Department of Solid Waste Management

Operations Assessment

Appendix E

MIAMI-DADE COUNTY

Table of Contents

Executive Summary 2

Overview 2
Conclusions and Recommendations 2

Collection and processing 4

Introduction 4
Overview of the Four Collection and Processing Options 5
One-Stream Mixed Waste Collection and Processing 5
Two-Stream Wet/Dry System 9
Three-Stream System 10
Four-Stream System 16
Variable Rate Pricing 18
Comparative Analysis and Recommendations 23

Implementation Plan 24

Organic Waste Collection 24
DSWM Service Area 25
Financial Implications 34
Performance Monitoring 35
Non-DSWM Service Areas 36

Tipping Fees and Organics Diversion Payback 40

Methodology 40
Benchmark Tipping Fees 41
Results 41
Limitations and Intended Use 42
Regional Economic Impact Analysis 42

Organics Management 49

Introduction 49
Waste Flow Characterization and Volumes 51
Organics Processing Technologies and Supporting Infrastructure Considered 69
Qualitative Analysis of Considered Options 77
Quantitative Analysis 78
Organics Processing Scenarios 79
Lifecycle Cost Analysis Assumptions (LCCA) 82

Sustainable Materials Management Complex 92

Sustainable Materials Management Infrastructure 92
Sustainable Materials Management Complex Site Plan (conceptual) 97
Sustainable Materials Management Complex Benchmarks 99
Benchmark-Based Implementation Considerations 102
Conclusions and Recommended Next Steps 107

EXECUTIVE SUMMARY

Overview

The purpose of Task 4F is to provide a comprehensive strategy for the Department of Solid Waste Management (DSWM), focusing on collection, sorting, processing of organic waste and recyclables, and associated infrastructure and policy recommendations.

- **Collection and sorting evaluation:** Various collection stream options from single to four-stream systems were evaluated based on contamination rates, market viability, diversion and participation rates, operational costs, and environmental impacts, leading to a recommended collection and sorting alternative in coordination with the County.
- **Organic waste processing infrastructure:** The organics management assessment is based on the estimated quantities of organic material identified in the County's waste stream as reported in the 2024 Miami-Dade County Waste Stream and System Characterization Study (Appendix D). Alternative technologies such as composting, anaerobic digestion (AD), and bio-gasification were assessed for environmental impacts, economics, participation, social acceptance, land use, and integration potential, including end-use market considerations and risks of pollutants, culminating in recommendations for facility size, scale, and diversion projections.
- **Sustainable materials management infrastructure:** The assessment evaluates additional infrastructure needed to support a Sustainable Materials Management Complex, including recovery options for Construction and Demolition (C&D) debris, bulky materials, glass, tires, carpet, and other hard-to-recycle materials. This infrastructure is intended to complement organics processing and existing recycling systems by expanding material recovery capacity, improving diversion opportunities, and supporting the County's long-term zero waste goals.
- **Fleet recommendations:** Necessary changes and accessories for the DSWM collection fleet to support implementation, improve air quality, and/or reduce costs.
- **Implementation, financing, and program management:** The strategy outlines a phased implementation plan for residential organics collection, including service-area rollout, cart procurement and distribution, contamination control, fleet readiness, public education, performance monitoring, and program operations. It also evaluates financial implications through tipping fee benchmarks, organics diversion payback, and regional economic impacts, while identifying infrastructure and procurement considerations needed to support organics processing and a Sustainable Materials Management Complex.

Conclusions and Recommendations

The assessment of DSWM's operations indicates that Miami-Dade County's most practical path toward increased recovery and diversion is to build on its existing source-separated recycling program while adding a dedicated organics collection stream. A three-stream collection system for municipal solid waste (MSW), recyclables, and organics offers the best balance of diversion potential, material quality, operational feasibility, and resident acceptance. This approach avoids the contamination and marketability challenges associated with mixed waste processing, while providing a more achievable implementation pathway than a fully separate four-stream system.

Implementation should be phased to manage cost, operational risk, and public adoption. Near-term priorities should include reducing MSW collection frequency where feasible, using the freed collection capacity for organics service, continuing every-other-week recycling collection, and developing the necessary organics processing infrastructure. A phased rollout by municipality in DSWM’s service area would allow the County to refine education, route design, contamination controls, and processing capacity before expanding countywide.

The County should also evaluate a variable rate pricing structure as a complementary policy tool. When designed equitably, a say-as-you-throw (SAYT) system can strengthen resident incentives to reduce waste, increase recycling and organics participation, and better align service fees with disposal behavior. Any pricing changes should be paired with robust outreach, clear cart-size options, customer support, and monitoring for unintended impacts such as illegal dumping.

