulching wood waste.

²⁷ This value was calculated from the difference between Tier II facilities permitted capacity and accepted tonnage and does not reflect any other requirements that may apply for the facility to accept additional food waste.

²⁸ This estimate is a combination of the total permitted capacity at the new Veteran Compost location and the additional capacity at Prince George’s and does not necessarily reflect the food waste tonnage that will be processed in the future.

²⁹ Difference between permitted capacity and annual throughput at all facilities

Aspen Nursery. 15710 New Hampshire Ave, Silver Spring, MD, 20905. The Aspen Nursery is in Montgomery County about 29 miles one-way from Baltimore. The Nursery offers a variety of landscaping services to both commercial and residential customers, including excavation, shade tree planting, retaining walls, and irrigation. They also specialize in various landscaping materials, such as wood fiber mulch, shredded hardwood mulch, and topsoil. It is unlikely they have the desire or the capacity to process food waste.

Cecil County Central Landfill. 758 E. Old Philadelphia Road, Elkton, MD, 21921. The Cecil County Central Landfill is in Cecil County about 49 miles one-way from Baltimore. The county owned facility has a compost pad co-sited with a landfill. The compost side of operations primarily composts residential yard waste with a limited amount of commercial yard waste.

Cedarville Holdings Composting Facility. 9120 Cedarville Road, Brandywine, MD, 20613. The Cedarville Holdings Composting Facility is in Prince George's County about 55 miles one-way from Baltimore. The facility is owned by Cedarville Holdings LLC and is permitted for 26,250 tons but is not currently composting any materials as of this report. The facility is slated to accept yard waste including leaves, grass and branches from residents and commercial landscapers. The facility will not accept biosolids or manure but is looking to accept and process food waste in the next 3-5 years.

City of College Park. 9217 51st Ave, College Park, MD, 20740. The City of College Park facility is in Prince George's County and is about 31 miles one-way from Baltimore. The facility is owned by the City of College Park and composts only leaves and grass from residents of the city.

Eastern Sanitary Landfill Solid Waste Management Facility. 6259 Days Cove Road, White Marsh, MD, 21162. The Eastern Sanitary Landfill is in Baltimore County and is about 15 miles one-way from downtown Baltimore. The facility is owned and operated by Baltimore County Department and has a co-located landfill, Tier I compost facility and transfer station. The facility has no plans to expand to taking food waste.

Reiches Ford Site B Landfill. 9031 Reiches Ford Road, Frederick, MD, 21704. The Reiches Ford Site B Landfill compost facility is located in Frederick County and is about 48 miles one-way from Baltimore. The facility is owned by Frederick County DPW and only accepts yard waste, which includes grass, shrubs, and woody materials. Feedstock comes from residential and commercial entities.

Harford Waste Disposal Center Mulch Compost Facility. 3135 Scarboro Road, Street, MD, 21154. The Harford Waste Disposal Center Mulch Compost Facility is in Harford County and is about 35 miles one-way from Baltimore. The Harford County Division of Environmental Services operates and maintains the mulch and composting facility. Currently yard trim is composted, and there is no indication of a desire for expansion.

Harvest RGI (Harvest Mid Atlantic). 7800 Kabik Court, Woodbine, MD, 21797. The Harvest RGI compost facility is in Carroll County and is about 30 miles one-way from Baltimore. The facility is owned and operated by Harvest, and composts a large amount of yard waste from mixed commercial and residential sources.

Level Land Lisbon Mulch Yard. 1000 Madison Street, Lisbon, MD, 21765. The Level Land Lisbon Mulch Yard is in Howard County and is about 31 miles one-way from Baltimore. The facility is co-located with a NWWRF facility and the wood and green waste feedstock is from demolition jobs by Level Land or local

commercial sources. As well as organic material composting, the facility specializes in land clearing and producing topsoil, mulches and other organic landscaping materials.

Millersville Landfill and Resource Recovery Facility Composting Pad. 389 Burns Crossing Road, Severn, MD, 21144. The Millersville Landfill and Resource Recovery Facility Composting Pad is in Anne Arundel County and is 18 miles one-way from Baltimore. The facility is owned by Anne Arundel County DPW but is managed by Waste Management. The facility has a landfill with a co-located composting pad for composting yard waste and brush.

Montgomery County Yard Trim Composting Facility. 21210 Martinsburg Road, Dickerson, MD, 20843. The Montgomery County Yard Trim Composting Facility is in Montgomery County and is 65 miles one-way from Baltimore. The facility is owned by the county and operated by MES. The County has provided single-family curbside yard waste collection to all residents since the 1990s. Landscape contractors, private collectors, individuals, multi-family residents, and businesses can also bring material to the facility. At current capacity and annual throughput (77,000 and 60,093 tons per year respectively), the Montgomery County facility should be able to add food waste feedstock from the single-family residential sector with necessary composting changes. The 2018 County Strategic Plan to advance composting recommends that the Montgomery County Department of Environmental Protection (DEP) pursue necessary agreements with MES to incorporate food waste into the composting facility.³⁰ However, to accept food waste, the facility must get approval from the surrounding neighborhoods, and two years ago a proposal to accept food waste at this facility was denied by the facility's neighbors.

TIER TWO FACILITIES

Composting Facility at Alpha Ridge Landfill. 2350 Marriottsville Road, Marriottsville, MD, 21104. Owned and operated by Howard County DPW, this Tier II-Large facility is 21 miles one-way from Baltimore. The facility began accepting food waste in 2013 with a small pilot, and now accepts commingled food and yard waste from 15,000 households around the County (includes pick up in ElkrIDGE, Ellicott City, Clarksville and Columbia). The facility doubled its capacity in October 2018 in response to increased community demand for composting and is now able to service 30,000 homes with curbside organics collection. The County also collects food scraps from 7 county schools.³¹

Prince George's County Organics Composting Facility. 6550 S. E Crain Highway, Upper Marlboro, MD, 20772. Owned by Prince George's County and operated by MES, this Tier-II Large facility is 40 miles one-way from Baltimore. Prince George's is the largest compost facility in the region, and accepts residential, commercial, and institutional food waste and yard waste. The facility tipping fee is set slightly higher per ton for material coming from outside of the County. In fall of 2018, the facility increased food waste capacity to 57,000 tons per year. Despite the expanded capacity, there remains a waiting list of municipalities, institutions, and businesses throughout the region that want to take their food scraps to Prince George's. The facility sells their finished product under the brand name Leafgro GOLD, and demand for it is high, selling out each season. There is potential for this facility to expand again over the next several years.

³⁰ Montgomery County Strategic Plan to Advance Composting, Compost Use, and Food Scraps Diversion in Montgomery County, Maryland, April 2018
<https://www.montgomerycountymd.gov/SWS/Resources/Files/foodwaste/Strategic%20Plan%20to%20Advance%20Composting,%20Compost%20Use,%20and%20Food%20Scraps%20Diversion%20in%20Montgomery%20County,%20MD.pdf>

³¹ Oct 17, 2018 Howard County Press release: <https://www.howardcountymd.gov/News/ArticleID/1293/News101718>

Veteran Compost - Aberdeen. 328 Bush Chapel Road, Aberdeen, MD, 21001. Owned by Garrity Renewables LLC, this Tier II-Small facility is 31 miles one-way from Baltimore. The Aberdeen site is one of two facilities operated by Veteran Compost in Maryland. The facility accepts food scraps only, hauled by Veteran as well as by other haulers. They collect material from both the residential and commercial sectors, including the Baltimore Ravens Stadium. Veteran Compost indicated interest in locating a facility within Baltimore City if possible.

West Coast Mushrooms. 342 Hopewell Road, Rising Sun, MD, 21911. Owned by West Coast Mushrooms Inc., this Tier II-Large facility is located 46 miles one-way from Baltimore. Although it is permitted for food scraps, it currently only accepts hay, straw, and manure. The facility is operating at capacity and unlikely to expand.

Planned Permitted and Potential Compost Facilities

Current Capacity: None.

Potential Additional Capacity: 45,000 tons all organics, 20,000 tons food only or commingled.³²

Likelihood of Expanded Capacity: High.

Summary: There are three planned sites in the region that received MDE composting permits in 2018. Two of those sites are Tier I and one site is Tier II-Small. The Tier II-Small site will be operated by Veteran Compost, which already operates a successful food waste composting facility in Aberdeen. Additional interest in food waste composting beyond the planned permitted sites was gleaned from interviews and included here as well.

Tolson & Associates LLC. End of Capitol Raceway Road, Crofton, MD, 21114. The Tolson & Associates compost Tier I facility is in Anne Arundel County and is about 23 miles one-way from Baltimore. This facility will be online in spring of 2019 and mainly accept residential yard waste. The operator has no plans to expand this facility to accept food waste. The facility received a 2018 composting permit for 25,000 tons.

Veteran Compost - Lothian. 4900 Sands Road, Lothian, MD, 20711. Owned by Garrity Renewables LLC, this is a Tier II-Small facility located 41 miles one-way from Baltimore. The Lothian facility sites on a 130-acre site and will accept food waste and manure from residential and commercial generators. The facility received a 2018 composting permit for 20,000 tons.

Level Land Lisbon Mulch. 1000 Madison Street, Lisbon, MD, 21765. Level Land has been owned and operated in Howard County by Justin and Zack Brendel since 2001. It is a Tier I around 30 miles one-way from Baltimore. The operators have investigated expanding the facility to incorporate food waste composting, however they have experienced push back from Howard County. The challenges toward the expansion come from a combination of the county residents' distrust in the ability to run a food waste facility without incurring nuisances, and issues with local zoning laws. Currently, Level Land operates in the western part of the County, which is not zoned for industrial uses. Justin would ideally like to expand to a 15-acre site that is industrially zoned, and get permitted for 20,000³³ tons annual capacity, which would include food scrap composting.

³² Based on 2018 permitting report

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKewiWna2U0bbfAhUI5oMKHYwpBM0QFjABegQICRAC&url=http%3A%2F%2Fwww.mde.state.md.us%2Fprograms%2FLAND%2FRecyclingandOperationsprogram%2FDocuments%2FComposting%2520Facilities%2520with%2520Capacities%25202018.xlsx&usq=AOvVaw3Hd379S4nQAgn_VcGN6nrm and does not include potential capacity at non-permitted sites mentioned here

³³ From phone interview with Keith Lasoya from Waste Neutral 10.01.2018.

Fat Worm Compost. Fat Worm has expressed interest in establishing a new compost facility near the DC metro/Baltimore area, but they are still in early planning stages of development, and details of any potential site are unknown.

Anaerobic Digesters

Current Capacity: *Less than 5,000 tons per year.*

Potential Additional Capacity: *100,000 tons per year.*

Likelihood of Expanded Capacity: *Low – Medium.*

Summary: Anaerobic digestion is not currently a major organics recycling solution in the region, but this may change next year with the completion of the large BTS BioEnergy facility in Jessup. The only currently operational AD facility in the Baltimore metro area is the Beltsville Agricultural Research Center. The primary aim of this facility is research and not publicly available food scrap recycling, and the facility is very unlikely to expand operations.

Beltsville Agricultural Research Center. 10300 Baltimore Avenue, Beltsville, MD, 20705. The AD in the region is part of the United States Department of Agriculture, Agricultural Research Service facility in Beltsville, MD. The facility conducts research on dairy cattle health and crop health and employs about 500 people. The research farm has an anaerobic digester that processes manure generated on-site from about 100 dairy cows. The facility conducts studies on the small-scale anaerobic digestion process. Due to the nature of this facility, it is unlikely that the facility would ever expand to accept and process outside feedstock.

BTS BioEnergy. 7801 Oceano Ave, Jessup, MD, 20794. European company BTS BioEnergy, with investment from the Maryland Energy Administration and Maryland Environmental Services, is constructing an AD facility co-located with Maryland Food Center Authority (MFCA) in Jessup, MD. The facility, which is expected to be operational in fall 2019, will process up to 100,000 tons of food waste, fats, oil, and greases per year, predominantly sourced (two-thirds of capacity) from the food processors and distributors in the region.³⁴ The source of the feedstock to utilize the remaining one-third of capacity has not yet been determined. Animal manure can also be processed. The facility will produce energy as well as approximately 42,500 tons of solid digestate per year, which will be processed into a class A soil amendment that will go into soil blending and the horticultural industry. The digestate produced during the AD process is ~80% water and is de-watered to produce the solid digestate. The digestate can be nutrient stripped, meaning nutrients such as phosphorus and nitrogen can be removed to avoid “dead zones” in waterways.

Transfer Stations

Current Capacity: *Not applicable.*

Potential Capacity: *Not applicable.*

Likelihood of Expanded Capacity: *Not applicable.*

Summary: The nearest compost facility is 15 miles one-way from central Baltimore, and there are 7 transfer facilities within 15 miles or less from Baltimore. Transfer of organics does not play a major role in composting currently, and only one of the area transfer station takes organics for recycling. The Eastern Transfer Station, owned and operated by Baltimore County, collects yard waste and mulches it on-site. The transfer stations

³⁴ <https://news.maryland.gov/mea/2018/05/18/celebrating-marylands-newest-food-to-waste-energy-plant/>

interviewed expressed space limitations, and uncertainty as to how expansion to include transferring source-separated food waste would work. Table 5 provides a summary of the transfer stations located in the region.

