



SUSTAINPVD
MAYOR JORGE ELORZA

MOVING TOWARDS ZERO WASTE

**A Residential Compost Assessment
of Providence, RI**

Photo Credits: Groundwork RI and The Community Compost Depot

ACKNOWLEDGMENTS

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DEFINITIONS

Anaerobic Decomposition: the process of bio-degradation occurring in the environment in the absence of oxygen, producing reduced organic compounds such as methane as a byproduct.

Anaerobic Digestion: a series of biological processes in which microorganisms break down biodegradable material in the absence of oxygen. One of the end products is biogas, which is combusted to generate electricity and heat, or can be processed into renewable natural gas and transportation fuels.¹

Compost: A humus-like product made from decaying organic matter and is used for fertilizing and conditioning land.

Composting: Composting is the controlled aerobic decomposition of organic matter by microorganisms into a stable, humus-like soil amendment. The processes used in composting occur in nature, but systems can be designed and managed to enhance and accelerate the process.²

Circular Economy: A circular economy is a systemic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the 'take-make-waste' linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources.³

Organic Matter: Derived from living matter.

Organic Resources: Organic matter which requires both good handling practices and further processing so as not to become an environmental burden.

Municipal Solid Waste: Landfill waste generated by the specific municipality.

Tipping Fee: A fee paid for disposing of waste at a landfill. Typically it is a cost per ton of material.

Zero Waste: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials.

1 | "What Is Anaerobic Digestion?," American Biogas Council, accessed July 2021.

2 | USDA, "Part 637, Environmental Engineering: Chapter 2, Composting," in *National Engineering Handbook*, 2010, p. 2-1.

3 | "The Circular Economy In Detail," Ellen MacArthur Foundation, 2017.

EXECUTIVE SUMMARY

This report is in response to the resolution passed by Providence City Council to study organic waste disposal and advise a residential composting plan to the City. It is also an important step towards achieving the City's goals including becoming a carbon neutral city by 2050, developing a zero waste strategy by 2033, and eliminating food waste by 2040.

Diverting organics from the landfill through composting has economic, environmental, and social benefits including:

- | **Addressing climate change:** When organic material is sent to the landfill, it creates a highly potent greenhouse gas, methane. Landfills are the third largest contributor to GHG emissions in the United States and keeping organic matter out of the landfill would work towards the City's goal to be carbon neutral by 2050 and eliminate food waste by 2040.
- | **Save tax-payer dollars:** Diverting organic materials would save the City money by reducing waste tonnage and refuse processing costs. The city spent an estimated \$775,965 on the landfilling of organic material in FY2020.
- | **Prolong the life of the landfill:** The state's only landfill is estimated to reach capacity in 2034. Approximately 32% of Providence's residential waste stream is organic material that could be composted instead of landfilled.
- | **Enhance soil health and reduce the need for harmful fertilizers:** By capturing organic waste and returning it to our soils, we can stabilize erosion, support vegetative growth and a healthy soil microbiome, and increase carbon sequestration. By adding compost to soils, we also reduce the need for pesticides and fertilizers, which are harmful for human health, water quality, and pollinators and other beneficial insects.
- | **Create local jobs:** The Institute for Self-Reliance (ILSR) conducted a study in 2013 and found 1,400 full-time jobs were created for every one million tons of organic material composted. In contrast, ILSR found 120–220 jobs were created per one million tons of material processed.⁴

Based on an assessment of best practices and speaking with local stakeholders and residents, the following strategies will help Providence meet its goals:

1. Steward an education and outreach campaign on organic recycling.
2. Offer free community composting throughout the city.
3. Advocate for additional composting facilities across the state.
4. Promote composting through land use policies.
5. Procure compost for City projects.
6. Compost organics at municipal facilities and events.
7. Long term: Develop a plan for city-wide organic diversion and ban organic material from the Municipal Solid Waste stream.

ABOUT THIS REPORT

On January 7, 2021 Providence City Council passed [Resolution](#) 30814 - A Resolution Requesting to Study Providence Composting. Specifically, the resolution asks the Office of Sustainability, Department of Public Works, the Environmental Sustainability Task Force and other community groups that represent Providence's diverse constituencies, to produce a residential composting plan that explores current composting practices in Providence, identifies short and long-term steps to eliminate food waste from the residential waste stream and establishes a set of principles and values to guide the work. This resolution was championed by Councilman John Goncalves and supported by Zero Waste Providence (ZWP), a grassroots organization with the mission of resource recovery.

On January 14, 2021, Mayor Elorza signed the resolution and directed the Office of Sustainability to begin the work to build awareness around organics recycling and align efforts with the City's environmental and climate justice goals: carbon neutrality by 2050⁵, zero waste strategy by 2033⁶ and eliminating food waste by 2040⁷.

The Office of Sustainability partnered with ZWP to engage residents and composting stakeholders. ZWP conducted a literature review on organic material processing and conducted interviews of local composting organizations including haulers, processors, and community-based organizations.

A survey was distributed February 22nd–April 6th, 2021 to Providence residents to learn who composts, who doesn't, and what type of organic recycling services are the most desired. The survey was a Google Form published in English and Spanish and distributed via electronic newsletters, community organizations, and flyers posted with a QR code linking to the survey. 416 residents of Providence participated in the survey. This survey is not a complete representation of disposal practices for the entire city of Providence; however it exemplifies the interest in recycling organic material and the preferred practices for doing so among those who participated. Many of the highlights from the survey are included throughout the report. However, if you'd like to receive a full copy of the anonymized survey results, please contact the Office of Sustainability.

This report explores Providence's current residential organic waste diversion practices, most commonly through the means of composting, and assesses the economic and environmental impacts of landfilling organic materials. The report also provides recommendations on how to increase organic recycling as a means to meeting climate and sustainability goals while also creating jobs and saving taxpayer dollars.

5 | City of Providence, "Executive Order 2016-3 Commitment to Eliminating City-wide Carbon Emissions and Preparing for the Long-term Impacts of Climate Change."

6 | ---, *Sustainable Providence*, 2014.

7 | ---, *Climate Justice Plan*, 2019.

ORGANICS IN PROVIDENCE'S WASTE STREAM

In 2015, the Rhode Island Resource Recovery Corporation (RIRRC) conducted a year-long audit of Rhode Island's waste generation to study the components of the solid waste stream⁸. The study found vegetative food waste (organics like fruits, vegetables, pantry items) to be the single largest wasted material in the residential waste stream, at 17.1% of the total waste generated. Combined with other compostable organic materials, like yard debris and compostable paper, the study found 32% of residential waste was compostable at any scale, meaning any composting facility has the ability to process it. It also reported the total grocery store waste was 46.4% food waste; restaurant waste was measured at 48.1% food waste with an additional 11.6% of compostable materials such as napkins and paper plates. In conclusion, the study found food waste to be the largest category of landfill disposal with significant diversion potential. Assuming Providence's waste stream has a similar characterization as the state as a whole, it can be inferred that **32% of**

Providence's residential waste stream is organic material that could be diverted from the landfill.