Overall, the recommended strategy is to advance a phased three-stream collection program supported by organics processing capacity, targeted policy changes, and sustained public education. This approach positions DSWM to reduce landfill disposal, improve recovered material quality, lower greenhouse gas emissions, and create a more resilient and sustainable solid waste management system for Miami-Dade County.

Furthermore, it is recommended to proceed with Scenario 2 described in this report, which includes adding High-Solids Anaerobic Digestion (AD) process in parallel to the composting, and splitting the organic waste flow between the two processing methods. The key reason for developing both AD and composting facilities is that the projected amount of segregated food waste in the County exceeds the projected amount of green waste, therefore exceeding the maximum 1:1 ratio (food to green) allowed for the composting process. In the absence of AD, the County would be forced to send approximately 175K tons of food waste to landfills by 2037, undermining the zero-waste goal and leading to increased waste disposal costs.

COLLECTION AND PROCESSING

Introduction

This report provides a detailed analysis of four alternative collection, sorting, and processing options for Miami-Dade County's Department of Solid Waste Management (DSWM) to consider for managing municipal solid waste (MSW), recyclable materials, and organic waste (yard debris and food scraps). The four options include:

1. One-Stream (post-collection sorting)
2. Two-Stream (wet and dry)
3. Three-Stream (MSW, recyclable materials, and organics)
4. Four-Stream (MSW, recyclable materials, yard debris, and food scraps).

Each alternative is evaluated across multiple criteria to analyze the effects each option could potentially have on the following:

- Contamination rate
- Capture rate for recyclable and organic materials
- Diversion rate
- Participation rate
- Social and political acceptance
- Operational cost
- Economic impact
- Market viability of processed commodities
- Environmental impacts

WSP used a combination of staff experience, published reports, and research to gather qualitative and quantitative data for this analysis. References and citations are provided in footnotes where applicable. In addition, the report examines successful case studies from municipalities across the United States including Santa Barbara County, San Jose, San Francisco, Seattle, and Minneapolis to inform the decision-making process for Miami-Dade County's future waste management strategy.

For this analysis, WSP used the following calculations:

- **Diversion rate** – the tons of material collected for recycling divided by the tons of all waste collected.

- **Capture rate** – the weight of recyclable and/or organic material collected for recycling and composting (not including contaminants) divided by the weight of all recyclables and/or organic materials in the waste stream.1

- **Participation rate** – average number of homes that participate at least once in a given time period (e.g., once per month). Not to be confused with setout rate, defined as the average number of carts on the curb at any one time.[2]

Overview of the Four Collection and Processing Options

The analysis examines four distinct collection methodologies with varying levels of source separation. One-Stream systems combine all materials (MSW, recyclables, food scraps, and yard debris) in a single wheeled cart for post-collection sorting at a mixed waste processing facility. Two-Stream wet/dry systems require homeowners to pre-sort waste into two carts – one for wet materials (food scraps, food-soiled paper, yard debris) and one for dry materials (recyclables like cardboard, paper, plastics, glass, metal). Three-Stream programs utilize three carts: one each for MSW, recyclable materials, and combined organics (yard debris and food scraps). Four-Stream systems provide the highest level of source separation with four containers, one each for MSW, single-stream recyclable materials, yard debris, and food scraps. These methods are summarized in Table 1. All collection methods utilize wheeled, lidded carts (typically color-coded) and automated or semi-automated collection vehicles.

Table 1: Collection and Processing Methodologies

Collection Method	Number of Containers	Source Separation Level	Primary Processing Method
One-Stream	1 container	None (post-collection sorting)	Mixed waste processing facility
Two-Stream (Wet/Dry)	2 containers	Moderate (wet vs dry)	Two processing streams*
Three-Stream	3 containers	High (MSW/recyclables/organics)	Three processing streams*
Four-Stream	3 or 4 containers	Highest (MSW/recyclables/yard/food)	Four processing streams*

* The processing of two, three, and four streams may take place at one location or several locations, depending on the service provider and location of their facilities.