Table 5: Transfer Stations in Baltimore Area

Permitted Site Name <small>(PF= Processing Facility, TS= Transfer Station)</small>	Owner/Operator	City	Distance to Downtown (miles)	Description
Baltimore Recycling Center PF & TS	Baltimore Recycling Center LLC	Baltimore	3	Privately-owned and -operated transfer station that only accepts C & D materials
Northwest TS	Baltimore City	Baltimore	6	Baltimore City-owned transfer station open to residents and small commercial haulers and accepting MSW for consolidation and disposal
Curtis Creek PF & TS	Waste Management, Inc.	Baltimore	8	Privately-owned and -operated transfer station accepting MSW and C & D materials for consolidation and disposal
Western Acceptance Facility TS	Baltimore County	Halethorpe	8	Baltimore County-owned transfer station open to residents and accepting MSW and recyclables
Baltimore PF & Transfer Center	Republic Services, Inc.	Baltimore	9	Privately-owned and -operated transfer station accepting MSW, C & D, recyclables, and tires
Ameriwaste PF & TS	Waste Management, Inc.	Elkridge	14	Privately-owned and -operated transfer station that accepts MSW and C & D
Eastern TS	Baltimore County	White Marsh	15	Baltimore County-owned transfer station open to residents and accepting MSW and recyclables. Site also accepts yard waste composting into mulch.
Central Acceptance Facility	Baltimore County	Cockeysville	16	Baltimore County-owned transfer station open to residents and accepting MSW and recyclables
Annapolis Junction PF & TS	Waste Management, Inc.	Jessup	17	Privately-owned and -operated transfer station that accepts MSW for consolidation and disposal
Alpha Ridge PF & TS	Howard County	Marriottsville	18	County-owned and -operated facility with compost processing, transfer station and landfill
Auston PF & TS	Auston Contracting, Inc.	Joppa	20	Privately-owned transfer station and C&D recycler
Northern Landfill PF & TS	Carroll County	Westminster	33	Carroll County owned and -operated transfer station that consolidates and transfer yard waste to a private compost facility
Recycle One PF & TS	The Goode Companies, Inc.	Hyattsville	33	Privately-owned and -operated transfer station that accepts MSW and C&D for consolidation and disposal.
Sheriff Road PF & TS	Brandywine Enterprises, Inc.	Fairmont Heights	35	Construction company-owned and -operated transfer station
Shady Grove PF & TS	Montgomery County	Derwood	42	Montgomery County-owned and -operated transfer station
Woodlawn TS	Cecil County	Port Deposit	42	County-owned and -operated transfer station that separates and processes yard waste
Site B Solid Waste	Frederick County	Frederick	48	County owned and -operated facility with compost processing, transfer station and landfill

Natural Wood Waste Recycling Facilities

Current Capacity: 391,024 NWW tons accepted, 336,922 NWW tons recycled in 2016.

Potential Capacity: Unknown.

Likelihood of Expanded Capacity: None.

Summary:

There are 49 permitted Natural Wood Waste Recycling Facilities (NWWRF) in the state as of April 2018, of which 24 are located in the Baltimore region.³⁵ Facilities are required to report location and amount of wood waste inbound to the facility and the monthly amount of wood waste processed and removed. In 2016, there were a total of 46 NWWRFs in Maryland which accepted 484,079 tons of natural wood waste, of which they recycled 89% (429,121 tons). Table 6 lists the 24 NWWRF in the Baltimore region, along with tons accepted and recycled in 2016.³⁶ Natural wood waste (NWW) is defined as tree and natural vegetative refuse, is primarily large branches, stumps, tree trunks, root mats and wood chunks that come from tree removal or land clearing activities. Lumber, firewood and furniture are not included. The state distinguishes NWW from yard waste, which is smaller logs, leaves, grass clippings, and other natural vegetative materials that come from household activities like gardening, or landscaping.³⁷ If facilities combine NWW with yard waste, then the facilities need a Compost Facility Permit instead of a NWWRF Permit. Natural wood waste facilities accept, grind and process wood waste but are not allowed to burn wood except as permitted by the Maryland Department of the Environment. Facilities operated by a nonprofit, governmental agencies, and individuals or businesses that provide recycling services for their own employees or process materials generated on-site do not need a permit. The potential for these facilities to expand to accept food waste is extremely low, as Maryland strictly prohibits these facilities from accepting any materials other than natural wood waste and changes to regulation are highly unlikely.³⁸

³⁵ Natural Wood Waste Permits, Maryland Department of the Environment, April 10, 2018.

https://mde.maryland.gov/programs/LAND/SolidWaste/Documents/NWW_Recycling_Facilities.pdf

³⁶ Yard Waste, Food Residuals, and Other Organic Materials Diversion and Infrastructure Study, Maryland Department of the Environment, March 2018.

<https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/3%2019%20%2718%20Waste%20Diversion%20Infrastructure%20white%20paper.pdf>

³⁷ Permitting Guidance for Maryland Composting Facilities, Maryland Department of the Environment, June 12, 2015,

<https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Permitting%20Guidance%20-%20Final%206.12.15.pdf>

³⁸ Title 26 Subtitle 04 Chapter 09, Code of Maryland Regulations, Office of the Secretary of State, Division of State Document.

<http://www.dsd.state.md.us/comar/comarhtml/26/26.04.09.03.htm>

Table 6: Natural Wood Waste Facilities in Baltimore Region

Facility Name	Address	City	Distance to Downtown (Mi)	NWW Accepted (tons)	NWW Recycled (tons)	Compost Facility Permit?
Hollins Organic Products, Inc.	6247 Falls Rd	Baltimore	8	14,118	14,118	No
King Mulch and Pallet	1114 Hengemihle Ave	Essex	9	4,442	4,442	No
Bronson Contracting Inc.	1000 Kembo Rd	Curtis Bay	11	0	0	No
Hollins Organic Products, Inc.	10155 Beaver Dam Rd	Cockeysville	16	0	0	No
Wirtz & Daughters, Inc.	6275 Days Cove Rd	White Marsh	16	16,796	16,796	No
L & W Recycling General	8308 Lokus Rd	Odenton	17	35,252	35,252	No
Edrich Lumber Inc.	9700 Old Court Rd	Windsor Mill	18	19,164	19,164	No
R.L.O. Contractors, Inc.	8615 Old Dorsey Run Rd	Jessup	19	60,190	60,190	No
A-A Recycle & Sand, Inc.	8217 Baltimore Annapolis Blvd	Pasadena	20	23,618	0	No
Harford Industrial Minerals, Inc	40 Fort Hoyle Rd	Joppa	21	0	0	No
Northwest Recycling, LLC	212 Cockeys Mill Rd	Reisterstown	22	9,750	9,750	No
Country Nursery, Inc.	3330 Spencerville Road	Burtonsville	25	0	0	No
Grant County Mulch, Inc.	5402 Van Dusen Road	Laurel	25	128,180	115,975	No
Acme Biomass Reduction, Inc.	21601 New Hampshire Ave	Brookeville	30	23,368	19,864	Yes
Brian Baker, Inc.	2001 Conowingo Road	Bel Air	30	4,984	4,713	No
Comer Construction, Inc.	900 Cirelli Ct	Aberdeen	30	6,049	5,497	No
Harvest RGI, LLC	7800 Kabik Ct	Woodbine	30	19,054	21,777	Yes
Level Land, Inc.	1200-1281 Madison Street	Lisbon	30	15,935	15,488	Yes
Oak Ridge Farm, LLC	2700 Woodbine Road	Woodbine	33	17	18	No
Crouse Construction Co., Inc.	1001 Old Philadelphia Rd	Aberdeen	34	0	0	No
C.J. Miller, LLC	390 Vision Way Drive	Westminster	38	882	882	No
Hidey's Landscape Supply Yard	3112 Ridge Rd	Westminster	40	1,777	2,327	No
Bussard Brothers Landscape Supply	5307-B Green Valley Rd	Monrovia	41	7,119	7,119	No
Heston's Mulch Arthur David Heston	2304 Whiteford Rd	Whiteford	46	329	329	No

Wastewater Treatment Plants

Current capacity: None. No facilities are processing food waste.

Potential capacity: 13,000 tons to 31,000 tons ³⁹

Likelihood of expansion: None in the short term, Low chance in the long term

Summary

There are 8 wastewater treatment plants in Maryland with dedicated anaerobic digesters, 5 of which are in the Baltimore area. None of the WWTPs in the Baltimore area are currently accepting food scraps for processing in their anaerobic digestors. The high cost of retrofits and upgrades along with projected high population growth in the area (resulting in increased demand for wastewater treatment) makes this an unlikely outlet for significant food waste tons in the near future.

WWTPs were investigated because of their potential to increase diversion of food waste through adding food waste into facilities with existing anaerobic digesters. For the process to work, food waste must be pre-treated and have liquid added to it before entering the wastewater treatment facility. Food waste is typically added to a dilution tank and turned into a slurry. Some facilities also install machinery to de-package, chop and grind food waste on-site or off-site prior to adding the food waste to the stream. Other facilities use manual labor to remove contaminants. The limit on how much of the slurry can be solids before it enters the anaerobic digesters ranges from 3%-35% depending on the facility.

The AD and WWTP process results in biosolids or “sludge”. In Maryland, wastewater treatment plants report generation and management of sludge data to the state. The most significant portion of the biosolids is exported out of state, where the final disposition is not reported. From 2011 to 2015, the amount of biosolids hauled out of state has increased from 52% to 68% out of the average 700,000 wet tons generated yearly.⁴⁰ Biosolids used on agricultural lands has decreased from a high of 23% in 2012 to 8% in 2015. In 2015, one-quarter of the biosolids generated were used for agricultural use, pelletized or composted and made into commercial soil products, used for land reclamation, or otherwise stored. A smaller portion, 7%, were landfilled or incinerated in waste-to-energy facilities. This translates to 75% of biosolids in the states either going out of state to unknown final destinations or being disposed (landfilled or incinerated), and only 25% being used for land or agricultural applications.⁴¹

Including food waste in WWTP composting which results in biosolids that are ultimately sent to the landfill does not result in that food waste actually being diverted, which may pose a challenge to meeting diversion goals. While accepting food waste at WWTPs appears technically and legally feasible in Maryland, other challenges including organics collection, infrastructure for pre-treatment composting, investment into equipment, room to expand, and quality of feedstock can make composting food waste at WWTPs difficult. If facilities in the Baltimore area did invest significantly in upgrading facilities to pre-treat and process food waste, and efforts were made to use the majority of biosolids produced on land or agricultural applications, WWTPs with anaerobic digesters could be

³⁹ RRS estimates of potential food waste processing capacity were based on case studies of WWTPs with food waste processing and looked at each facility’s average dry weather flow, flow capacity, and anaerobic digester. The case studies came from this report: EPA, “Food Waste to Energy: How Six Water Resource Recovery Facilities are Boosting Biogas Production and the Bottom Line”, September 2014. https://www.epa.gov/sites/production/files/2016-07/documents/food_waste_to_energy_-_final.pdf

⁴⁰ Volume Comparison of the Sewage Sludge Utilization in The State of Maryland (WT), Maryland Department of the Environment, July 2016. [http://www.mde.state.md.us/programs/LAND/RMP/Documents/2015-Generators%20Report%20Volume\(for%20web\).pdf](http://www.mde.state.md.us/programs/LAND/RMP/Documents/2015-Generators%20Report%20Volume(for%20web).pdf)

⁴¹ Percentage Comparison of the Sewage Sludge Utilization in The State of Maryland (%), Maryland Department of the Environment, July 2016. [http://www.mde.state.md.us/programs/LAND/RMP/Documents/2015-Generators%20Report%20Percent%20\(for%20web\).pdf](http://www.mde.state.md.us/programs/LAND/RMP/Documents/2015-Generators%20Report%20Percent%20(for%20web).pdf)

part of the long-term food scrap recycling infrastructure. The five facilities listed below are in the Baltimore region and have active anaerobic digesters.

Aberdeen Area WWTP. 361 Michael Lane, Aberdeen, MD, 21001. Located on the northern end of the Aberdeen Proving Ground (U.S. Army base) and operated by the Aberdeen Proving Ground DPW, the wastewater treatment plant serves about 2,500 residents (about 300 households) that live on the 72,500-acre base. The facility can treat up to 4 million gallons per day (MGD) and does not accept outside materials. All of the biosolids produced at the facility are processed and distributed to residents and commercial entities as Class A Compost for land application.

Back River WWTP. 8201 Eastern Avenue, Baltimore, MD, 21224. This facility is owned and operated by the City of Baltimore and serves 1.3 million city and county residents in a 140 square mile radius. The facility treats an average of 180 MGD with a peak capacity of 400 MGD. The facility does not accept outside waste. It processes biosolids for land application and marketing as soil amendment / fertilizer.

City of Frederick WWTP. 8145 Gas House Pike, Frederick, MD, 21701. This facility is owned and operated by the City of Frederick and serves 70,000 residents. The facility processes an average of 6.5 MGD. It is unknown whether the facility accepts any outside materials.

Edgewood Area WWTP. Edgewood Area, Aberdeen Proving Ground, MD, 21005. Located on the southern end of the Aberdeen Proving Ground (U.S. Army base) and operated by the Aberdeen Proving Ground DPW, the wastewater treatment plant serves about 2,500 residents (about 300 households) that live on the 72,500-acre base. The facility can treat up to 1.2 MGD and does not accept outside materials. All of the biosolids produced at the facility are processed and distributed to residents and commercial entities as Class A Compost for land application.

Harford County Sewage Plant. 1212 Chelsea Road, Perryman, MD, 21130. This facility is owned and operated by Harford County. The facility serves up to 130,000 residents and has a peak capacity of 20 MGD. The facility does accept outside waste in the form of grease from restaurants, but the quantity is unknown. Biosolids are processed into Class B biosolids and applied to land.

Backyard/Home Composting, Drop-Offs, and Community Gardens

Current Capacity: ~34 tons per year at 7 community composting sites (4 community gardens and 3 urban farms). Zero current drop-off capacity and unknown diversion via home composting.