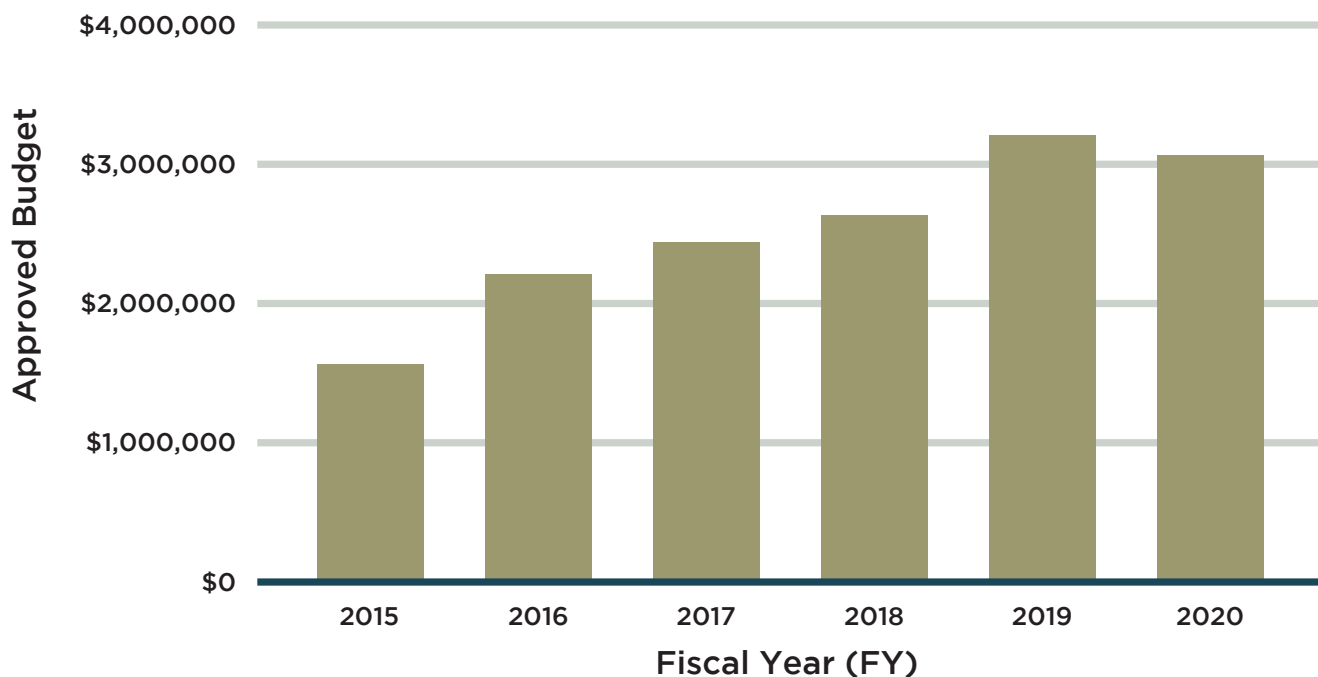
THE FINANCIAL IMPACTS OF LANDFILLING ORGANIC MATERIAL

There are substantial financial savings opportunities from diverting organic material from the waste stream. In FY20, the City spent roughly \$3 million on refuse processing⁹, which refers to the allocated expenses for solid waste processing at Rhode Island Resource Recovery Corporation (RIRRC). There has been a 48.8% budgetary increase over the last five years due to an increase in RIRRC tipping fees and increased demand for waste disposal at the landfill.

⁸ | *Rhode Island Solid Waste Characterization Study*, Rhode Island Resource Recovery Corporation, December 31, 2015.

⁹ | City of Providence, "52020: Refuse Processing," *Approved Budget Revenues and Expenditures*, Fiscal Year 2020, p. 66.

FY 2015–2020 REFUSE PROCESSING BUDGET



The City's expenditures on refuse processing has increased 48% over the past five years.

In order to understand the potential savings from diverting organics from the Municipal Solid Waste (MSW) stream, we must first understand the costs related to processing these materials. RIRRC charges what is known as a tipping fee per ton of waste delivered to the RIRRC for processing and disposal. Every municipality has a cap on the amount of waste it can send to the Central Landfill. RIRRC uses these caps to discourage excessive waste deliveries since there is finite space available within the Central Landfill and it is expected to reach capacity by 2034. In regards to the landfill's remaining availability, the RIRRC states:

Rhode Island has some of the lowest trash and recycling fees in New England. Rhode Island cities and towns pay a below-market disposal fee, or tipping fee, for each ton of trash, currently \$47 per ton, and pay no disposal fee for recyclables by law... When the landfill closes there are some alternatives for us: (1) Find another city/town to build a landfill, (2) attempt to expand the current facility, (3) ship it out of state, and (4) find alternative technologies for waste processing¹⁰.

It is widely expected that any of these alternatives will result in significantly higher tipping fees for municipalities. Tipping fees have already been steadily increasing over the past few years and there are planned increases for the coming years.

Fiscal Year (FY)	Tipping Fee Under Cap	Tipping Fee Over Cap
2015	\$32	\$54
2016	\$32	\$54
2017	\$32	\$54
2018	\$39.50	\$67
2019	\$47	\$67
2020	\$47	\$80
2021	\$47	\$80
2022	\$47	\$90
2023	\$54	\$100

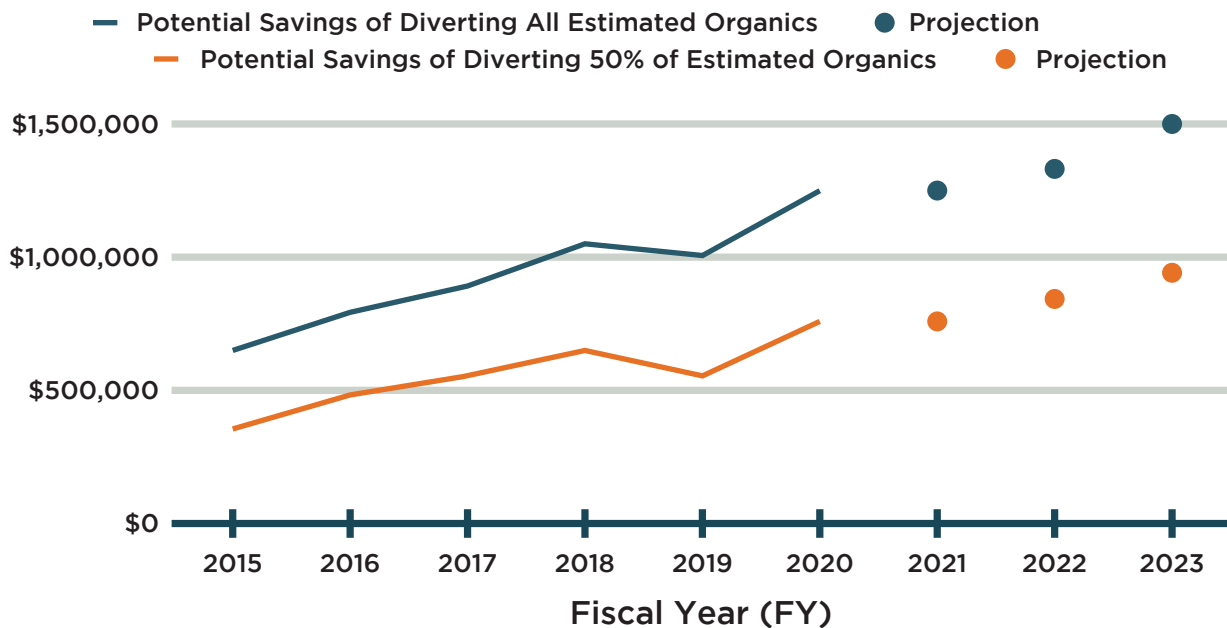
Providence exceeds its cap each year; however, if the City had programs to divert organic materials (32% of its total waste), it would have remained under the cap each year since 2015.

Fiscal Year (FY)	Waste Cap (tons)	MSW Generation (tons)	Tons Over Cap	Potential Organic Diversion (32% x MSW Generation)
2015	53,781	56,848.16	3,067	18,191
2016	53,403	60,957.35	7,554	19,506
2017	52,880	63,626.09	10,746	20,360
2018	52,648	62,060.82	9,413	19,859
2019	54,938	60,038.15	5,102	19,212
2020	56,638	64,861.65	8,224	20,756

Using the over and under the cap tipping fees, we can calculate the potential savings the City could have realized each year. Since diverting 100% of the potential organic material might not be realistic in the short term, we also calculated the savings for diverting half of that organic material. This analysis also included projections for FY21-FY23. For these years, we used the same tonnage and cap from 2020, but used the tipping fees which have already been set by RIRRC.

In FY2020, the City could have saved up to \$1.2 million dollars by diverting the compostable material, which is an estimated 32% of its waste stream. If the City diverted only half of this material, the City could have saved \$759,000.

POTENTIAL SAVINGS OF DIVERTING ORGANICS MATERIAL



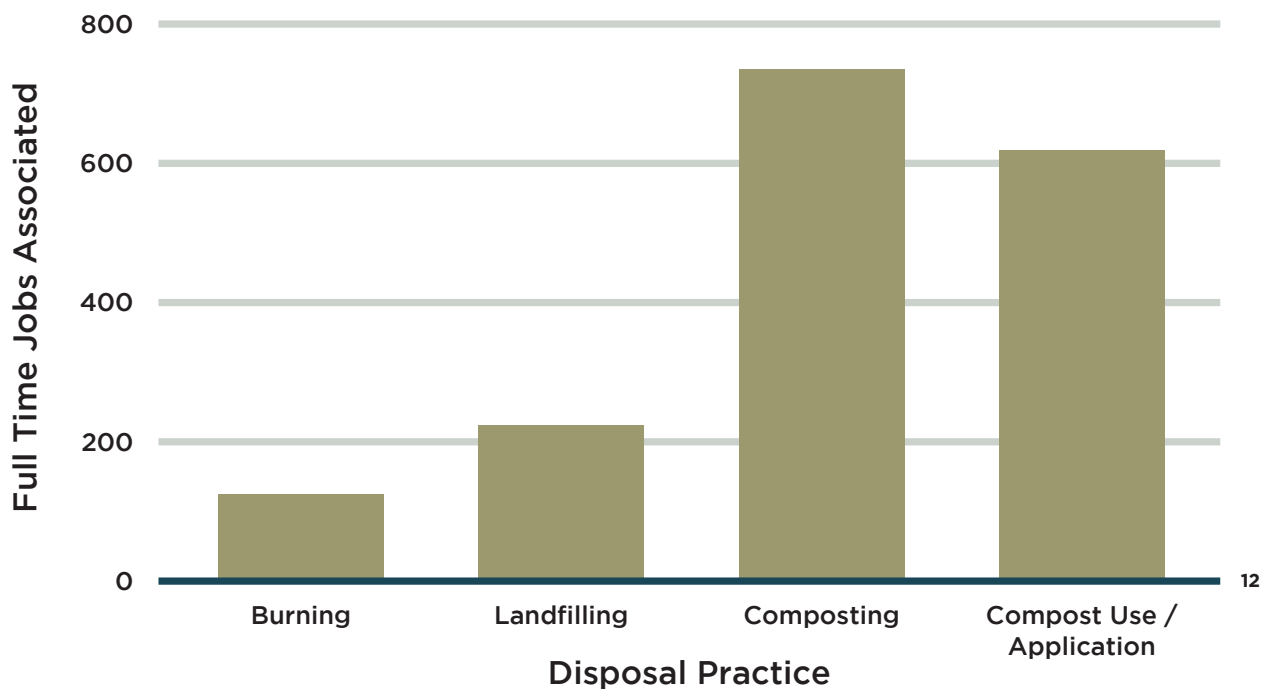
WORKFORCE DEVELOPMENT OPPORTUNITIES

Diverting food waste from the landfill can increase local job opportunities through the addition of services related to hauling organics, managing businesses, processing and applying compost. As discussed later on, Providence is already home to a growing composting industry. An increase in organics recycling, resulting from city engagement and support, would create job opportunities and support a circular and regenerative economy.

Composting incorporates more employment opportunities than landfilling and creates a valuable end product that otherwise would have been buried in a landfill. The Institute for Self-Reliance (ILSR) conducted a study in 2013 and found 1,400 full-time jobs were created for every one million tons of organic material composted. When compared to landfilling, ILSR found 120 - 220 jobs were created per one million tons of material processed¹¹. Furthermore, keeping composting systems local introduces jobs within the community and influences local spending of those businesses buying materials and supplies for their operations.



JOB CREATION PER 1 MILLION TONS OF ORGANIC DISPOSAL



ENVIRONMENTAL IMPACTS

Landfilling Impacts

When organic matter is buried in a landfill it becomes deprived of oxygen and produces methane gas, the process known as **anaerobic decomposition**. Anaerobic decomposition is the process of organic material breaking down in an environment without oxygen, creating methane gas as a byproduct. Methane gas is a potent greenhouse gas (GHG) with a 20-year Global Warming Potential that is 84–87 times more potent than CO₂¹³. The more organic material disposed of in a landfill, the greater amount of methane produced. The United States Environmental Protection Agency reports landfills as the third largest contributor to GHG emissions in the United States due to methane production; this was about 15.1% of the country's total emissions in 2018¹⁴.

TOTAL MSW GENERATED BY MATERIAL, 2018

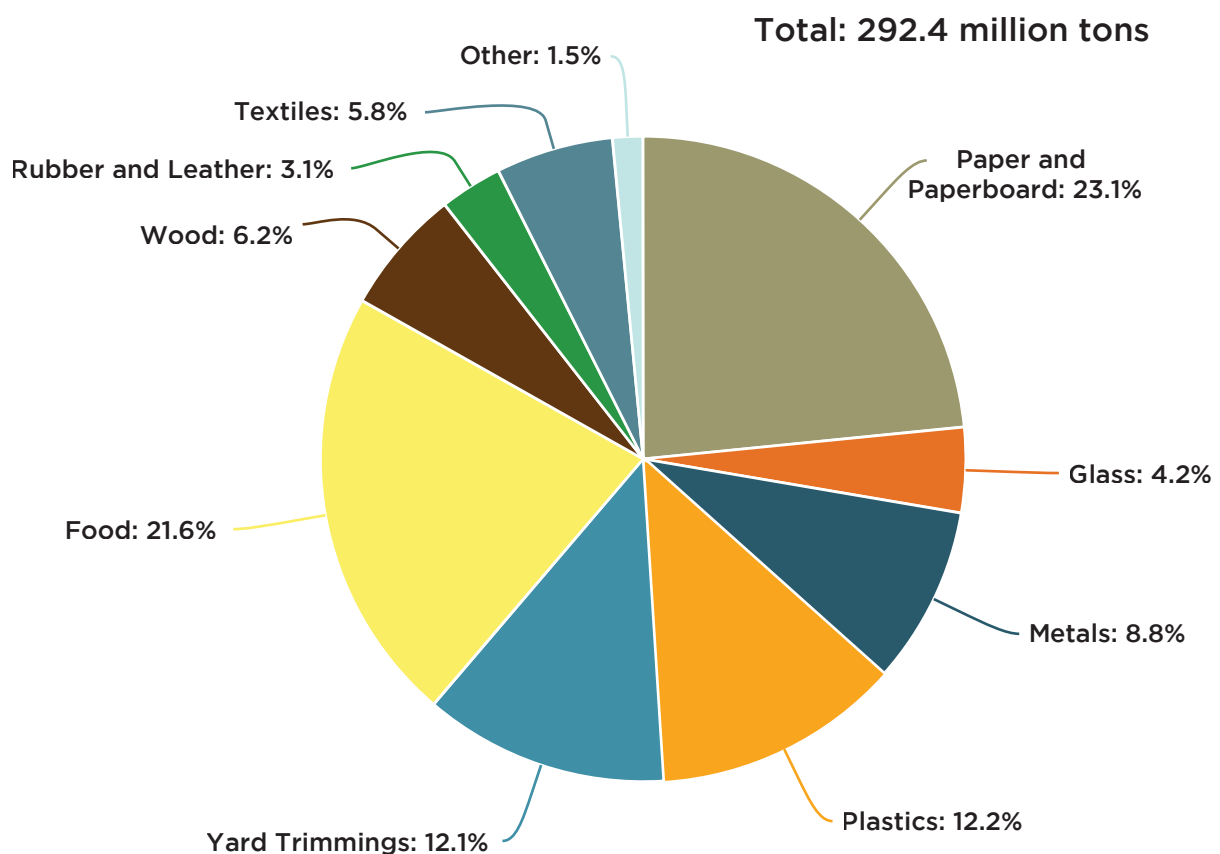
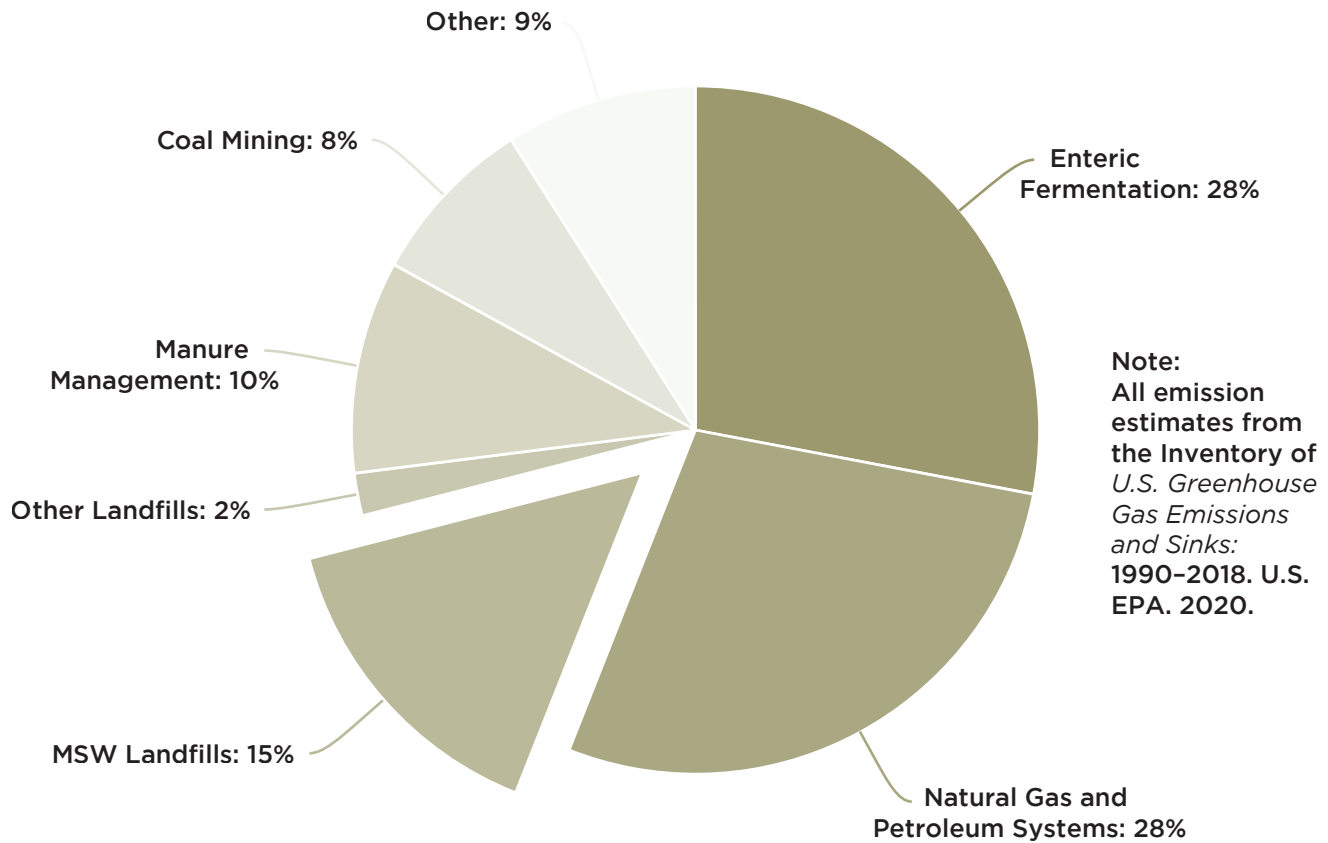