Potential Capacity: 13,000 tons per year

Home Composting: 3,900 tons per year⁴²

Community Gardens & Urban Farms: 1,300 tons per year⁴³

Drop-off at farmers markets and other sites: 7,800 tons per year⁴⁴

Likelihood of Expansion: medium – high (depending on City investment)

⁴² Based on 10,000 households home composting an average of 15 pounds per week of food scraps and yard trimmings. Potential could increase with compost “coaching” and engaging more households.

⁴³ Based on 100 community gardens or community-managed green space sites instituting community compost cooperatives, each with 50 members composting 6 pounds per week of food scraps, plus another 50 garden and urban farms sites installing more robust compost systems that can process on average 400 pounds per week of food scraps. This tonnage does not include carbon feedstocks composted.

⁴⁴ Based on 45,000 drop-offs per year at 6.6 lbs/drop-off. Figures based on DC’s drop-off program, which launched April 2017. In 2017 in DC, there were 12,024 individual drop-offs and the average weight per drop-off was 8.27 pounds. In 2018, there were 51,498 individual drop-offs of a total 340,619 pounds of food scraps (6.61 pounds per drop-off participant). Note: the 45,000 drop-off figure adjusts for Baltimore’s larger population as compared to DC. DC figures based on personal communication with Howard Lee, DC Department of Public Works, email communication, January 9, 2019.

Backyard/Home Composting: Home composting offer a hyper-localized way to divert food waste from the waste stream with virtually zero transportation costs and increased individual- and community-level food recycling awareness and participation. At-home or backyard composting saves local governments money by avoiding the need for cities to collect and process material. By directly engaging citizens in the act of converting waste into a resource, home composting also builds a critical culture of composting know-how. This, in turn, will help build support for larger-scale municipal efforts. In its May 2018 report, *Yes! In My Backyard: A Home Composting Guide for Local Government*, the Institute for Local Self-Reliance (ILSR) pointed out the misconception that home composting adoption is low due to poor system designs, lack of space, and odors. Rather, ILSR found that adoption is low because citizens are not incentivized to compost at home and are not provided the training, guidance, equipment, and exposure to best practices to succeed. The report concluded that too little attention is paid to home composting, though it is among the best opportunities to reduce the need for municipal management of food scraps, especially in the near-term and especially in areas lacking facilities to compost. Another misconception about home composting is that it can only divert a small portion of a household's waste. ILSR's report found that:

- 23 to 83 pounds per household per month could be diverted through home composting.
- Personalized training and support increase the potential.
- For every 10,000 households composting at home, between 1,400 and 5,000 tons per year could be diverted from curbside collection, with potential savings in avoided disposal costs alone ranging from \$72,000 to \$250,000.
- The potential to expand home composting is largely untapped but potentially significant.⁴⁵

While the Bureau of Solid Waste's Environmental and Routine Services Division collects trash from over 210,000 homes,⁴⁶ not all of these homes have backyards, an important indication of the potential to compost and use compost at home (though vermicomposting and other systems can be used indoors). Baltimore is a city of rowhouses, many of which are in densely populated urban areas and have very little or no front or back yard/lawn. Other rowhomes may be in low-density neighborhoods and have sufficient greenspace to allow for outdoor composting.⁴⁷ The City is divided into 8 residential district zones, R-2 through R-10, where R-2 is less dense (5.9 units per acre) and R-10 is the densest area (up to 217.8 units per acre). Estimating how many housing units are in lower density areas would help determine the potential for home composting. In lieu of using specific housing numbers, if we assume a conservative 1% of the 210,000 homes served with DPW collection might home compost, between 290 and 1,050 of tons of food scraps per year could potentially be diverted (adding yard trimmings needed for composting would approximately double the tonnage).

The City currently has no program to actively promote or teach home composting. The DPW has a webpage on source reduction that includes a section on composting and grasscycling, with links to some websites on how to compost at home.⁴⁸ The City could add to those resources by actively promoting home composting, including instituting programs such as the following:

- Rebate/voucher program for discounts on qualifying home composting bins to residents who take a training class;

⁴⁵ Brenda Platt and Colton Fagundes, Institute for Local Self-Reliance, *Yes! In My Backyard: A Home Composting Guide for Local Government* (May 2018), <https://ilsr.org/yimby-compost/>.

⁴⁶ City of Baltimore 10 Year Solid Waste Management Plan for 2013-2023, page 33, <https://publicworks.baltimorecity.gov/solid-waste>.

⁴⁷ Rowhomes and Commercial Zones, Citizens Planning & Housing Association, October 14, 2014, <http://www.cphabaltimore.org/2014/10/rowhomes-and-commercial-zones/>

⁴⁸ Baltimore DC DPW website: <https://publicworks.baltimorecity.gov/pw-bureaus/solid-waste/services>

- Pre-order programs through which residents can pre-order a bin at a discounted price (e.g. to be delivered to a central location on a specific date);
- Discount bulk purchases for bins;
- Offering bins for free;
- Urban master composter training courses.⁴⁹

Whatever program is selected, training is a critical component in order to set home composters up for success and to avoid animal and odor issues. The DPW might consider incorporating small-scale compost demonstrations (as well as education on the benefits of compost use) at its Baltimore GROW Centers (pop-up Green Resource Hubs). The City held 8 pop-up events in 2018 that provided free and/or low-cost trees, mulch, plants, and other materials, as well as free workshops on topics including community greening, vacant lot revitalization, and installing rain gardens and rain barrels.⁵⁰

Drop-Off Sites: The City does not currently operate or support any public drop-off sites for food scrap collection. There are at least two privately operated community sites at urban farms for members (Whitelock Community Farm and Civic Works Real Food Farm).

Drop-off programs for food scraps are growing across the country, and there are many success stories the City could replicate.⁵¹ Drop-off programs can be valuable for introducing food waste collection to new areas, especially in cities like Baltimore that have yet to institute curbside food scrap collection programs. Drop-off programs are varied, with access ranging from round-the-clock to weekly availability at farmers' markets. Some sites are located at transfer stations or recycling depots, where residents can bring their food scraps along with household recyclables. New York City has been operating drop-off sites at more than 50 farmers' markets for a number of years, more recently adding locations at subway stations, public libraries, and other heavily trafficked areas. DC supports two drop-off programs by two different agencies. The DC DPW, through a contract with Compost Cab, collects food scraps every Saturday from several farmers' markets (at least two of which are open year-round).⁵² The DC Department of Parks & Recreation operates a compost cooperative network at more than 50 community gardens. Each cooperative has an enclosed 3-bin compost system and cooperative members earn the ability to drop off their food scraps after they learn how to compost properly and agree to volunteer each month (at least 9 hours a year).⁵³

The City might consider a pilot program to collect food scraps at one or more farmers' markets (there are at least 15 farmers' markets in Baltimore, one of which, the Waverly Farmers Market, is open year-round⁵⁴) and at one or more of its three Citizens' Convenience Centers (Northwest Citizens' Convenience Center at 2840 Sisson Street, Eastern Citizens' Convenience Center at 6101 Bowleys Lane, and Southwest Citizens' Convenience Center at 701 Reedbird Avenue).⁵⁵ These centers accept recyclable materials (in addition to trash).

⁴⁹ *Yes! In My Backyard: A Home Composting Guide for Local Government* (May 2018), available online at <https://ilsr.org/yimby-compost/>.

⁵⁰ Pop-up event information: <https://publicworks.baltimorecity.gov/grow-center>

⁵¹ Brenda Platt and Virginia Streeter, Institute for Local Self-Reliance, Nationwide Survey: Residential Food Waste Collection Access in the U.S., BioCycle, December 2017, <https://www.biocycle.net/2017/12/06/residential-food-waste-collection-access-u-s/>

⁵² DC food waste drop-off program: <https://dpw.dc.gov/compostfeasibilitystudy> and <https://dpw.dc.gov/foodwastedropoff>

⁵³ DC Department of Parks and Recreation compost cooperative program information: <https://dpr.dc.gov/page/community-compost-cooperative-network>

⁵⁴ Information on farmer's markets:

https://mda.maryland.gov/maryland_products/Documents/2017_2018_MDA_Farmers_Market_Directory.pdf

⁵⁵ Citizen's convince centers: <https://publicworks.baltimorecity.gov/solid-waste/drop-off>

Community Gardens/Urban Farms:

Baltimore has more than 50 community gardens and urban farms⁵⁶. Baltimore City Farms is a Recreation and Parks program offering garden beds for rent to City residents and employees at 12 sites: Carroll, Clifton, Dewees, Druid Hill, Cimaglia (formerly Fort Holabird), Leakin, Patterson, Rockrose, Roosevelt, Light Street at Heath Street, and Heath Street at Charles Street.⁵⁷ None of these sites are yet composting food scraps generated offsite, although City Farms coordinator Harold McCray is interested in starting a project at the Clifton garden. The Baltimore Farm Alliance is a network of 16 urban farms working to increase the viability of urban farming and improve access to urban-grown foods.⁵⁸ Several of its members are composting food scraps: Whitelock Community Farm, Civic Works Real Food Farm, the Filbert Street Community Garden, and The Plantation at Park Heights. Baltimore has many other community gardens as well. Two other sites that have composted in the past include Charm City Farms and Deborah's Garden.

Whitelock Community Farm: Whitelock has a 3-bin open compost system (made from hardware cloth) where members of the community can drop off their food scraps. Currently, they process 60-100 gallons per week, and are in the process of building a larger, rodent-resistant system. The farm could greatly benefit from funding, as it is currently not charging for processing food scraps that it accepts from the community. They would also like support in the form of training and signage.

Civic Works Real Food Farm: Civic Works is working towards improving local access to fresh foods and educating the local community. The farm has a "Compost Knox" 5-bin system, a 2-bin system, and windrows for composting food scraps from local residents and a few small businesses, processing about 22,000 pounds of combined organics annually. They would be interested in expanding composting operations, but would require additional staffers and funding to do so. ILSR raised grant monies to build the Compost Knox system and train staff and volunteers at the farm through its Neighborhood Soil Rebuilders composter training program.⁵⁹

Filbert Street Community Garden: In 2016, the Institute for Local Self-Reliance joined with the Filbert Street Community Garden and the Chesapeake Center for Youth Development (now defunct) to create the Baltimore Compost Collective, a food scrap pickup and composting program which also provides employment and mentoring to local youths year-round. In 2017, United Workers became the nonprofit host for the project. The Baltimore Compost Collective collects food scraps primarily from residents of Federal Hill. Other serviced areas include Curtis Bay, Riverside Park, and Locust Point. Once collected, the youth employees compost these food scraps at Filbert Street Garden using two rodent-resistant 3-bin Compost Knox composting systems with a combined capacity of approximately 800 pounds of food scraps per month. The operation is poised to grow and could be replicated at other sites but is looking for funding to support another vehicle, additional equipment, and other needs.

The Plantation at Park Heights: This community garden recently acquired a compost tumbler, although they have not started using it yet. Previously, the garden had a small bin system, and was accepting only a small amount of vegetative food scraps from members. The garden is not currently accepting food scraps from the surrounding community, citing concerns about disproportionate amounts of packaged and processed foods less suitable for composting. Although the Plantation is potentially interested in expanding

⁵⁶ Estimate of community gardens and farms found through research conducted by ILSR

⁵⁷ Baltimore City Farms: <https://bcrp.baltimorecity.gov/special-programs/farms>

⁵⁸ Baltimore Farm Alliance: <http://www.farmalliancebaltimore.org/farms/>

⁵⁹ Neighborhood Soil Rebuilders: <https://ilsr.org/ilsr-raises-up-urban-farms-in-baltimore-and-dc/>

to accept food scraps from the surrounding community, they first want to focus their efforts on reintroducing high-quality food into the neighborhood.

Deborah's Garden: This community garden, owned by the New Creation Christian Church, has a 3-bin composting system where they process garden and farm trimmings generated onsite — about 200 to 300 pounds per week. The garden could expand and start accepting food scraps with appropriate funding and training.

The potential to expand community-oriented composting at these and other sites is significant, and benefits of expansion include keeping more food scraps out of the municipal waste stream, jobs for residents, and using finished compost to enhance soils and grow more food locally. Baltimore has many vacant lots (677.3 per 10,000 housing units, or approximately 5,440 lots⁶⁰) and the City has an active Adopt-A-Lot program (run by the Land Resources Division of Baltimore Housing).⁶¹ Approximately 600 lots have already been adopted for community gardens or qualified community-managed open space (QCMOS), leaving around 4,840 lots available to be adopted.⁶² Groups adopting lots include St. Frances Academy, Oakenshaw Improvement Association, Temple of God Church, Reaching the Unreachable, Westport Neighborhood Association, Historic Wilson Park Community, Druid Heights Community Development, Meraki Community Uplift, Civic Works, Strength to Love Urban Farm, Day Star Community Support and Development, JahBless Baltimore Plantation, Baltimore Aquaponics, Caton Avenue Neighborhood Association, Clean & Green Bon Secours, Men of Valuable of Action, and Pigtown Food For Thought. A potential step for the City could be to discuss possible partnerships with Baltimore Green Space⁶³ and Baltimore Parks & People Foundation⁶⁴ to grow community-oriented composting in alignment with their mission to protect green space and parks in Baltimore.