Figure 1, U.S. MSW generation in 2018. Compostable organics labeled “Food” and “Yard Trimmings” combine to make up 33.7% of the waste stream.

¹³ | “Understanding Global Warming Potentials,” Environmental Protection Agency, accessed July 2021.

¹⁴ | “Sustainable Management of Food Basics,” Environmental Protection Agency, accessed July 2021.

2018 U.S. METHANE EMISSIONS, BY SOURCE



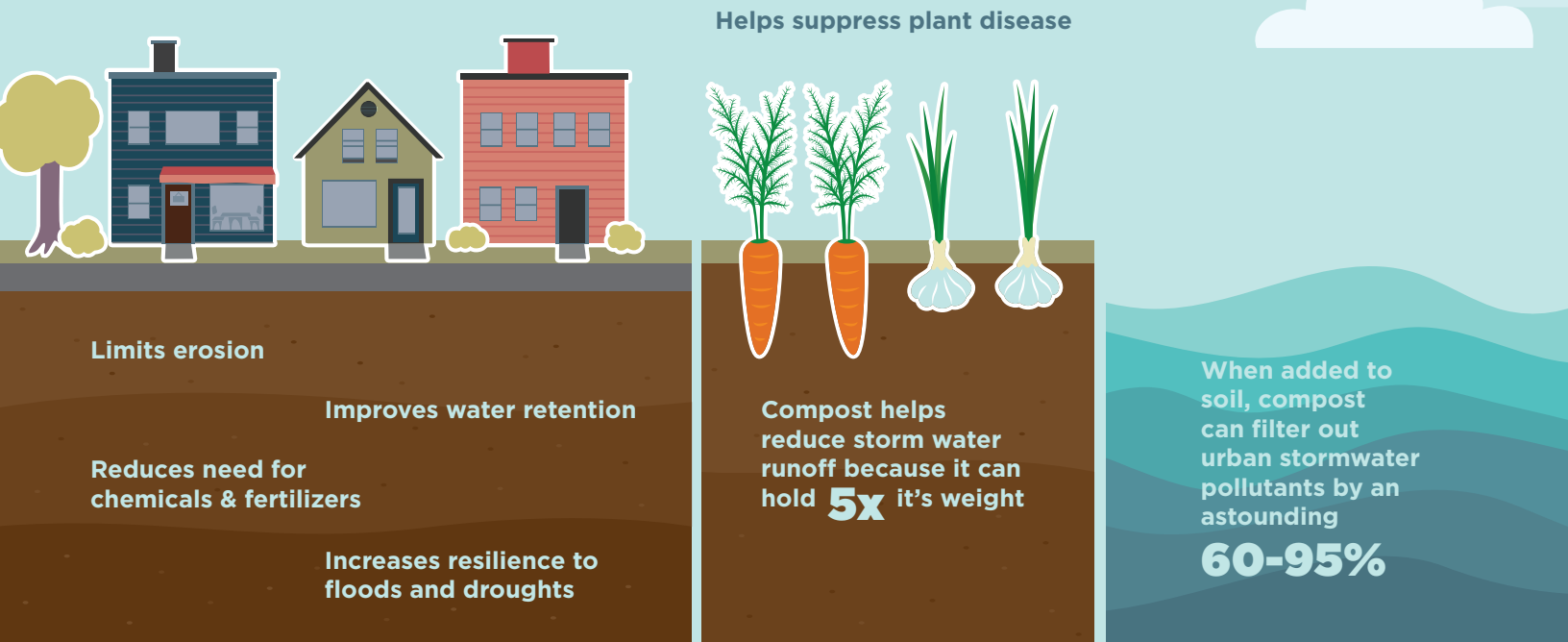
Composting Benefits

Healthy Soils

Perhaps the greatest benefit of composting is promoting healthy soils, which is critical for the ecosystem and food production. Composting is the decomposition of organic matter, like food scraps and yard trimmings, into a nutrient rich soil amendment. It is an engineered process that takes advantage of the natural biodegradation process in a controlled environment. Compost has a natural abundance and diversity of bacterium, microorganisms, and fungi that enhance root development and plant growth. The positive effects of compost on vegetative growth has been demonstrated by tests called “bioassays,” which compare the growth and development of plants treated with chemical fertilizers versus compost products.

Reliance on chemical fertilizers and unsustainable growing techniques has reduced nutrient availability and the long-term productivity of our soils. Compost is capable of restoring nutrients and overall landscape fertility affected by chemical fertilizers. While chemical fertilizers provide plants with nutrients for growth, they strip natural elements from the soil creating a dependency on the chemical fertilizers. They are also made by burning fossil fuels, which cause climate change.

COMPOSTING ENHANCES SOIL AND PROTECTS WATERSHEDS



Improved Water Quality and Water Retention

Excess fertilizers pollute local waterways through stormwater runoff. When fertilizers runoff lawns, gardens and farms, they enter streams, ponds, rivers, and ultimately, the ocean where they cause algal blooms that consume oxygen. These are known as hypoxic zones, or low-oxygen dead zones, that kill off aquatic life and produce toxins harmful to human health¹⁵. Some algal blooms are so toxic they can kill dogs and other animals that may swim in and drink from the waterbody. Currently, Rhode Island has about 71 water bodies impaired by excess nutrient, or fertilizer, pollution¹⁶. (Water Image¹⁷)¹⁸

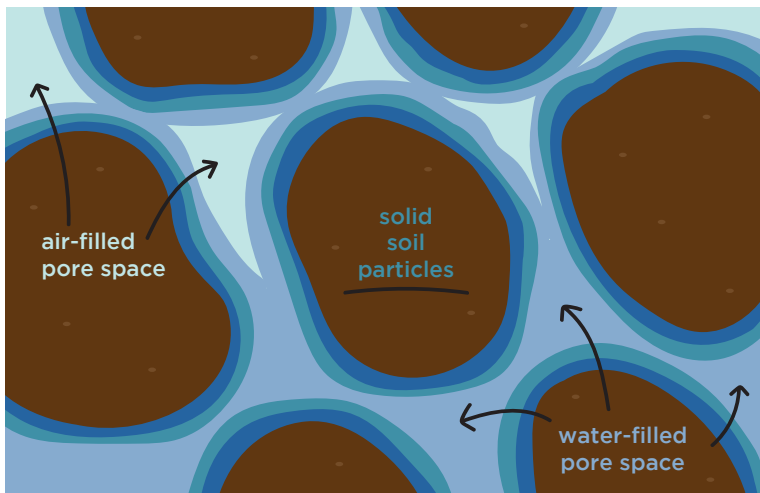
Healthy soils are able to absorb, retain, and filter stormwater pollution before they enter the watershed. This ability to retain more water also helps support plants, trees and microorganisms. Structurally, compost is a network of clustered particles with tiny pockets of open space perfect for absorbing moisture and filtering stormwater runoff water. The application of compost for agricultural or horticultural

¹⁵ | "Stormwater Runoff," Chesapeake Bay Program, accessed July 2021.

¹⁶ | Clean Ocean Access - Rhode Island

¹⁷ | "Cyanobacteria (Blue-Green Algae)," Office of Water Resources (Department of Environmental Management), accessed July 2021.

¹⁸ | "Basic Information about Landfill Gas," Environmental Protection Agency, accessed July 2021.



purposes has proven to reduce the amount of water typically used to irrigate parcels without compost. Per acre, a 1% increase in application of organic matter (compost) causes the soil to store 20,000 gallons more water than landscapes without compost¹⁹. This absorbent characteristic of compost creates a resilience to nutrient offloading from stormwater runoff. Chemical pollutants that enter waterways make aquatic environments

aesthetically undesirable and can create hazardous conditions for the species that use them. Incorporating compost into Providence's urban landscape can control erosion and buffer pollutants headed for Narragansett Bay.

Supporting Urban Agriculture

Providence is home to many urban gardens maintained by community members who grow produce for food or profit. A locally available source of compost can improve urban crop yields and remediate vacant lots into public gardens or green spaces. Healthy soil directly influences the food security of those who grow food to feed their families or earn an income. Committing to a system that deters organic material from the waste stream for local composting will provide greater accessibility to nutrients that amplify vegetative success.

Carbon Sequestration

When applied to soil, compost enhances vegetative growth and carbon drawdown from the atmosphere. As plants grow they photosynthesize, extracting carbon dioxide from the atmosphere for storage within microorganisms found in healthy soils. The US Geological Survey suggests carbon drawdown, or carbon sequestration, as an effective method for removing GHGs from the atmosphere²⁰. Since compost is naturally equipped with the microbes responsible for bonding to carbon, compost application is an encouraged method for pulling carbon out of the atmosphere²¹. Incorporating compost into Providence's landscape will assist with carbon neutrality goals.

¹⁹ | Lara Bryant, "Organic Matter Can Improve Your Soil's Water Holding Capacity," Natural Resources Defense Council, May 27, 2015.

²⁰ | "What Is Carbon Sequestration?," USGS (U.S. Department of the Interior), accessed July 2021.

²¹ | Peter Kareiva, "Carbon Sequestration through Compost," Institute of the Environment and Sustainability at UCLA (The Regents of the University of California, June 17, 2020).

THE PROVIDENCE COMPOSTING LANDSCAPE

Most organic material management in Providence is spearheaded by community organizers, small businesses, and nonprofits dedicated to diverting food waste from the landfill for recycling back into the soil. These organizations and practices arose from residential demand and were boosted by the 2016 Food Waste Ban that mandates large food waste producers to recycle their organics (see Rhode Island General Law § 23-18.9 – Refuse Disposal).²²

Collection Services

There are a variety of collection practices in Providence such as curbside collection, aggregate collection (i.e. community dropoff sites), and commercial business collection. Haulers collect organic materials from residents and businesses throughout Providence on a scheduled basis and deliver the material to composting sites, or an anaerobic digester, for processing. Bootstrap Compost, City Compost, The Compost Plant, Harvest Cycle Groundwork RI, and Rhodside Revival are some of the primary operators that offer curbside collection services at a fixed rate dependent on frequency, or volume, of material collection. The Office of Sustainability maintains a list of businesses that compost on their website. In 2019, they teamed up with Zero Waste Providence and set a goal to get 100 businesses composting.

Photo Credit: The Community Compost Depot



The haulers are experiencing a consistent increase in demand for their services; however, they are restricted by the limited capacity at processing facilities in the region. In other words, the interest in composting organic material is growing but the facilities available to process the materials limit how much haulers can collect.

IMAGE: Map of composting processing facilities <https://arcg.is/1r4GWn>

Survey Findings: 71% of respondents said they are interested in a curbside organic waste collection service and 59% of respondents are willing to pay for that service.

Community Composting

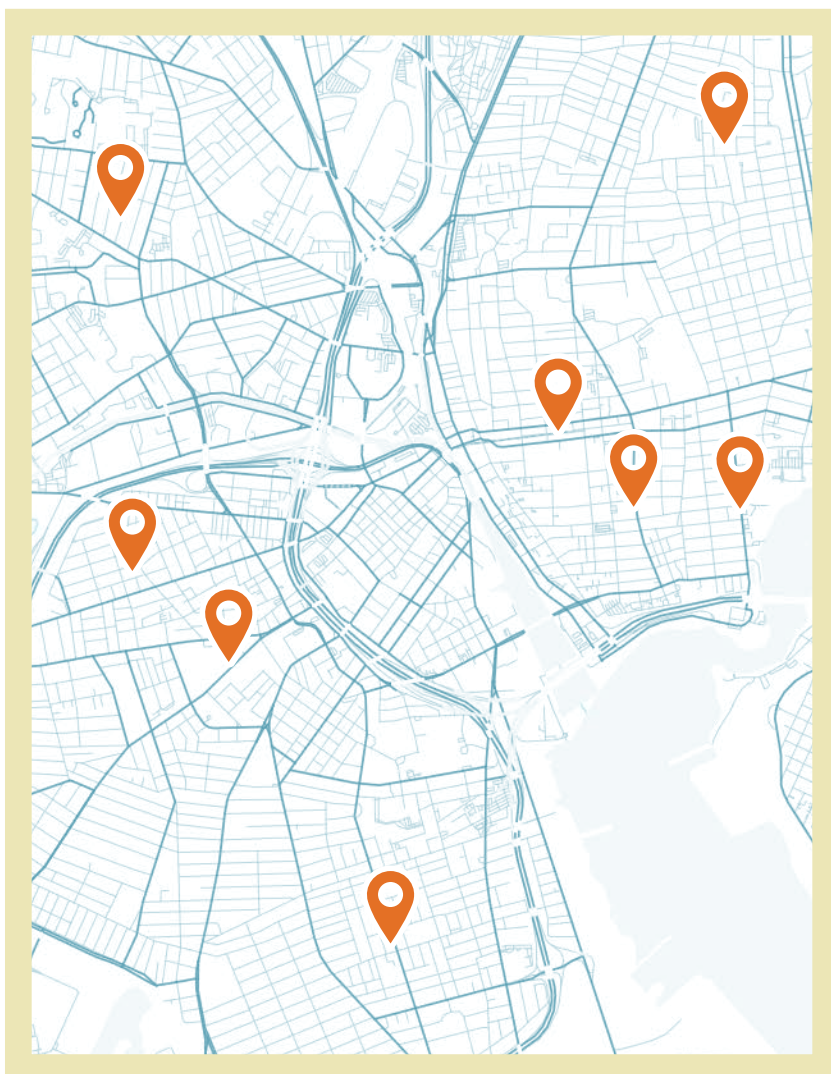
Photo Credit: Groundwork RI

There are a handful of community composting operations in Providence that offer a centralized location for residents to drop off their food scraps for local processing. The drop-off locations are managed by local composters and urban gardeners who process the organic material into compost either on the same site as the drop-off location, or at another process site in the community. For example, Community Compost Depot, Inc. transfers their material collected at Frey Florist in Smith Hill to Earth Appliance Organics composting facility, which is a medium-scale facility in Providence registered with the RI Department of Environmental Management.



Medium-scale composting offers significant opportunity in Providence due its lower bar to entry, both regulatory and financial. The Rhode Island Department of Environmental Management defines medium-scale composting as having a total on-site quantity of material between 25 and 600 cubic yards (excluding finished compost) and does not require a permit for compost facilities processing less than 25 cubic yards (which is considered small-scale composting). Compared to large-scale composting, medium-scale composting is more in line with a restorative justice approach because it does not require the composter to own a large amount of land, which is often a barrier, especially for historically oppressed populations. Medium-scale facilities are also easier to site and manage, particularly within a dense urban setting. Community composting operations can increase the distribution and reach of composting within neighborhoods and help keep composting closer to the source, reducing greenhouse gas emissions from transportation.