Onsite Composting: In addition to community gardens and urban farms, Baltimore has many parks and venues that may be able to compost onsite. The Maryland Zoo, for instance, is a 135-acre site in Druid Hill Park. It is the City's major producer of manure. The DPW makes multiple scheduled pickups to and from the zoo each week. In 2012 the City collected and disposed 593 tons of waste.⁶⁵

⁶⁰ Baltimore City Health Department, *Baltimore City 2017 Neighborhood Health Profile*, June 2017, <https://health.baltimorecity.gov/neighborhoods/neighborhood-health-profile-reports>

⁶¹ Division of Baltimore Housing: http://www.baltimorehousing.org/adopt_a_lot

⁶² Vacant lot information: http://static.baltimorehousing.org/pdf/adopt_properties.pdf

⁶³ Baltimore Green Space: <http://baltimoregreenspace.org>

⁶⁴ Baltimore Parks & People Foundation: <https://parksandpeople.org/about/>

⁶⁵ City of Baltimore 10 Year Solid Waste Management Plan for 2013-2023, p. 31. Available online:

http://publicworks.baltimorecity.gov/sites/default/files/10%20Year%20Solid%20Waste%20Management%20Plan%20w%20Appendice_s_0.pdf

Processing Capacity Key Take-Aways

- *The 2018 Prince George's County food waste processing capacity expansion was driven by increasing demand for both compost processing and finished compost product. Their compost product Leafgro GOLD sells out each fall, and even with the expanded capacity, the facility will not meet demand for processing in the region.*
- *The food waste processing capacity in the region is growing; however, there remains limited capacity near large population centers such as Baltimore. Additionally, processing is dominated by one large-scale facility, Prince George's County, and while the facility is well-operated and unlikely to close, heavy reliance on one facility results in low resiliency to disruption in the processing network, which is a concern for many stakeholders.*
- *High disposal fees (Baltimore County charges \$80 per ton for landfill tip fees) and limited landfill capacity are incentivizing many municipalities and counties in the region to seek alternatives to disposal. In the City of Baltimore, however, disposal costs at the Wheelabrator Incinerator are lower (\$67.44 per ton), and the ready access to disposal has made it harder for composting to compete with disposal in Baltimore.*
- *Siting composting facilities is a challenge in the Baltimore region. The new composting regulations issued in 2015 may have eased this issue by standardizing the permitting process, and the MDE is seeking input through the HB171 process into ways to make siting easier. Some of the challenges with siting include finding a large enough parcel of land near urban centers and addressing concerns of nearby residents.*
- *Contamination in organic streams that include food scraps is a continuous challenge for processors, but not one that is significantly hindering the growth of composting. Processors expressed the need for ongoing education on contamination and welcome any support in that area.*
- *There is high likelihood that processing capacity for food waste will continue to increase in the region due to high demand. Several stakeholders expressed interest in siting a facility within Baltimore city limits.*
- *Community gardens, urban farms, and backyard composting are underutilized in the City of Baltimore. While these activities have a lower impact on total tons diverted, programs to support small-scale and local composting can generate interest and provide needed education on food waste, as well as keeping some materials out of the municipal waste stream entirely.*
- *Anaerobic digestion at wastewater treatment plants and stand-alone facilities is not being used as a processing solution in the region. The construction of the stand-alone AD facility in Jessup may spur growth in this type of processing, so there is potential for AD to be part of the long-term solution.*

TASK 2: COLLECTION INFRASTRUCTURE ASSESSMENT

This section provides NRDC with an overview of the existing organics collection infrastructure in Baltimore. The overview includes an evaluation of both the collection system as well as state and local policy directed at food scrap recycling.

SUMMARY FINDINGS

Ten years ago, curbside source separated food waste collection did not exist in Baltimore. Today, there are several private sector haulers collecting food scraps from the residential and commercial sectors. While there has been growth in this market since 2010, there are still barriers in collection infrastructure and compost-related policy slowing further expansion. The project team identified three high-level barriers to increased organics collection:

1. **Residential disincentive:** Baltimore SMW provides customers with trash and recycling collection services for “no fee” (costs are paid from a general fund and are not directly allocated to households). Organics collection service through private haulers (Veteran Compost, Compost Crew, Compost Cab) is an additional cost to residents. Without volume-based trash pricing, there is little financial incentive for residents to reduce waste, and this limits signups for composting to residents that are willing to pay for additional services.
2. **Private sector service cost and demand:** The cost of collection service can be a barrier to generators, particularly smaller businesses such as restaurants; and, when customer density is low, collection tends to cost more. The price of service is additionally impacted by the transportation distances to large facilities such as Prince George’s.
3. **Lack of Baltimore City policies directly supporting food waste recycling:** There are no specific policies in Baltimore that target food scrap recycling. Participation in any collection program (residential, commercial, multi-family, school) requires seeking out a hauler and paying a fee, and is fully voluntary. Licensed haulers are not required to offer service, and generators are not required to source-separate organics for composting. There are active discussions in the City on ways to reduce the amount of food going to waste and encourage food scrap recycling, most of which are summarized in the Baltimore Food Waste and Recovery Strategy Plan⁶⁶.

COLLECTION FINDINGS

Trash and recycling services are provided by the Baltimore Department of Public Works to residents as well as to commercial businesses that generate up to 96 gallons of trash per week. Private sector haulers collect waste from multi-family residences and commercial entities generating more than 96 gallons of trash per week. Organics collection services are provided entirely by the private sector and are voluntary.

⁶⁶ Baltimore Food Waste and Recovery Strategy Plan:

https://mayor.baltimorecity.gov/sites/default/files/BaltimoreFoodWaste&RecoveryStrategy_Sept2018.pdf

Residential Service: Baltimore’s Department of Public Work’s Bureau of Solid Waste provides weekly curbside trash and recycling pickup and occasional bulk and seasonal item pickup for 640,000 residents in about 210,000 households citywide. Each resident is allowed up to 96 gallons of trash and unlimited recycling pickup each week. Residential customers include single family homes and row houses. Any residential address is eligible for collection services if they produce up to but not exceeding 96 gallons of mixed waste per week. Generation of waste above this limit requires the residence to contract with a private hauler. Residential pickup fees are covered by property taxes and other general revenues. As a result, customers do not see a bill or pay a direct user fee for services.

Unlike trash and recycling, residential organics collection is provided entirely through residents contracting voluntarily with a private hauler. There are three local residential food waste haulers: Baltimore Compost Collective, Compost Cab, and Compost Crew. Table 7 below outlines the services provided by these companies:

Table 7: Residential Food Waste Haulers Servicing Baltimore

Name	Material Accepted	Size of Container	Collection Frequency	Cost	Facility/Site Material is Taken to
Baltimore Compost Collective	Vegetative food scraps (no meat, dairy or paper)	5-gallon sealable buckets	Weekly	\$25 per month	Filbert Street Community Garden
Compost Cab	All food scraps, no meat, dairy, or paper	5-gallon sealable buckets	Weekly	\$32-35 per month	Community gardens, urban farms, Prince George’s
Compost Crew (Fat Worm)	All food scraps, paper products	5-gallon sealable buckets	Weekly	\$32 per month	Prince George’s

Compost Crew, which was recently acquired by a commercial organics hauler (Fat Worm Compost), collects organics from residential and multi-family households. Compost Crew is limited to only servicing larger groups of units through pilot programs. These pilots target homeowner associations, multi-family units, or residential areas willing to locally champion and promote the pilot. The Baltimore Compost Collective is a youth-engaged enterprise currently providing service in the Curtis Bay, Federal Hill, Riverside Park, and Locust Point neighborhoods.

Public Schools:

Maryland requires all schools and facilities to recycle paper and cardboard, glass, plastic, metal, light bulbs, and electronics. All Baltimore City Public Schools have access to recycling of these materials. DPW provides collection service via single-stream recycling, in which all materials are commingled.⁶⁷

While BCPS has not yet developed a schoolwide food waste collection and recycling program, over the years, a handful of schools have run pilot projects. For instance, Federal Hill Prep began a food scrap collection program in fall 2011, as part of a Baltimore Office of Sustainability composting pilot program in Baltimore City Schools. At the beginning of each school year, parent volunteers and the student Green Club instruct students on properly sorting waste. Waste Neutral hauls the separated food waste to the Prince George’s County composting site.

Great Kids Farm, an educational farm in Catonsville, serves as a hub of information and resources for gardens at all stages of development and partners with BCPS on food and compost education. All second-grade public school classes visit the farm and learn about farming and growing food as well as hot and worm composting. The farm’s

⁶⁷ Baltimore Schools recycling information: <https://www.baltimorecityschools.org/recycling>

manager, James Koval, is interested in improving the vermicomposting system at the farm to make it more accessible to students.⁶⁸

According to the BCPS Green Schools Coordinator, Joanna Pi-Sunyer, five schools have expressed interest in either improving or starting a food scrap composting program: Ben Franklin High School, Federal Hill Prep, Digital Harbor High School, Francis Scott Key Elementary and Middle School, and Hamilton Elementary and Middle School. Further, she notes that implementing such programs in conjunction with food scrap reduction/rescue and soil curriculum could be timely as BCPS recently hired four full-time Farms-to-Schools specialists who will be working on science-based farm field trips and curriculum.⁶⁹ In addition, BCPS promotes school gardens, which aligns well with incorporating composting onsite at schools.⁷⁰

Ben Franklin High School is located in Curtis Bay, near the Filbert Street Community Garden, and is a partner in the youth-engaged Baltimore Compost Collective. The school also has its own garden. Many of the Collective's youth workers have been students at Ben Franklin. Students in Ms. Appleby's sustainable agriculture course are already researching how to start composting the school's food waste and have been considering a Rocket composter.

In Maryland, students are required to earn service learning hours in order to graduate high school. Last year, Maryland students completed more than 6.6 million hours, representing an estimated \$88 million value. Qualifying student involvement in soil health and composting activities for their service learning hours is an opportunity to harness volunteer power while engaging youth.

Commercial Service: There are currently over 200 businesses that have opted to receive recycling services from the DPW, while all other commercial services are provided through private haulers. Baltimore currently has four private food waste haulers that service the commercial sector.

⁶⁸ Personal communication, James Koval, Farm Manager, Great Kids Farm, with Brenda Platt, Institute for Local Self-Reliance, September 24, 2018.

⁶⁹ Joanna Sunyer-Pi, Green Schools Coordinator, Baltimore City Public Schools, in-person meeting with Brenda Platt, ILSR, September 13, 2018.

⁷⁰ Baltimore City Schools: <https://www.baltimorecityschools.org/Page/27743>

Table 8: Commercial Food Waste Haulers Servicing Baltimore

Name	Material Accepted	Size of Container	Collection Frequency	Cost	Facility Material is Taken to
Waste Neutral	All food scraps, compostable paper products	65-gallon cart	As Needed	Negotiable	Prince George's
Fat Worm	All food scraps, compostable paper products, compostable bags and yard waste	35-gallon cart			Prince George's
Envirelation	All food scraps, compostable paper products, and yard waste	35- or 65-gallon cart			Unknown
Veteran Compost	All food scraps, compostable paper products, and certified compostable wares	32- or 64- gallon cart, 20- or 30-yard dumpsters			Veteran Compost Aberdeen

Waste Neutral - Waste Neutral is one of the largest haulers, serving hospitals, universities, restaurants, businesses, schools, and events. The company has conducted residential organics recycling pilot programs, including one in the Woodberry neighborhood that covered multiple residential blocks. They provide 96-gallon rollout carts to their customers and haul pre- and post-consumer food waste to Prince George's County compost facility (operated by MES).

Envirelation - Envirelation mainly services commercial and institutional facilities. They collect unlimited numbers of 35- and 65-gallon rollout carts, depending on the needs of the client, every other day.. The company partners with other service providers, such as waste and recycling haulers, to complement those haulers' pickup services with food waste collection. They also partner with waste consultants, sustainability focused businesses, and new or existing composting operators.

Fat Worm - Fat Worm Compost provides 35-gallon rollout carts to collect pre- and post-consumer food waste from hotels, restaurants, special events and other commercial customers. Fat Worm requires food waste to be bagged in certified compostable paper bags, and hauls organics to Prince George's County's MES facility.

Veteran Compost - Veteran Compost provides 32- and 64-gallon rollout carts as well as 20- and 30-yard dumpsters to commercial customers in the Baltimore / Annapolis metro area. The veteran-owned and -operated business hauls waste to their own composting facilities in Harford and Anne Arundel Counties.

Institutional Service: State regulations define hospitals, schools, and government building waste generation as institutional, which is serviced by private haulers. Waste Neutral provides the majority of food waste hauling to this sector, but Envirelation and Fat Worm Compost also service various government buildings as well.

Multi-Family Sector: The city defines any residence with more than one unit as a multi-family residence, which are predominantly serviced by private haulers. Any multi-family dwelling or condominium can request trash and unlimited recycling pickup service from the Baltimore DPW if the address generates up to but not exceeding 96 gallons of mixed refuse weekly. Multi-unit properties of 10 or more units are required to offer recycling services to

residents⁷¹, but property owners with fewer units have the choice to opt out and request service from a private hauler. The food waste haulers that service the multi-family sector are primarily Compost Cab and Compost Crew. Compost Crew requires at least 5 units to sign up for a 2-month pilot program for \$35 / home, and requests that customers place large collection bins at a central location of the property. Compost Cab does not have a threshold for participation to provide services.

POLICY FINDINGS

Disposal capacity concerns and sustainability goals have brought organics recycling to top of mind for the state of Maryland, as well as for many municipalities and counties. There is growing interest in food waste diversion around the state. Cities and counties are taking initiative, creating partnerships and pilots, and creating policy/diversion goals around organics and food waste, but so far neither Baltimore City nor the state have implemented any policies specific to increasing food waste diversion. A summary of the relevant state and local policies is provided below:

State Level Policies

State Diversion Goal: In 1988 Maryland established the Maryland Recycling Act (MRA), which set mandatory recycling rates for local jurisdictions in the state based on population size, as well as a voluntary statewide goal of 55% recycling rate by 2020. The recycling rate for cities and counties with greater than 150,000 population size was revised and set to 35%. Cities and counties can count organics composting, mulching, and anaerobic digestion toward their recycling rates.⁷² It was reported in 2017 that the residential recycling rate in Baltimore was 28%; however, this value was calculated assuming a 5% credit for incineration and 4% credit for source reduction, and includes 9% of the total coming from C&D. Without these credits, the residential recycling rate for Baltimore would be closer to 13%.⁷³

State Composting Studies: MDE has studied and/or made composting recommendations through four separate avenues in the last few years. House Bill (HB) 817 of 2011 required the MDE to conduct a study of composting in the State, as well as make recommendations of legislative, programmatic, and regulatory changes to promote composting development and growth. That resulted in a 294-page report, *Composting Workgroup Final Report*, submitted to the General Assembly, January 2013.⁷⁴ The report outlined 15 core recommendations ranging from authorizing MDE to adopt new regulations governing composting facilities to launching an education and outreach campaign to highlight composting and compost use. While new permitting regulations were promulgated and enacted, many of the other recommendations have been ignored. The second avenue was through former Governor Martin O'Malley's Zero Waste Plan. The Plan, released December 2016, included organics diversion as one of eight priority strategies and established a 90% diversion goal for food and yard waste by 2040. It also identified 10 key steps to reaching these goals. Governor Larry Hogan rescinded the plan and instead signed an executive order (EO) in 2017, The Waste Reduction and Resource Recovery Plan, to provide guidelines for a study to minimize environmental

⁷¹ Maryland Apartment Recycling Bill: <http://mlis.state.md.us/2012rs/billfile/sb0208.htm>

⁷² Solid Waste Management and Recycling in Maryland, DEPARTMENT OF LEGISLATIVE SERVICES REVISED JANUARY 2017: <http://mgaleg.maryland.gov/pubs/legislegal/2017-waste-management.pdf>

⁷³ ILSR: Why Should Baltimore Recycle More?: <https://ilsr.org/report-baltimore-recycle/>

⁷⁴ Composting Workgroup Final Report:

[https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Publications/composting_workgroup_final_report_1-2013000%20\(1\).pdf](https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Publications/composting_workgroup_final_report_1-2013000%20(1).pdf)

impacts of materials management⁷⁵. The EO highlights lifecycle analysis as a method to determine opportunities in materials reduction, reuse, and recycling, as well as conserving and extending disposal capacity in Maryland. Finally, HB 171 of 2017 required the MDE to work in consultation with various organizations to study issues related to the diversion of yard waste, food residuals, and other organic materials⁷⁶. The final report, including recommendations, will be completed by July 1, 2019.

State Statutes: The Code of Maryland Regulations (COMAR) only includes specific hauling regulations for specialty types of waste, such as coal combustion residuals, hazardous waste, medical waste, and scrap tires. The regulations for hauling municipal solid waste are determined by individual counties and municipalities. In rural areas, residents can haul their own waste to a transfer station or other recycling facility, or they can contract with private haulers. In more urban, densely populated areas, the local government uses city employees or contracts with private haulers to collect and dispose of public sector waste, which typically includes waste generated from government offices and institutions and from single-family households of up to 4 to 6 units.⁷² Private sector waste generated from restaurants, multi-family apartment buildings, retailers and other private establishments is typically collected by private haulers. In Baltimore, the DPW collects waste generated at single-family residences and at condominiums under contract with the City. While the City collects from some multi-family residences and commercial and industrial establishments, private contractors typically provide collection services to these customers.⁷⁷

The complete scope of state regulations regarding the design, construction, and operation of composting facilities are promulgated in Ch. 26.04.11 of COMAR. Design requirements include extensive regulations regarding all-weather padding of facilities and other measures to ensure that groundwater, flood plains, and the Chesapeake Bay will not be impacted by composting activity.⁷⁸

State Composting Facility Permitting: In addition to the permit regulations described in Task 1 of this report, composting facilities may also be required to obtain water and air discharge permits to comply with federal and state effluent standards. Equipment use and construction may require additional permitting if found to generate an air effluent, and the facility itself may require a permit for discharge to the water table. All commercial facilities must also satisfy the requirements under the MDE's General Permit for Stormwater Discharges Associated with Industrial Activity.⁷⁹

State Anaerobic Digestion Facility Permitting: The MDE passed HB 124 in 2017, requiring a workgroup to develop regulations for recycling facilities, including a clarification of when a facility does not need to seek permitting. A refuse disposal permit is not required if a facility only generates a *de minimis* amount of waste, and does not cause nuisances, pollution, or threats to public health, safety, and comfort. The

⁷⁵ Waste Reduction and Resource Recovery Plan:

<https://mde.maryland.gov/programs/Land/RecyclingandOperationsprogram/Pages/Waste-Reduction-and-Resource-Recovery-Executive-Order.aspx>

⁷⁶ HB 171 Law:

<http://mgaleg.maryland.gov/webmgg/frmMain.aspx?id=hb0171&stab=01&pid=billpage&tab=subject3&ys=2017RS>

⁷⁷ See City of Baltimore's 10 Year Solid Waste Management Plan for 2013-2023, page 7: <https://publicworks.baltimorecity.gov/solid-waste>.

⁷⁸ COMAR 26.04.11.08: <http://mdrules.elaws.us/comar/26.04.11.08>

⁷⁹ Department of Environment HB171 Topic 1 White Paper:

<https://mde.maryland.gov/programs/Land/RecyclingandOperationsprogram/Documents/Topic%201%20HB%20171%20White%20Paper%20Post%20Meeting%20Edits.pdf>

workgroup from HB 124 is working with the group from HB 171 to determine how the new regulations will apply to ADs going forward.⁸⁰

State Compost Procurement: Signed into law May 2014, HB878/SB814 – State Highway Administration – Compost and Compost-Based Products – Specification requires the MD State Highway Administration (SHA) to establish the use of compost and compost-based products as a best management practice for controlling soil erosion and stormwater runoff in highway projects. The bill, effective July 2014, is still expected to create major market demand for Maryland-produced compost, and thus, help drive compost infrastructure development in the state⁸¹.

Local Policies in Baltimore

City Diversion Goal: Building on the 35% recycling rate mandated at the state level, Baltimore Mayor Catherine Pugh announced in September 2018 that the city would strive to reduce commercial food waste by 50% and residential food waste by 80% by 2040.⁸² The City's *Food Waste & Recovery Strategy* outlines these goals:

- Reduce commercial food waste in Baltimore City by 50% by 2040
- Eliminate all food waste from higher education institutions by 2040
- Divert 90% of food and organic waste generated by Baltimore City government agencies from landfill or incineration by 2040
- Reduce household food waste in Baltimore City by 80% by 2040
- Ensure all Baltimore City residents have access to organic waste collection at home or in their neighborhoods by 2040
- Divert 80% of residential food and organic waste from landfill or incineration by 2040
- Create composting and/or anaerobic digestion facilities in the Baltimore region capable of processing all of Baltimore City's organic waste by 2040
- Support the food waste diversion market by ensuring an adequate supply of organic waste is being diverted to compost and anaerobic digestion facilities
- Attain 90% food and recyclable waste diversion in Baltimore City K-12 schools by 2040
- Create a supportive culture for food waste reduction and diversion in K-12 students, faculty, and staff.⁸³

Baltimore Hauler Licensing: The Baltimore City Health Department promulgates the statutory authority regarding solid waste collection in Baltimore, which requires licensing for both large and small haulers. The permit required by an individual hauler is determined by the truck manufacturer's rated hauling capacity, the gross vehicle weight (GVW) of the collection vehicle, and the length of licensing.⁸⁴ Small haulers are rated at $\frac{3}{4}$ ton or less with a GVW of 7,000 lbs. or less, while large haulers have a GVW over 7,000 lbs. Haulers can obtain a license in 90-day increments or yearly, and there is also a license available to haul a dumpster of 2 cubic yards or more. These city ordinances do not apply to any entity under contract with the DPW.

⁸⁰HB 171 Presentation on AD Facilities:

<https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/5%2017%20%2718%20SWP%20AD%20Digestion.pdf>

⁸¹ HB 878: <http://mgaleg.maryland.gov/2014RS/bills/hb/hb0878t.pdf>

⁸² <https://www.nrdc.org/media/2018/180905>

⁸³ <https://ilsr.org/baltimore-food-waste-recovery-strategy-released/>

⁸⁴ Baltimore City Health Code §7-205: <http://legislative.reference.baltimorecity.gov/sites/default/files/Art%2000%20-%20Health.pdf>

Other Policies: There are no city ordinances specifically requiring private haulers to collect recycling or compost. Likewise, there are no mandates requiring waste generators (residential, multi-family, commercial) to participate in organics recycling programs, pay for services, source separate organics, or other requirements that have been demonstrated in other communities to successfully drive diversion.

Local Policies and Programs Elsewhere

Relevant requirements or programs adopted in other Maryland municipalities as well as nearby District of Columbia that could serve as examples for City of Baltimore include:

Montgomery County Food Scrap Diversion: Montgomery County reported a diversion rate of 60% in 2016⁸⁵ and a goal of reaching 70% by 2020. To spur the County division of solid waste services to divert food waste prioritizing locally-based options, the Montgomery County Council passed Bill 28-16 in 2016, requiring the County Director of the Department of Environmental Protection (DEP) to develop a Strategic Plan to Advance Composting, Compost Use, and Food Waste Diversion⁸⁶. The Strategic Plan was published in April 2018, and covered topics ranging from backyard composting, on-site institutional, business, and farm composting, as well as addressing challenges and recommendations for increasing curbside collection in the county.

City of Bowie's Food Waste Collection Program: There are seven suburbs of Bowie that participate in food scrap collection. The program is available free to any residential participants, who receive a free 2-gallon bin for the kitchen and 6-gallon curbside bin, which is picked up weekly. Each participant also receives a free set of 60 compostable bags from the Bowie DPW. The program is first-come, first-served, with 145 current participants and expansion available up to 200 residents⁸⁷.

Prince George's County Food Scrap Composting Pilot: Beginning in May 2013, Prince George's County started a pilot program collecting food scraps from the University of Maryland, the Town of University Park's curbside program, and other commercial generators. In late 2017, the County launched a residential curbside food waste collection pilot program. Residents were provided with 32-gallon carts for curb collection, kitchen bins, compostable liners, and how-to and FAQ guides. Prince George's is looking to expand the pilot.⁸⁸

Cheverly Backyard Composting Project: This program was instituted by Doug Alexander, a local resident, with \$4,700 in grant funding from the town of Cheverly, the nonprofit Chesapeake Bay Trust, and other sources. Alexander used the grant funds to buy composting units which he then at a discount to residents both onsite at the Cheverly Community Market and via email request. The money from the sales was used to purchase additional bins. Currently, residents can purchase bins (now Enviroworld's FreeGarden Earth bins) at the Cheverly DPW, and, if needed, the DPW can also deliver bins to residents. Other Maryland municipalities are now participating in this backyard composting project, including Frederick, Bowie, Greenbelt, Brunswick, and Boonsboro. The project guarantees that municipalities' investments will be returned within a year of the launch of the program or the project will refund the difference.⁸⁹

⁸⁵ Montgomery County Recycling Rate:

<https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/2016%20County%20Rates.pdf>. Approximately 24% of the recycling tonnage reported by Montgomery County is ash sent to alternate daily cover:

<https://www.montgomerycountymd.gov/SWS/Resources/Files/recycling-rate/CY16-mass-balance.pdf>.

⁸⁶ Montgomery https://www.montgomerycountymd.gov/COUNCIL/Resources/Files/bill/2016/Packets/20160628_4B.pdf

⁸⁷ Bowie State Food Waste Collection Program: <https://www.cityofbowie.org/2309/Food-Waste-Collection>

⁸⁸ Notes from presentation by Denice Curry at Metro Washington Council of Governments meeting 9.20.2018

⁸⁹ See ILSR's May 2018 report, *Yes! In My Backyard: A Home Composting Guide for Local Government*: <https://ilsr.org/yimby-compost/>

Ocean City Composting Pilot: Starting in mid September 2018, Go Green OC began a 4-week compost pilot program with the Hobbit Restaurant to gather data on food scraps generated and potential for diversion and to test composting food scraps with a local farmer in nearby Berlin. A key impetus for the project was to demonstrate a non-burn option for Ocean City's food waste; the City's trash is transported to an incinerator in Pennsylvania. Other compost pilot project partners were Sunbelt Rentals (donated a tractor), ILSR and Energy Justice Network (pro-bono consulting), and Biobag (donated compostable plastic bags). For the first two weeks, only food scraps from the kitchen were collected and composted. For the final two weeks, all food scraps from the restaurant were collected for composting by the farmer. The pilot program collected and composted 1,681 pounds of material; every dinner sold generated approximately 1.23 pounds of food scraps. Go Green OC is seeking funding support to expand the program to additional restaurants and farms in 2019.⁹⁰