Community compost facilities, medium or small, often require participants to register with the affiliated host organization before they start using the service; and most require a one-time or recurring payment to participate. Many of these drop-off locations experienced an increase in use during the COVID-19 Pandemic and continue to grow. As new sites are opened, participation and demand grows significantly. For example, after the Urban Greens site opened, there were 60 new sign-ups in just one week according to Harvest Cycle, the group that manages the site.



Compost drop-off locations, June 2021, <https://arcg.is/0av9yK2>

One of the challenges with drop-off sites is that they can be susceptible to contamination from passer-bys throwing in inorganic materials or participants who improperly dispose of non-organic material. Due to the anonymity of participants, drop-off locations can have a harder time getting in contact with the specific person responsible for disposing of non-compostable materials. However, this challenge can be overcome with the proper siting, signage and management of the facility. Additionally, any composting facility requires proactive planning for reducing unwanted pest activity. Bins with locking lids and secure infrastructure have been used to manage access and pest activity.

Survey Findings: 57% percent of respondents said they were interested in an aggregate drop-off location to bring their organic waste and 27% of respondents would be willing to pay for that service.

Composting at Home

There are a variety of methods and small-scale composting structures created for processing household organic materials into compost within a backyard. There are also alternative techniques, like Bokashi composting, that break down the organics through fermentation processing, and indoor composting using worm bins, which is often called vermicomposting. Backyard composting requires space for processing materials, the means to purchase materials, and knowledge on the process of composting. Issues can arise when backyard composters neglect their compost bins; however, community groups like The Community Compost Depot, Zero Waste Providence, Groundwork RI, and others host educational events to share resources and best practices for maintaining compost bins. Residents may also purchase compost bins from the Department of Public Works for \$45 or from RIRRC for \$35.



**An organic drop-off site managed at Urban Greens Co-Op managed by Harvest Cycle.
Photo Credit: Groundwork RI**

Graph: Compost bins sold to Providence Residents <https://data.providenceri.gov/d/r6cj-bh5z>

Survey Findings: 38% of respondents said they would be interested in learning how to compost in their backyard.

Composting at Schools

Groundwork RI and The Community Compost Depot have brought composting education to Providence schools. Groundwork RI has worked with Mary E. Fogarty Elementary School and Robert L. Bailey IV Elementary School, as well as Bishop McVinney School and the Jewish Community Day School. The Community Compost Depot has worked with Mount Pleasant High School, The Wheeler School and Providence College to build community awareness and train on composting options.



Compost Educational Workshop at Bishop McVinney School. Photo Credit: Groundwork RI



Compost Educational Workshop with Children's Friend & Services. Photo Credit: Groundwork RI

RI Schools Recycling Club is currently working with six Rhode Island schools on *Get Food Smart, RI*, a pilot project to reduce, recover and divert food waste away from the landfill. Vartan Gregorian Elementary School in Providence is expected to be one of the six pilot schools, in partnership with Sodexo, with a site survey scheduled for the fall of 2021.

Sodexo partnered with CET in July 2021 to do a walk-through site assessment of the Bucklin Production Facility and prepare a food scrap estimate with recommendations for food recovery and composting. They hope to divert food scraps to the new Groundwork RI Composting Facility when it comes online in late 2021. Sodexo has also signed on to receive technical support from CET for composting potential at two other schools as part of the City of Providence's USDA Composting grant application

Anaerobic Digestion

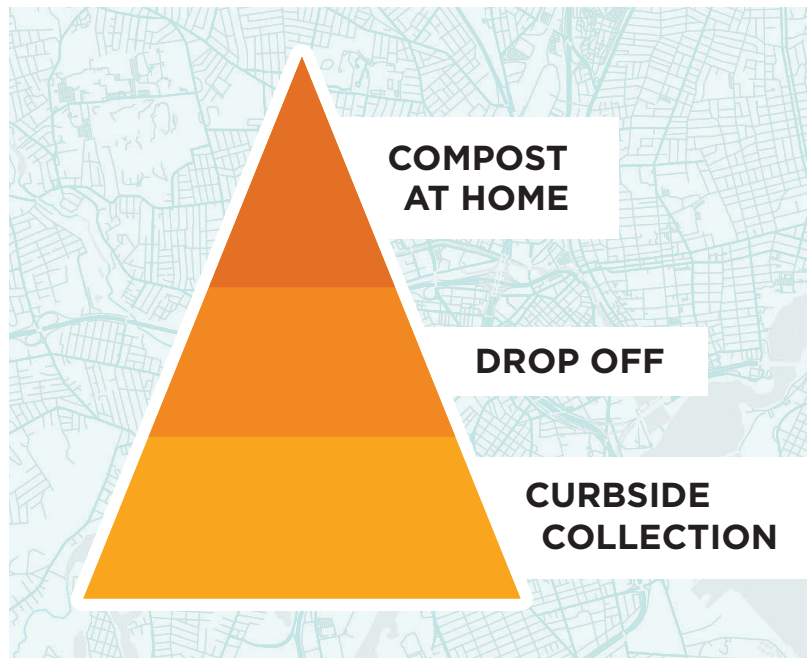
Anaerobic digestion is the process of breaking down organic material in an oxygen-free environment. Biogas, which is made out of mostly methane and is a byproduct of this process, is used as a fuel source to create energy. The state's only anaerobic digester is in Johnston, RI and it accepts materials from both in and out of state. Some organic haulers deliver materials from Providence to the digester when composting facilities reach their capacity. The anaerobic digester produces two byproducts. A liquid, or "slurry", that can be applied to the landscape as a fertilizer and a solid that is often used as animal bedding. When the slurry is not demanded for application among the landscape, it is landfilled. Due to the frequent contamination of materials processed within the digester (unfiltered contaminants like plastics) the slurry is not certified organic. Anaerobic digestion is not composting but can serve as an alternative to landfilling organic waste.

EXPANDING ORGANIC WASTE DIVERSION IN PROVIDENCE

While the local composting landscape is growing, there is significant work to be done to scale food waste diversion efforts and realize the many benefits of composting. Conversations with industry leaders were unanimous in identifying two primary challenges to expansion: 1) the limited capacity of existing compost facilities and the challenges that come with siting new facilities or expanding existing facilities, and 2) the lack of incentives for residents to participate. Compost haulers often take material out of state or to the Anaerobic Digester for processing because local compost processors reach their capacity (see Appendix A). Some haulers have attempted to open their own processing facilities but inconsistent local laws and weary neighbors have prohibited such developments. At the same time, participation in composting programs is limited to early adopters who are willing to pay for collection of their food scraps, manage their own backyard pile, or elect to bring the scraps to a drop off location. Backyard composters get the benefit of their own finished product, but other than that, residential composting is mostly an altruistic endeavor.

Addressing these barriers is critical to expanding but will take time and scaffolding. Care should be taken to make sure programs are set up for success, are equitable, and capture the most co-benefits of composting. As such, Providence should keep the following goals in mind:

- 1. Keep materials local:** Processing should occur as close to the origins of the waste as possible. If processing can be done on site (at home or in the neighborhood) that is the best option. This reduces the impacts of transportation (i.e., emissions). It also increases the likelihood that finished compost will return to soils in Providence.
- 2. Promote community composting:** If onsite or backyard composting is not an option, community composting is the next best option. Aggregating collection with drop off sites will help reduce emissions from transportation and increase overall efficiency of the system.
- 3. Close the loop:** Regardless of how it was collected or where it was processed, finished compost should be returned to soils in Providence as much as possible.
- 4. Support local workforce development:** Programs should be designed to maximize the workforce development benefits and align with goals in the City's Climate Justice Plan such as prioritizing frontline communities and democratically owned and operated enterprises.
- 5. Center Justice and Equity:** Ensure that new programs or policies do not disproportionately burden frontline communities. This means frontline communities should be part of the decision-making process.
- 6. Prioritize composting over anaerobic digestion:** Composting provides added environmental benefits; however, anaerobic digestion is a good alternative when composting is not an option. Anaerobic digestion provides the additional benefit of generating renewable energy. In some cases, this may be preferred over composting.



The following strategies will help Providence meet its composting and waste reduction goals.

1. Steward an education and outreach campaign on organic recycling.
2. Offer free community composting throughout the city.
3. Advocate for additional composting facilities across the state.
4. Promote composting through land use policies.
5. Procure compost for City projects.
6. Compost organics at municipal facilities and events.
7. Long term: Develop a plan for city-wide organic diversion and ban organic material from the Municipal Solid Waste stream.