District of Columbia: The District has embraced a multi-faceted approach to composting spurred by passage of a solid waste bill, the Sustainable Solid Waste Management Amendment Act of 2014, which called for a zero waste plan to achieve an 80% waste diversion goal and a collection program for compostable material.⁹¹ As one result, the DC DPW released a Compost Feasibility Study (also authored by RRS) in May 2017 and established a drop-off program for food scraps at farmers' markets in each of the City's 8 wards (under contract with Compost Cab).⁹² The latter program, based on the successful New York City GrowNYC program,⁹³ has been very popular since its roll-out on Earth Day 2017. In May 2018, the City Council passed the Home Composting Incentives Act, which would create a home composting incentives program in which qualified residents receive either a rebate or a voucher for up to \$75 of the purchase of a DPW-approved home composting system; require DPW to offer an in-person composting training program, which residents would need to complete in order to qualify for the rebate or voucher; and require DPW to create educational materials about home composting so all residents can learn more about effective at-home composting.⁹⁴ (This incentives program is based on Austin's successful program - <http://www.austintexas.gov/composting>.) The DC Department of Parks & Recreation (DPR) also supports food waste composting at its community gardens through a cooperative composting network.⁹⁵ Each cooperative has a 3-bin enclosed compost system that can handle around 100 active composters or about 1 ton of material a month. DPR currently has 50 cooperative compost sites with a capacity of 5000 people actively composting or 50 tons of material a month, and no operating costs due to reliance on volunteer labor. Currently, there are more than 1000 people composting around 20 tons a month in this network. DPR also conducts an Urban Master Composter training program, which helps to ensure the success of the community composting program. ILSR's Neighborhood Soil Rebuilders composter training program,⁹⁶ launched in the DC metro region in 2014, has helped support these locally-based composting initiatives, including by training many of DPR's cooperative site compost managers

⁹⁰ Ocean City Compost Pilot: <https://mdcoastdispatch.com/2018/10/04/ocean-city-group-launches-compost-pilot-program-month-long-campaign-aims-to-collect-data/>

⁹¹ District of Columbia Sustainable Solid Waste Management Amendment Act: <https://ilsr.org/dc-city-council-embraces-waste-planning/>

⁹² DC Drop-off program: <https://dpw.dc.gov/compostfeasibilitystudy> and <https://dpw.dc.gov/foodwastedropoff>

⁹³ New York City GrowNYC Program: <https://www.grownyc.org/compost>

⁹⁴ DC At-home Composting Information: <https://ilsr.org/washington-dc-home-composting-bill-passes/>

⁹⁵ DC Department of Parks and Recreation: <https://dpr.dc.gov/page/community-compost-cooperative-network>

⁹⁶ <https://ilsr.org/neighborhoodsoilrebuilders/>

Collection and Policy Key Take-Aways

- *There are several residential and commercial haulers dedicated to organics recycling in the Baltimore area, so there are existing opportunities to expand food waste collection.*
- *There are three main policy and collection barriers related to food scrap recycling:
1) Residential disincentive – Residential trash and recycling services provided by the Baltimore DPW are perceived as “free,” whereas residents must seek out organics haulers and pay for the service.
2) Private sector service cost and demand - The cost of service is a barrier to both commercial and residential generators, and on the other side, the lack of customer demand prevents route density and keeps price per stop high.
3) No local policy to support supply – There are no policies in Baltimore that encourage diversion of organics including food scraps. For example, large commercial generators are not required to divert food waste. Without policy to support food waste diversion, reaching the City’s diversion goals may be challenging.*
- *While there have been several food waste composting pilot studies in schools, there are no policies in place requiring schools to compost similar to state requirements that schools recycle.*
- *Multi-family properties of fewer than 10 units that generate more than 96 gallons of mixed refuse weekly are at risk of being left out when it comes to convenient diversion opportunities because they fall outside of Maryland’s multi-family recycling law and property managers are not required to offer recycling services to residents.*
- *There are a number of composting pilot programs in Maryland ranging from curbside collection to backyard composting that the City of Baltimore could look to as examples of ways to spur food waste diversion.*

TASK 3: FEEDSTOCK ANALYSIS

The aim of Task 3 is to provide NRDC with a detailed map of potential food waste feedstock availability in the City of Baltimore. The map can be used to identify potential large generators and create a map of clusters of food scrap recycling potential that could be targeted for new commercial or multi-family routes.

- **Feedstock Mapping:** Using a dataset developed by NRDC on food waste produced by generator type, RRS created a map of estimated total food waste generated annually in the City of Baltimore by zip code. The map includes food waste estimated to be produced by the following large generators: universities, food manufacturers, food wholesalers, grocery stores, hospitals / nursing care facilities, hotels, K-12 schools, events/recreation facilities, and restaurants.

SUMMARY FINDINGS

NRDC estimates that 72,348 tons of food waste are generated by large commercial businesses in the City of Baltimore.⁹⁷ Using the NRDC-developed estimations for food waste generation, the project team created an on-line ArcGIS map of food waste generation in Baltimore. The map is based on NAICS business type and detailed business location and is designed to allow users to identify clusters of feedstock availability. A screen shot of the map is included in figure 3.1. The online map can be accessed by following the link: <https://arcg.is/yebre>.

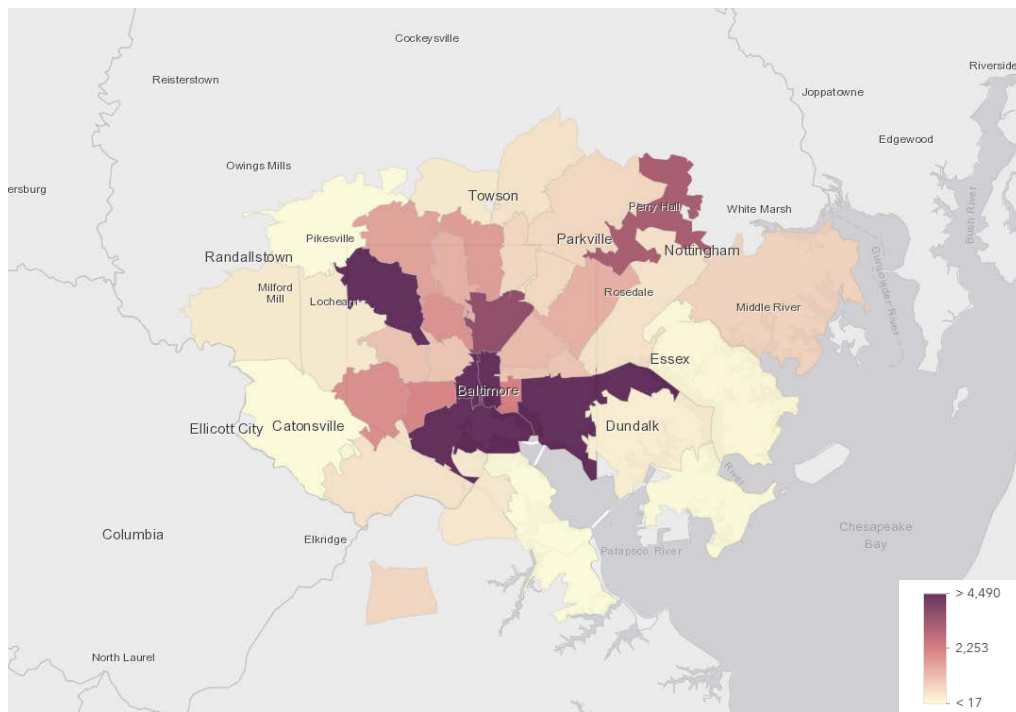


Figure 1 Screenshot of on-line Feedstock Generator Map (Tons Per Year)

⁹⁷ Food waste generation estimates were based on different formulas depending on the type of facility. For example, estimates for hospitals were based on number of beds and estimates for hotels, grocery stores, and restaurants were based on number of employees. Formulas used can be found in “Estimating Quantities and Types of Food Waste at the City Level”, NRDC, October 2017, <https://www.nrdc.org/resources/food-matters-what-we-waste-and-how-we-can-expand-amount-food-we-rescue>.

A total of 59 zip codes were mapped with estimated food waste generation totals from 9 types of businesses (see Figure 3.1). Overall, the largest amount of food waste estimated to be generated in the City is located in the central downtown area, centered around the harbor, with central business districts and industrial centers playing a key role in generation. Radiating out from the main downtown center were typically areas of lower generation.

The top three zip codes in terms of total estimated food waste generated, 21230, 21202, 21224, account for almost 40% of the total estimated food waste generated in the City. 21230 is an industrial area on the southern side of the city, situated on the harbor with access to main highways and commuter rail. The area has a high density of food manufactures, food wholesalers, restaurants and event centers, including the M&T Bank Stadium. 21202, which has the second largest total generation, is a central business district area running north to south in the middle of the city including the Harbor East area, home to a large number of restaurants and hotels. Lastly, 21224 is a mixed-use area with residential and heavy industrial use. The bulk of the commercial food waste estimated to be generated in 21224 is driven by food manufacturers, food wholesalers and restaurants.

The top 10 zip codes by food waste tons per year, shown in Figure 3.2, account for roughly three-fourths of the total generation in the City. The top commercial types are listed for each zip code. Restaurants heavily influenced the food generation in all top 10 zip codes, primarily due to the high number of restaurants in those areas. Like restaurants, higher concentrations of hotels drove food waste generation numbers up in several zip codes. Grocery stores, food manufacturers and food wholesalers also influence food waste generation. The large food-related businesses are less numerous than restaurants but produce significantly more food waste per location. The zip codes in Figure 3.2 could be ideal candidates for increasing organics recycling through targeted education and recruitment for commercial collection.

Figure 3.2: Top 10 Zip Codes by Estimated Total Food Waste Generated

Zip Code	Estimated Total Food Waste Generated (Tons/Year)	Top Generators
21230	10,547	Food Manufacturers, Wholesalers, Restaurants, Events/ Recreation Facilities
21202	9,452	Restaurants, Hotels
21224	8,438	Restaurants, Wholesalers, Food Manufacturers, Grocers
21201	6,772	Restaurants, Events/Recreation Facilities, Hotels
21215	5,211	Restaurants, Wholesalers
21218	3,560	Restaurants, Universities
21236	3,102	Restaurants, Grocers
21231	2,175	Restaurants, Hotels
21223	2,066	Food Manufacturers, Restaurants, Grocers
21229	1,889	Grocers, Restaurants, Hospitals/ Nursing Homes

TASK 4: STAKEHOLDER MEETINGS

Over a period of two months, the RRS project team conducted a series of targeted interviews and meetings with a variety of food scrap recycling stakeholders. The stakeholders were identified based on their influence and ability to drive positive development in food scrap recycling in the Baltimore region. The 14 total interviews provided in-depth input on the barriers, gaps, and opportunities to improve the local landscape for food scrap recycling. The input was combined with the results of the other project activities to shape the final recommendations. Stakeholders included city and county staff, haulers, non-profits, state regulators, local thought and trend leaders, and regional organics processors.

SUMMARY FINDINGS

The implications of the interviews are summarized below.

Food Scrap Recycling

Food scrap composting capacity is not enough to support the growing interest in food scrap recycling in the region. While the 2018 expansion of food waste composting capacity at Prince George's County helped ease the capacity constraints in the region, there are still more generators wanting to take material to the facility than Prince George's can accommodate. Larger food waste haulers have reported being turned away from Prince George's facility due to reaching their allotted hauling limit. Additionally, anaerobic digestion is underutilized in the region.

The food scrap recycling network lacks resiliency due to capacity being concentrated in a few composting facilities. Half of all current food waste composting capacity is provided by one facility, Prince George's County. Haulers expressed concern that if Prince George's County closed, they would not know where they would take food waste. This is an especially sensitive topic for haulers in the region that have experienced three facility closures in the last 10 years.

Barriers and Gaps

The market for finished compost is solid now but it is unclear if the market could handle a significant increase in finished compost. Facilities selling finished compost currently in Maryland all report no issues moving their product, even as facilities expand. While end markets are currently consuming finished compost, stakeholders have voiced concern that there is not sufficient demand to support large amounts of finished compost. The inability for a composter to identify stable end markets for large quantities of finished compost has been cited as a reason to forgo building a large composting facility.

Contamination is not currently cited as a significant barrier to composting but is something all composters mention managing regularly. All composters cited contamination as something they continually address but not a major barrier for composting. Requiring haulers and large generators to visit the composting facility was a policy of one composter to increase understanding and reduce contamination.

Lack of policy to drive waste reduction makes it challenging for curbside composting to grow. Haulers suggested they would be challenged to expand their customer base without policy reform such as requiring large food waste generators to compost or establishing pay-as-you-throw waste pricing systems.

Currently, any individual or organization looking to recycle food scraps must contract separately with a private hauler and pay a fee. While haulers report working hard to maintain reasonable and competitive rates, low route density can push rates up. Haulers feel that policy could drive interest in composting, allowing them to increase route density and lower rates for customers.

The 2015 compost regulation updates made rules clearer for facility siting, but challenges in obtaining land for composting remain. Prior to the regulation re-write (see the Regulatory Framework section in Task 2), stakeholders wanting to site facilities in Baltimore found it extremely challenging due to the outdated and unclear requirements for composters. In the re-write, a surface water setback requirement was reduced from 1,000 to 100 feet, opening up more potential sites in Baltimore⁹⁸. Additionally, the permitting process has been streamlined. While these changes have generally been welcomed by the composters, many still cite challenges in finding suitable land and overcoming barriers with zoning, NIMBYism, and obtaining capital.

Needs

Additional capacity and collection programs. Stakeholders suggested that new diversion programs such as farmer's market drop-offs for food scraps, curbside collection programs, and requirements for large generator food waste diversion would spur growth in food scrap composting, helping improve the landscape for new composting facilities located closer to Baltimore.

Market support to drive demand and value for finished compost. While demand for finished compost product is not currently an issue in the region, stakeholders expressed concern that it could become an issue as composting capacity expands. Local, regional, or state policies designed to bolster the market for end-product were mentioned by several stakeholders. This would help to close the loop and would improve the overall economics of the system. Some stakeholders suggested that updates to the Department of Agriculture definition on compost could open additional end markets to finished compost such as farmers, golf courses, and areas near waterways.