Strategy 1: Steward an education and outreach campaign on organic recycling and provide free materials for backyard composting.

The City of Providence should support an educational campaign on the direct environmental impacts of landfilling organic waste, offering resources to residents on how they can donate excess food, recycle their organic material, and/or compost in their backyards. Educational materials should include visuals and be circulated in multiple languages in order to reach as many residents as possible. A central focus of the campaign should be teaching backyard composters and community composters how to rodent-proof their piles to ensure urban composting does not cause or exacerbate pest issues.

Rodent-Proofing Strategies for Backyard Composting

For small scale composting, select an enclosed container without any openings larger than a dime. This will reduce the potential for burrowing into the container.

When building an outdoor container, use ¼ inch steel hardware cloth to enclose the site. This will help prevent rodents from accessing the organic material.

Consistent maintenance, management, and human activity that disrupts the materials will reduce site desirability for rats.

The City should budget and/or apply for grants for education and outreach programs in partnership with community organizations who are experts in the field of reducing organic waste for processing into compost and have close ties to diverse communities in Providence. Outreach and education should initially focus on the neighborhood surrounding the drop-off site. Providing materials to residents interested in backyard composting, such as household bins to hold food scraps or rodent-proof backyard processing bins, should also be a part of this outreach strategy. A compost survey circulated by ZWP and the Office of Sustainability studied how Providence residents commonly dispose of their organic material and their preferences for organic recycling accessibility. This survey can help target initial outreach and education to those who aren't already composting.

By partnering with local organizations, hosting neighborhood events, and providing incentives for participation and attendance, the City could increase community awareness, disseminate information more readily, and increase residential organics recycling. Supporting local nonprofits in hosting compost workshops and events has been a successful strategy in multiple cities. The City of San Francisco, where over 75% of waste is diverted from landfill, subsidizes the training programs for compost educators who teach community members how to compost. Additionally, in Denver, CO, the City's recycling department partners with a community garden to provide monthly composting workshops free of charge.²³ It is worth noting that California and Colorado have very different regulatory structures for waste management and Providence will need to identify incentives within the Rhode Island structure to support such programs.



Compost Bucket Swap.

Photo Credit: The Community Compost Depot

23 | Judith A. Layzer and Alexis Schulman, "Municipal Curbside Compostables Collection: What Works and Why?" Urban Sustainability Assessment Project, Department of Urban Studies and Planning, Massachusetts Institute of Technology, 2014.

Strategy 2: Offer free community composting throughout the city.

Providence should expand community composting and increase access by making the drop-off sites free, especially for low-income residents. Compared to curbside collection, community composting reduces costs and allows the City to focus on educating residents rather than route collection logistics.

Community compost sites would also contribute to a local, regenerative economy by processing waste as close as possible to where materials were consumed. Community compost can help close the loop of waste generation, since organic waste created in Providence can be turned into compost to enrich local gardens and urban farms. Additionally, community composting engages and empowers residents, provides local jobs, and is scalable to each neighborhood and its unique needs.²⁴



Two examples of aggregate organic material drop-offs. The left photo shows organic material totes left out for the public to use. The right photo is Healthy Seas Healthy Soils hubspot on Aquidneck Island (the structure houses the totes).

In order to offer a free service, the City would need to support the construction, materials, educational outreach, and contracted collection service. The chosen drop-off location should be accessible by foot and have truck ingress/egress, which is necessary for haulers that operate vehicles. Residents would receive education in composting before being provided access to the drop-off site. For example, the City of Boston's Project Oscar requires residents to complete an online quiz to receive the lock combination to a compost site.²⁵

A formal agreement between the City, an organic materials hauler, and any other affiliated party should be made to define the protocol for maintenance, payments, and overall responsibilities. To deter unwanted pests, vermin-resistant totes with

²⁴ | "What Is Community Composting?," Institute for Local Self-Reliance, June 12, 2020.

²⁵ | "Project Oscar," Department of Public Works (City of Boston, July 19, 2016).

lids that lock should be used. Enclosing the containers inside a constructed casing can create an additional barrier for pests. The contracted hauler should weigh and report all collections from the site in order to measure the success of the program. It is also recommended that the City incentivizes processing materials locally at sites within Providence, to encourage a circular economy.



Example of an organics tote with a “locking” lid that prevents pests from entering the lid of the receptacle.

Strategy 3: Advocate for additional composting facilities across the state.

Compost facilities, including small-scale urban sites, are regulated at the state-level. The Department of Environmental Management’s Solid Waste Regulation No. 8: Rhode Island Organic Waste Recycling Facilities (Composting Regulations)²⁶ outlines the required standard procedures composters must follow in order to operate, like sanitation standards, material acceptance, and compliance assessments.

Many entities in the composting industry have expressed concern with the challenges of siting new facilities in the state. The only farm-based compost operation in Rhode Island frequently

reaches its weekly capacity, underscoring the need for additional large-scale compost sites. While state law is conducive to composting, all recent large-scale siting proposals have failed due to local residents’ concerns. Providence should strive to compost as much of its organic material as possible locally, but the volume of material produced, combined with the city’s density, may necessitate additional capacity throughout the state. The City should work with the state legislature to encourage the siting of more facilities in appropriate locations throughout the state so long as regulatory requirements are met.

26 | “Solid Waste Regulation No. 8: Rhode Island Organic Waste Recycling Facilities,” Office of Waste Management (State of Rhode Island Department of Environmental Management, April 2016).

Classification	Small-Scale Composting Operation	Medium-Scale Composting Facility	Large-Scale Composting Facility
*Total Quantity On-site (Excluding finished compost)	Quantity < 25 yd³	25 ≤ Quantity ≤ 600 yd³	Quantity > 600 yd³
Plan Facility Requirements According to:	Rule 8.C.00	Rule 8.D.00	Leaf and Yard Waste: 8.1.00 and 8.2.00 Putrescible Waste: 8.3.00 and 8.4.00

DEM Solid Waste Regulation No. 8: Rhode Island Organic Waste Recycling Facilities (Composting Regulations) Classification by quantity of material on site.

Strategy 4: Promote composting through land use policies

The majority of composting operations within Providence are considered small-scale operations and do not require a DEM permit to operate. They are, however, still required to follow operational standards regulated by DEM. The City should explore local land use policies that give land owners an explicit right to compost on their property, so long as they are in compliance with state law. If a site were to fall out of compliance, a DEM representative would assess the site and require compliance within 30 days.

The City should work with local composters and haulers to create a “best practices” guide and provide a universal standard of compliance for operators to reference while maintaining their site. Adherence to these guidelines would legitimize the existence of small-scale urban composting sites and demonstrate their right to operate in Providence.

The City should also explore incentivizing or requiring new large-scale residential developments to include organic waste collection for composting.

Strategy 5: Procure compost for City projects.

City projects that disturb soils should require a percentage of compost be applied to the soil to enhance soil health and help support the local market for compost. This should be part of an environmentally preferable purchasing policy that requires departments to purchase sustainable products, such as compost, to replace the purchasing, and application, of products harming community and environmental welfare.

The following table exemplifies compost procurement policies throughout the US that mandate the use of organic material, or compost, among their landscapes to control erosion and retain water.

Location	Policy Related to Sustainable Procurement
New York State Department of Transportation	Requires the use of organic material in the amending or manufacturing of topsoil in construction projects to control soil erosion. ²⁷
Duke University, Durham, NC	Developed an Environmentally Preferable Purchasing that gives preference to regional compost suppliers for landscaping and construction projects. ²⁸
King County, Washington	Environmentally Preferable Purchasing Policy that requires local governments to purchase compost whenever practical. The county has saved hundreds of thousands of dollars each year and decreased landfilled compostables and annual GHG emissions since its introduction. ²⁹
Denver, Colorado	Operating Rule that mandates the use of compost in disturbed soil or new landscaping projects to conserve water and reduce stormwater runoff. ³⁰
Leander, Texas	Water Conservation Ordinance requiring a minimal percentage of organic content in landscaping activities to increase water holding capacities of the soil and resist drought-prone conditions. ³¹
Greeley, Colorado	Ordinance that requires the installation of new lawns to be amended with compost to conserve water. Proper application could save up to 30% of annual water use. ³²

Strategy 6: Compost organics at municipal facilities and events.