Education for generators, haulers, and elected officials. Many stakeholders felt that 10 years ago no one in the region really knew what food waste composting was. Today, these stakeholders spend much less time explaining what composting is and the benefits of doing it. Despite these advances, stakeholders identified a need for increased education, especially in these areas: 1) teaching generators the value of composting and how collecting food scraps for collection can be done without mess, odor, or pests; 2) educating haulers on the composting process so they truly understand the issues of contaminants; 3) engaging farmers in conversations to secure stable, long-term markets for finished compost; and 4) informing elected officials of the benefits of composting within their county and of enacting policies that encourage generators to reduce waste.

Policies at the state or local level to drive increased food scrap recycling and more robust markets. Variable rates for residential trash, requirements for the purchase of locally-sourced compost products, agreements or tax incentives for farmers to use compost, and requirements for large commercial and institutional generators to divert food waste were all mentioned by stakeholders as potential policy drivers to increase food waste composting in Baltimore.

⁹⁸ The setback requirements prior to 2015 were provided via stakeholder interviews and the updated setback requirements can be viewed here: <http://mdrules.elaws.us/comar/26.04.11.08>

Stakeholder Meetings Key Take-Aways

- *There is not enough food scrap processing capacity to support demand in the region. The region would benefit from the development of a variety of processing methods including backyard composting, community gardens, composting on farms, dairy digesters, and both large- and small-scale AD and compost facilities.*
- *Long transportation distances to organics processing facilities drives cost of hauling up so that customers pay more for food waste services, and this makes it challenging for haulers to compete with Baltimore trash services cost since most waste generated in Baltimore is going to disposal at the relatively inexpensive incinerator. Since residents do not pay a separate bill for waste collection, the perception is that these services are “free”.*
- *Obtaining capital, siting facilities, working around zoning requirements, combating NIMBYism, a lack of supporting policies, and uncertain end markets for compost products were all cited by processors as challenges for growing processing capacity in the region.*
- *Processors would like to see more funding opportunities available for them to engage in education and outreach campaigns, purchase equipment, fund facility upgrades, or other activities to help them expand food waste composting in the region.*
- *Labor force training to prepare the workforce for working at a compost processing facility would help composters fill labor needs.*
- *A farmer’s market food waste drop-off program that is free for residents could be a great way to generate interest in food waste recycling and educate residents and could be implemented relatively quickly in Baltimore.*
- *While finished compost is in high demand currently and composters indicate having no difficulty finding buyers, end markets may not be sufficiently developed to support a significantly higher production in finished compost. Revisions to the Department of Agriculture’s definition of compost products so that end markets that are not currently able to accept finished compost due to restrictions – e.g., farmers, golf courses, operations near waterways – could open up new opportunities for more buyers to use finished compost.*
- *Contamination is an everyday focus for composters, although it was not cited as a significant barrier to food waste processing capacity expansion.*
- *Assistance, education, and engagement to build support among elected officials in Baltimore County has potential to increase interest in a processing facility nearer to Baltimore.*
- *Education and engagement to help reduce contamination and expand demand for collection service was mentioned as a need by many stakeholders. Although there are organizations and non-profits working to increase food scrap recycling access and messaging, there is opportunity for NRDC and the City of Baltimore to facilitate communication between groups and increase consistency of messaging to reach more residents and businesses.*

TASK 5: RECOMMENDATIONS

The project team’s philosophy is that there is no single solution for responsibly managing materials, including food residuals. Instead, there are a series of interconnected strategies and stakeholders that must work together to achieve a high-functioning and responsible materials management system to increase the recycling of food residuals in Baltimore. Using this systems-based approach, the project team evaluated the entire system and developed recommendations using the lens of the six key areas described below:

- **Collection:** Community access to effective and convenient collection systems.
- **Processing:** Regional processing to meet current and future demands.
- **End Markets:** Robust end markets for the processed organics to keep the system economically viable and ecologically optimal.
- **Education and Engagement:** Engagement to support on-going programs, collection, and market demand.
- **Supporting Policies:** Local policy that complements private and public-sector activities to make food scrap recycling the standard.
- **Public/Private Coordination:** Potential partnerships with private companies, shared owner/operator agreements, marketing and educational campaigns, and everything in between.

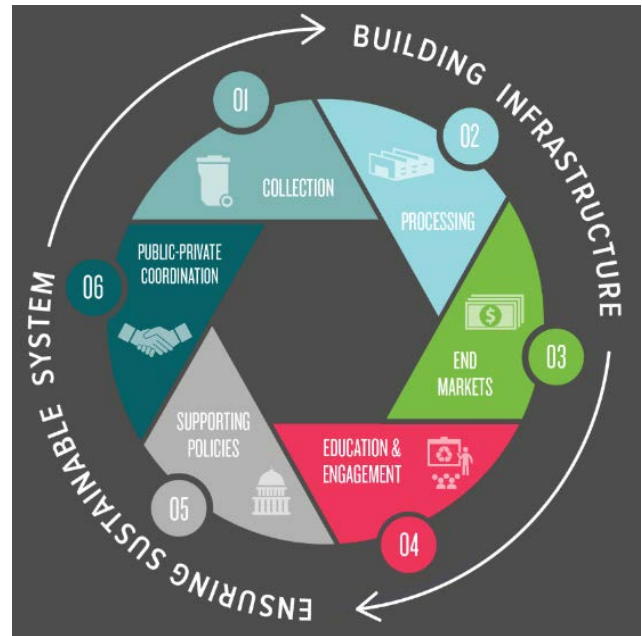


Figure 2 Six Key Sustainability Strategies

The recommended action steps (working in conjunction with local stakeholders) for each of the six key areas are included in Table 9 below; these are followed by detailed rationale, descriptions, and estimated impacts presented by key area. Recommendations considered to be high priority by the project team are in **bold** font. High priority recommendations are those that the project team believes should be considered for action in the near term as they are either low-hanging fruit or are recommendations that can have a large impact on the region.

Table 9: Recommended Action Steps (high priority recommendations are in **Bold**)

Area of Engagement	Action Steps
Collection	<ul style="list-style-type: none"> • Spread awareness to food scrap generators of private organics collection companies and other food waste recycling opportunities. • Institute food waste drop-off program at farmer’s markets, community gardens, convenience centers, and other suitable locations. • Explore options for the City to coordinate with private haulers and offer a reduced cost service to residents. • Encourage large grocers already collecting organics for composting (e.g. MOM’s Organic Market) to allow residents to bring food waste for diversion.

	<ul style="list-style-type: none"> • The City, with the support of NRDC, could provide three free months of service to businesses interested in starting food waste recycling programs. • Encourage City of Baltimore to perform a cost-benefit analysis of current waste management system and assessment of potential organics program in Baltimore.
Processing	<ul style="list-style-type: none"> • Provide funding for community gardens and farms in Baltimore to support a distributed community composting network. • Support program that provides free or reduced cost backyard/home composting bins to Baltimore residents. • Assess potential for large generators to recycle food waste on-site (ex: Maryland Zoo, correctional facilities, convention centers) • Explore siting and construction of a new organics recycling facility near Baltimore. • Facilitate discussions with wastewater treatment plants and others to investigate anaerobic digestion for targeted streams of food scraps. • The City should perform an assessment of vacant lots, open lots, and available properties to identify potential locations for composting activities at all scales.
End Markets	<ul style="list-style-type: none"> • Examine state policies to support market demand for compost products in the region. • Support the adoption of agreements between processors / haulers and municipalities / counties to buy back compost products made from local feedstock. • Coordinate a joint marketing campaign to drive demand for finished compost.
Education and Engagement	<ul style="list-style-type: none"> • Pursue a community education campaign on food waste recycling. • Support internal city operations for education and outreach on food scrap recycling to recruit multi-family and commercial sector participants. • Support a master composter training program. • Encourage the launch of a pilot food scrap recycling program targeting K-12 public schools. • Support commercial and institutional food waste recycling by providing businesses with access to worker training on organics recycling and waste audits. • Study HB171 recommendations and work towards implementation of food scrap recycling recommendations applicable to the Baltimore metro region. • Review Baltimore Food Waste & Recovery Strategy Report and engage the City on ways to achieve those goals. • Aid composters in finding and training labor. • Work with Baltimore City Department of Health so that rodent control aligns with City's food waste reduction goals.
Supporting Policies	<ul style="list-style-type: none"> • Investigate City and County level policies to drive food scrap diversion. • Encourage the City to clarify policy on composting at community gardens and urban farms. • Support Baltimore home composting legislation. • Support adoption of Baltimore City pay-as-you-throw or other variable rate program for residential garbage service. • Examine different definitions of and regulations on finished compost between state departments to assess consistency. • Explore possibility of an exemption or reduced requirements for small composters to distribute or sell compost products. • Explore policy options to create a funding mechanism for processors to purchase equipment and for site development.
Public / Private Coordination	<ul style="list-style-type: none"> • Establish local partnerships with like-minded non-profits and community organizations to expand reach of marketing and build support for food scrap recycling. • Continue building Baltimore cross-departmental coordination between the Department of Public Works and Office of Sustainability. • Explore coordination with Maryland Environmental Services.

COLLECTION

Recommendations to improve the landscape for the collection of food scraps in the City and County of Baltimore are provided in the following table.

Table 10: Recommendations to improve food scrap collection

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Residents looking for curbside composting of food scraps must look for private haulers and pay for this service. 	<p>Spread awareness to food scrap generators of private organics collection companies and other food waste recycling opportunities.</p>	<p>To increase awareness of options for end users to recycle food scraps, the City and County of Baltimore could provide information and links to the licensed organics hauler's websites. The MDE includes similar information on their website: MDE⁹⁹. Additionally, links to community garden or other drop-offs available to residents could be included.</p>	Low	Low	Low	Low
<ul style="list-style-type: none"> City of Baltimore does not have a practice of collecting organics separately from other waste. 	<p>Institute food waste drop-off program at farmer's markets, community gardens, convenience centers, and other suitable locations.</p>	<p>While most areas of Baltimore County have seasonal source-separated yard waste collection for composting, the City of Baltimore does not. To start building a habit of separating organics from other waste among Baltimore residents, the City could support a no-fee food waste drop-off program at farmer's markets and other suitable locations.</p>	Low	Low	Low	Low
<ul style="list-style-type: none"> Limited customer base results in low route densities for haulers, which can contribute to higher customer prices. 	<p>Explore options for the City to coordinate with private haulers and offer a reduced cost services to residents.</p>	<p>To encourage food waste diversion, the City of Falls Church, VA partnered with Compost Crew to provide residents with curbside composting service at a significantly discounted rate - \$6/month for Falls Church residents compared to an average cost of \$30/month – Falls Church. The City of Baltimore could consider a</p>	Medium	Medium	Medium	Medium

⁹⁹ Maryland Department of the Environment website: <https://mde.maryland.gov/marylandgreen/Pages/compostchallenge.aspx>

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Businesses with narrow profit margins such as restaurants may struggle with startup costs of a food scrap recycling program. 		similar partnership with private haulers to increase access and reduce cost for Baltimore residents.				
	Encourage large grocers already collecting organics for composting (e.g. MOM's Organic Market) to allow residents to bring food waste for diversion.	A potential way to generate greater interest and education in food waste diversion is to facilitate and advertise food waste drop-offs at grocers in Baltimore that may already be composting such as MOM's Organic Market and Whole Foods. MOM's currently accepts food waste drop-offs from customers: momsorganicmarket	Low	Low	Low	Low
	The City, with the support of NRDC, could provide three free months of service to businesses interested in starting food waste recycling programs.	In many cases, businesses can reduce their trash bill significantly by diverting food waste so that the added cost of the new service is minimal. However, a barrier restaurants and other businesses may face in starting a food waste composting program is the start-up and staff training costs. Covering the first three months of a composting program cost eases that burden on businesses so that food waste recycling programs can gain traction.	Medium	Medium	Medium	Medium

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
	Encourage City of Baltimore to perform a cost-benefit analysis of current waste management system and assessment of potential organics program in Baltimore.	The City of Baltimore should perform a cost-benefit analysis to measure the total cost of their current waste management system. Additionally, a feasibility assessment should be considered to understand residential, commercial, and institutional food waste generation rates, potential diversion rates, and costs of a new composting facility and food scrap collection program. A feasibility assessment might include waste audits, set-out rate studies, waste sorts, current program data analysis, case study examination, capital investment needs, study of current transfer station options, route design, etc.	None	None	Low	Medium

PROCESSING

Recommendations aimed at improving the processing infrastructure in the region are described below.

Table 11: Processing improvement recommendations

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Half of the region's food waste composting capacity is contained in one compost facility, resulting in a composting landscape that is not resilient to disruptions. Composting capacity is 	Provide funding for community gardens and farms in Baltimore to support a distributed community composting network.	NRDC and City can spur growth of the community gardens, farms, and school composting network by providing funding for startup and community education. Haulers can then utilize this additional capacity immediately.	High	High	High	High
	Support program that provides free or reduced cost backyard/home	To encourage home composting, NRDC could encourage Baltimore City to adopt a program to provide residents with training on how to compost at home. If the training is	None	Low	Low-Medium	Low-Medium

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<p>not keeping up with demand for food waste composting.</p> <ul style="list-style-type: none"> Monies set aside from the general fund for waste diversion by Baltimore City is relatively small and capital costs of start up are a challenge for many organics processors. Incinerator disposal fees in Baltimore are much lower than the County, discouraging diversion in the City. 	<p>composting bins to Baltimore residents.</p>	<p>fully completed, the resident can receive a free or reduced-cost compost bin for their home. Washington, DC passed a bill to implement a similar program in 2018: DC Backyard Composting.</p>				
	<p>Assess potential for large generators to recycle food waste onsite (e.g. Maryland Zoo, correctional facilities, convention centers)</p>	<p>Large generators that also have the capability to utilize compost or soil amendments can recycle food waste on-site through small composting piles or AD. The Riverbanks Zoo and Garden currently processes manure generated at the zoo with an on-site composting system: https://www.riverbanks.org/conservation-and-care/compost.</p>	None	Low-Medium	Low-Medium	Low-Medium
	<p>Explore siting and construction of a new organics recycling facility near Baltimore.</p>	<p>If food waste composting grew significantly in the Baltimore region, capacity would be a major issue. The Prince George's County facility, where the bulk of collected food scraps is currently processed, would not be able to accommodate major growth in composting demands. It is recommended that the City begin exploring the siting and constructing of a composting or AD facility near Baltimore. While siting new facilities is always challenging, the region would benefit from additional capacity particularly near metro areas such as Baltimore.</p> <p>In addition to adding capacity, haulers have indicated that reducing hauling distances to a process facility would help them lower their rates and be more competitive with trash services.</p>	High	High	Medium-High	High

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Anaerobic digestion is underutilized in the region currently, although this is poised to change in 2019. 	Facilitate discussions with wastewater treatment plants and others to investigate anaerobic digestion for targeted streams of food scraps.	Reach out to WWTP in the region to initiate a stakeholder discussion around the potential to send food scraps and residuals to facilities for digesting. At the same time, monitor progress at the BTS Bioenergy facility in Jessup to determine if the facility is able to successfully launch their program. Additionally, an examination as to why the majority of biosolids produced in Maryland are exported out of state should be performed before WWTP AD can truly become a successful recycling solution in Maryland.	Low to Medium	Low to Medium	Low	Low
<ul style="list-style-type: none"> Finding a suitable location for a composting or AD site is challenging for many processors. 	The City should perform an assessment of vacant lots, open lots, and available properties to identify potential locations for composting activities at all scales.	Several stakeholders expressed that locating a suitable site in Baltimore that meets the state's requirements for composting is challenging. The City could help ease that burden by identifying a list of locations within Baltimore that may be suitable for composting.	Medium	Medium	Medium	Medium

END MARKETS

The ability to sell finished compost for a reasonable price is integral to the success of a complete system for managing food scraps. Recommendations to improve end markets in the region are provided below.

Table 12: End markets recommendations

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Current market demand for finished compost is strong, but if 	Examine state policies to support market demand for compost	Consider working with the MDE and DOA to examine existing finished compost policies that prevent potential end markets such as farmers, golf courses, and facilities near	Low to Medium	Low	Low	Low

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
composting capacity were significantly expanded it is likely composters would struggle to find enough buyers for finished compost.	products in the region.	waterways from utilizing compost produced from yard waste and food waste, which is generally much lower in phosphorus than sewage sludge.				
	Support the adoption of agreements between processors / haulers and municipalities / counties to buy back compost products made from local feedstock.	Regional composters have indicated that there is a potential that if composting were to scale up significantly in the state, finding end markets may become challenging. To help mitigate that risk, NRDC can coordinate with composters and haulers to examine the potential for agreements between composters, haulers, and the City of Baltimore and surrounding municipalities to making buy-back compost product commitments.	Medium	Low	Low	Low to Medium
	Coordinate a joint marketing campaign to drive demand for finished compost.	Conduct a coordinated marketing campaign with NRDC, Baltimore and other local partners (such as ILSR, Energy Justice, Compost Cab, Waste Neutral, etc.) targeting landscape and home contractors to educate end users on benefits of compost products and the need to close the organics recycling loop by using finished compost.	Low	Low	Medium	Low to Medium

EDUCATION AND ENGAGEMENT

Recommendations aimed at increasing awareness and participation as well as reducing contamination are included below.

Table 13: Participation and awareness recommendations

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Many residents and businesses do not know what composting is or understand the benefits and are unaware that food waste recycling is available to them. Contamination is a persistent issue for composters, though no composters indicated the issue was severe enough currently to significantly impede food waste composting. 	<p>Pursue a community education campaign on food waste recycling.</p>	<p>NRDC and Baltimore City can educate residents on what composting is, the benefits of composting, how small behavior changes can have a large impact on diversion, and opportunities to recycle food scraps in the region.</p>	<p>Low to Medium</p>	<p>Low to Medium</p>	<p>Medium</p>	<p>Medium</p>
	<p>Support internal city operations for education and outreach on food scrap recycling to recruit multi-family and commercial sector participants.</p>	<p>NRDC staff could work closely with Baltimore to develop a marketing message and approach targeting multi-family and commercial generators (beyond grocery). Recommendation includes targeting high profile restaurants for front of house that while individually may not divert significant amounts, are seen as local leaders and can influence their customers and peers. Similar strategy recommended for a small selection of multi-family units.</p>	<p>None</p>	<p>Low</p>	<p>Low</p>	<p>Medium</p>
	<p>Support a master composter training program.</p>	<p>A master composter training program educates residents on the logistics, benefits, and potential methods of composting; these residents can then educate others and generate enthusiasm within their neighborhoods for composting (e.g. NY City master-composter-certificate-course¹⁰⁰.) The City could team-up with educators already operating in Baltimore</p>	<p>None</p>	<p>Low</p>	<p>Low</p>	<p>Low</p>

¹⁰⁰ Full website: <https://www1.nyc.gov/assets/dsny/site/contact/master-composter-certificate-course>

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
		(e.g.: ILSR) to create a master composter program.				
	Encourage the launch of a pilot food scrap recycling program targeting K-12 public schools.	Schools generate food waste which can potentially be composted onsite or collected for composting offsite; schools also provide opportunities to teach students about composting, potentially establishing life-long behavioral changes. In conjunction with starting a pilot food scrap recycling program, the City should develop curriculum on composting for K-12 schools.	None	Low	Low	Low
	Support commercial and institutional food waste recycling by providing businesses with access to worker training on organics recycling and waste audits.	Many businesses are unaware that they could potentially save money on their waste bills by participating in diversion activities such as food waste composting. Additionally, business owners may not know how to set up an organics collection system or train their employees successfully for a food scrap recycling program. NRDC and the City could support the business community by providing resources such as education materials and guidance, dumpster size calculators, and waste audits so that businesses can become proactive in reducing waste. Composters and haulers could be enlisted to help support this initiative.	Medium	Medium	Medium	Medium

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Some stakeholders indicated struggling to find consistent labor able and willing to do compost work. Rodents were listed as a concern impeding starting composting programs by some stakeholders. 	Study HB171 recommendations and work towards implementation of food scrap recycling recommendations applicable to the Baltimore metro region.	The MDE released draft food scrap recycling recommendations from the HB171 working group in December 2018, some of which recommendations are described in this report. The final HB171 recommendations will be released in July 2019. NRDC and Baltimore City and County should examine how these final recommendations can be used to spur food scrap recycling in the region.	Low	Low	Low	Low
	Review Baltimore Food Waste & Recovery Strategy Report and engage the City on ways to achieve those goals.	In 2018, the City of Baltimore released a food waste and recovery strategy plan that outlines Baltimore's goals for food waste reduction, recovery, and recycling over the next 20 years. NRDC should review this report and work with the City to achieve their food waste goals.	Low	Low	Low	Low
	Aid composters in finding and training labor.	Stakeholders have described difficulty in finding enough reliable laborers to do compost jobs. Composters would benefit from a program to help find and prepare laborers for compost jobs.	Low to Medium	Low	Medium	Medium
	Work with Baltimore City Department of Health so that rodent control aligns with City's food waste reduction goals.	To address both real and perceived rodent problems, the Office of Sustainability, Baltimore DPW and Baltimore Department of Health should coordinate to align composting and rodent control efforts and provide outreach to residents.	None	None	Low	Low

SUPPORTING POLICIES

Policy, if strategically crafted and implemented, can be one of the largest drivers of increased diversion. Recommendations on potential policy options are described below.

Table 14: Supporting policies

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> There is no policy in the City and County of Baltimore aimed at reducing food waste; this includes both residential and commercial generators. 	<p>Investigate City and County level policies to drive food scrap diversion.</p>	<p>Work with the Baltimore DPW and Mayor's Office of Sustainability staff to explore policy options for increased food scrap recycling. Policy options in the near term should be aimed primarily at commercial generators. Options may include required service for certain generator types (e.g. large grocery, convention, or sports arena), source separation requirements for commercial generators, hauler requirements to offer collection for certain generators, policies aimed at multi-family property managers, or incentive programs. NRDC roles could include supporting stakeholder groups, providing research into policy options, and educating stakeholders and / or elected officials.</p>	Medium	Medium	Medium	Medium
	<p>Encourage the City to clarify policy on composting at community gardens and urban farms.</p>	<p>Policy that supports community composting reduces confusion and ensures smaller-scale processors and government agencies are on the same page. To encourage community garden and farm growth, the City could adopt a zoning amendment ordinance or administrative rules to clarify that compost systems at community gardens and urban farms are a welcome addition to Baltimore's landscape as long as no odors or nuisances occur.</p>	Low	Low	Low	Low

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Baltimore DPW is funded through the general fund so that the perception to residents is that waste collection is “free”. 	<p>Support Baltimore home composting legislation.</p>	<p>In 2018, Washington, DC City Council passed the Home Composting Incentives Amendment Act to encourage home composting. The passage of the Act meant that the DC DPW had to dedicate budget towards home composting¹⁰¹. This Act is a great example of how policy can be used to spur action, and the City of Baltimore should consider enacting similar policy to support home composting and other food waste recycling activities.</p>	Low	Low	Low	Low
	<p>Support adoption of Baltimore City pay-as-you-throw or other variable rate program for residential garbage service.</p>	<p>Work with Baltimore staff to help support the adoption of a citywide pay-as-you-throw or volume-based fee structure for residential garbage services. Under the fee structure, residents would be charged a fee for trash service based on the subscribed volume of trash service, and compost service, along with recycling service, would be included for a flat or embedded fee. The variable rates provide an economic incentive for all residents to compost food scraps. In the long term, policy could be supported by source separation requirements or eventually every other week trash service with weekly organics collection (like Portland, OR¹⁰²).</p>	High	High	Medium	Medium

¹⁰¹ Article on Washington, DC bill B22-0501 – Home Composting Incentives Amendment Act of 2018: <https://ilsr.org/washington-dc-home-composting-bill-passes/>

¹⁰² Information on Portland, OR Pay-As-You-Throw Program: <https://www.portlandoregon.gov/bps/article/492501>

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Differences in the definitions between the state's Department of Environment, Department of Agriculture, and Department of Transportation create barriers to composters trying to sell compost to different end markets. 	Examine different definitions of and regulations on finished compost between state departments to assess consistency.	The Maryland Department of the Environment regulates the permitting of compost facilities while the Maryland Department of Agriculture regulates the sales of finished compost. In addition, the Maryland Department of Transportation has a qualified compost provider program that lays out compost requirements for MDOT use. Each of these different departments has their own set of definitions of finished compost that can be confusing and even conflicting, creating barriers to processors in selling compost.	None	None	Low	Low
	Explore possibility of an exemption or reduced requirements for small composters to distribute or sell compost products.	The MDA requires that any compost product distributed is tested for pH and a list of heavy metals and collects 25 cents per ton from compost vendors for all compost products sold in the state. While the MDA should regulate finished compost and collect fees to support this role, the fee and testing can be costly for small generators and can create a barrier to selling or giving away compost from community gardens or farms. The City could work with the state to consider possible exemptions or reductions in fees and testing requirements for small generators.	None	None	Low	Low
	Explore policy options to create a funding mechanism for processors to purchase equipment and for site development.	To create a needed funding mechanism and also help make composting more affordable than disposal, the City could add a per ton surcharge on refuse disposal facilities or explore other policy options.	Medium	Medium	Medium	Medium

PUBLIC / PRIVATE PARTNERSHIPS

Opportunities for increased public private partnerships are provided below.

Table 15: Partnership opportunities

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
<ul style="list-style-type: none"> Staff and resources at NRDC, Baltimore City and Baltimore County are limited by time and budget and cannot address the entire city. There are numerous organizations and non-profits working to reduce food waste and increase composting in the City; they are not always coordinated in their efforts or messages. 	<p>Establish local partnerships with like-minded non-profits and community organizations to expand reach of marketing and build support for food scrap recycling.</p>	<p>The City, with help from NRDC, could establish partnerships with local non-profits and community organizations (e.g. Energy Justice, ILSR) to expand community outreach and education on the benefits of composting, recruit participants, and support end market developments. E.g. New York City resources existing non-profit groups for master composter training program, etc. bringing everything under one brand – The New York Compost Project¹⁰³</p>	Low	Low	Low to Medium	Low
	<p>Continue building Baltimore cross-departmental coordination between the DPW and Office of Sustainability.</p>	<p>Work alongside Baltimore DPW and Mayor's Office of Sustainability to help coordinate activities. NRDC can facilitate standing meetings / committees to ensure that all Baltimore internal departments and staff are pulling in the same direction as well as to identify underserved markets / areas (e.g. multifamily generators).</p>	Low	Low	Low	Low

¹⁰³ The New York Compost Project: <https://www1.nyc.gov/assets/dsny/site/our-work/reduce-reuse-recycle/community-composting>

Rationale / Barriers	Action Steps	Description	Impact - Facilities	Impact - Diversion	Cost - NRDC	Cost - Gov't
	Explore coordination with Maryland Environmental Services.	Maryland Environmental Services was established in 1970 as a not-for-profit public corporation. MES operates two composting facilities in the Baltimore region – Prince George’s County facility and Montgomery County Composting Facility. These facilities are regarded as well-run by other composters and haulers in the region. NRDC and Baltimore could explore ways that MES could support greater food waste recycling in the region.	Low	Low	Low	Low