The City should require organics diversion at all municipal facilities and City-affiliated events. City buildings and parks should have zero waste stations which include not only trash bins, but recycling and compost bins as well. To promote compliance and avoid contamination, these waste stations should have clear signage with visuals illustrating acceptable materials for compost and recycling. Emptying these bins regularly would prevent odor, rodents, and other nuisances.

27 | Brenda Platt, “NYSDOT – Compost Procurement,” Institute for Local Self-Reliance, July 12, 2021.

28 | ---, “Duke University – Compost Procurement,” July 9, 2021.

29 | ---, “King County, Washington – Compost Procurement,” August 15, 2016.

30 | ---, “Denver, Colorado – Compost Amended Soil,” July 12, 2021.

31 | ---, “Leander, Texas – Compost Amended Soil,” July 13, 2021.

32 | ---, “Greeley, Colorado – Compost Amended Soil,” July 13, 2021.



Waste diversion should also be pursued at city-sponsored events through the use of compost stations. Because attendees of public events may be unfamiliar with compost logistics, the City could staff events with paid or volunteer waste monitors.

By requiring organic diversion at all municipal facilities and events, the City of Providence can **lead by example** in promoting sustainability, a central objective of the Climate Justice Plan.

Strategy 7: (Long term) Develop a plan for city-wide organic diversion and ban organic material from the Municipal Solid Waste stream.

To achieve the goal of eliminating food waste by 2040, the City will need to develop a system that enables all Providence residents and businesses to divert their food waste to compost. This would require that all households either have an aggregate collection or composting site within close proximity, or that they have access to curbside compost collection.

The City should explore restructuring waste collection to a pay-as-you-throw model for trash in conjunction with free compost services, which would reduce the cost of municipal solid waste disposal. The revenue generated from municipal solid waste could be invested into a contract with a local hauler or processor to support a residential organic diversion program. Once organics diversion is accessible city-wide, Providence can codify zero-waste efforts by banning organic, compostable materials from the municipal solid waste stream.

As Providence transitions to a zero-waste economy, single-use items which end up in the landfill must be replaced with recyclable or compostable products. However, the safety and health of the chosen alternatives must be ensured. Currently, many molded products marketed as “compostable,” such as bowls and plates, are produced using PFAS, or per- and polyfluoroalkyl substances, a class of chemicals which do not break down but bioaccumulate in wildlife and humans. PFASs have been linked to kidney and testicular cancer, thyroid disease, and several immune and developmental effects³³. To prevent further contaminating water and soil with these toxic “forever chemicals,” the City should avoid recommending PFAS-containing packaging as an alternative to single-use plastic containers.

33 | Laurel A. Schaider et al., “Fluorinated Compounds in U.S. Fast Food Packaging,” *Environmental Science & Technology Letters* 4, no. 3 (February 1, 2017): pp. 105-111.

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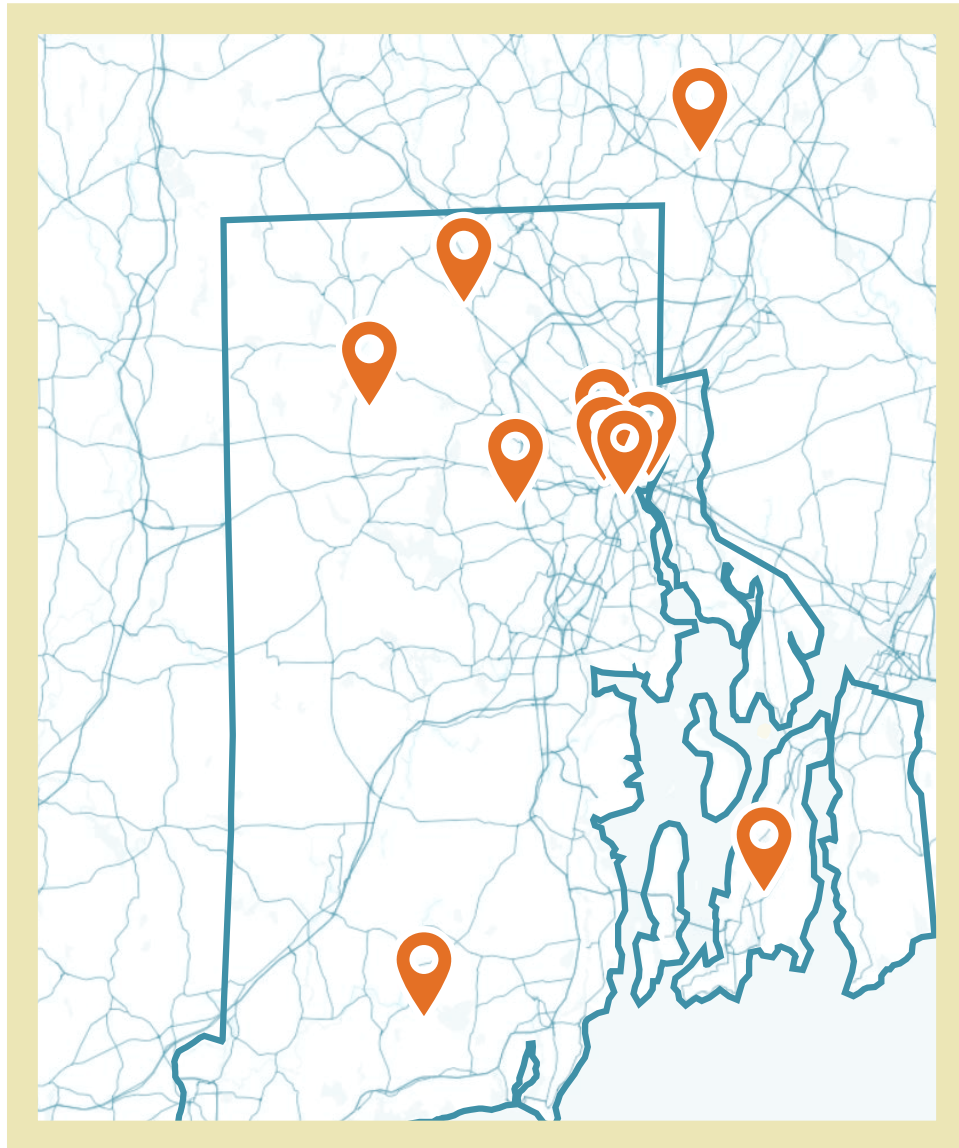
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APPENDIX A: COMPOSTING FACILITIES NEAR PROVIDENCE



Compost processing facilities, <https://arcg.is/OyP1qj>

The table below provides details on the select farms that process materials delivered by organic haulers in Providence and the capacity restrictions they face. This does not represent all of the composting sites within the state, just ones in connection with Providence's hauling services.

Rhode Island Organic Material Processing Facility	Location	Do they reach weekly acceptance capacities?	Explanation	Do they have plans to expand so they can accept more?
American Organics	North Smithfield	N/A	This farm just started accepting food materials in February 2020. They are in the initial stages of processing.	Potentially. As one of the youngest food processing sites on this list, they are working to perfect their system before they expand.
City Farm	Providence	Yes	Human powered processing, time, and space, limit further expansion or acceptance of additional organic material.	No.
Earthcare Farm	Charlestown	No	The farm is extremely vigilant about trash contamination in organic material deliveries. Their zero waste policy will turn away a haulers delivery if contaminated.	No. They are not at processing capacity but their strict zero trash contamination policy sets a high standard for source separation practices.
Harvest Cycle - Ring Street Garden	Providence	Yes	The garden has hired The Compost Plant to deliver excess organic material to alternative processing facilities due to spatial limitations.	Yes. In partnership with West Elmwood Housing Authority, HC is preparing a brownfield remediation project to build a garden and processing site with the initial capacity of 5-10 tons per week.
Rhode Island Nurseries	Middletown	Yes	The nursery can only process 1 ton a day, 7 tons a week, to remain a small scale agricultural unit.	No. They would have to apply for additional agricultural permits in order to process more materials. This is not an option they are exploring at this time.
Orbit Energy Anaerobic Digester	Johnston	No	The anaerobic digester accepts organic materials from both in and out of state. The operation anaerobically processes materials for biogas production.	No. They do not currently process at their daily maximum capacity. Note: this is not a composting operation but haulers use them as back-up recycler.
Big Train Farm	North Scituate	N/A	N/A	N/A
Earth Appliance Organics Company	Frey Community Gardens, Providence	Some weeks.	They are always pushing the edge of our capacity as the popularity of the program continues to grow.	Yes, they are seeking funds for a new buildout.