One-Stream Mixed Waste Collection and Processing

One-Stream collection eliminates the need for homeowners to pre-sort waste before collection, with all materials placed in a single cart and sorted post-collection at a mixed waste processing (MWP) facility, also known as a “dirty” or “total” materials recovery facility (MRF). Santa Barbara County, California

[1] Marshall, C., and Morrigan, M. (2018) “Start at the Cart,” The Recycling Partnership, https://recyclingpartnership.org/start-at-the-cart-2/

[2] “Set Out Rates,” The Recycling Partnership, 2026, https://recyclingpartnership.org/set-out-rates/

opened one of the few successful MWP facilities in 2021, co-locating a dirty/total MRF, anaerobic digestion (AD) facility, and composting operation. Unlike typical MWP systems that are built for processing commingled collection of single-cart setouts, Santa Barbara designed the program to keep in place the established recycling and yard debris collection programs. Residents have three carts: one for recyclables, one for yard debris, and a third for garbage and food scraps combined. The dirty/total MRF processes the third cart separating food scraps from the MSW. The food scraps go into AD bunkers and through the decomposition process, generate electricity. The digestate from the AD process is then composted to further reduce odors and create a marketable product.[3]

Although MWP in Santa Barbara County has been successful, most large-scale MWP facilities in the United States have struggled with long-term viability. A notable example is the Infinitus Renewable Energy Park (IREP) in Montgomery, Alabama which opened in 2014 and closed in 2015.[4]

In addition to Montgomery, cities such as Houston, Texas; Indianapolis, Indiana; Baltimore, Maryland; and Martinsburg, West Virginia all invested significant resources researching MWP but ultimately did not move forward as planned.

Contamination Rate

MWP may reduce collection costs, however processing and disposal costs are often higher due to the increased contamination within the waste stream, specifically with paper. Recyclables like bottles and cans can easily be rinsed off after coming into contact with garbage, but the paper recycling market requires clean and dry material. Soiled and/or wet paper products (such as dirty pizza boxes, used napkins, and coffee filters) can be diverted to AD or composting if they can be separated from the fines and are not a significant component of the materials being digested or composted. Issues arise from plastic-coated paper, inks, and potential PFAS from packaging that may impact the quality of the compost.

Capture Rate for Recyclable and Organic Materials

MWP facilities average between 10% and 30% of materials recovered for recycling post-collection, with low capture rates attributed to increased contamination and low material marketability.[5]

However, a project leader with the Santa Barbara Public Works Department noted that dirty/total MRFs tend to recover more organics than traditional curbside collection of organic waste.

Diversion Rate

A 2015 report commissioned by the American Chemistry Council to study whether MWP technologies could recover more recyclable materials from the residential curbside waste stream, projected that a single-cart MWP scenario could reach a diversion rate of 46% while a two-cart scenario, in which

---

[3] Karidis, Arlene, "Santa Barbara County Co-Locates Dirty MRF, Anaerobic Digester, and Compost," *Waste360*, November 4, 2024, https://www.waste360.com/waste-recycling/santa-barbara-county-co-locates-dirty-mrf-anaerobic-digester-and-compost

[4] WSFA12 News, "Montgomery purchases recycling facility, seeks operator," January 9, 2018, https://www.wsfa.com/story/37229772/montgomery-purchases-recycling-facility-seeks-operator/

[5] Granger, Trey, "Pros and Cons of All-in-One Waste Collection Programs," *Earth 911.com*, August 31, 2017, https://earth911.com/business-policy/all-in-one-waste-collection/

recyclables continue to be set out separately and processed at a traditional MRF and waste and organics are sent to a dirty/total MRF, might yield a 54% diversion rate.[6]

The owners of the now defunct IREP facility in Alabama had aimed to recover and recycle nearly 60 percent of the material delivered; and with the addition of waste-to-energy and composting, IREP said it would see a landfill diversion rate topping 90 percent.[7]

Participation Rate

Participation in a one-stream MWP collection program is expected to be 100 percent because it is the only option for residents and businesses to dispose of garbage, recyclable materials, and organic waste.

Social and Political Acceptance

After years of separating recyclable materials from garbage, some residents may be concerned that their municipality is not recycling anymore. The younger generation, having been taught recycling in school, is more environmentally conscious and is more willing to take the time to properly recycle. The one-cart system goes against what they have been doing most of their lives.

Operational Cost

Similar to single-stream recycling, MWP may reduce collection costs, however processing and disposal costs are often higher due to the increased contamination within the waste stream. In addition, lost revenue from contaminated recyclables that cannot be marketed may be higher than any savings realized on the collection side of the system.

Mixed waste processing facilities are associated with high construction and operational costs, often requiring larger footprints and floor space compared to regular MRFs.[8]

Another operational concern is employee health and safety. When all sorting occurs post-collection, there is the potential for increased exposure to sharps, chemicals, odors, and dust.

Economic Impact

The capital investment is high with MWP because of the sorting and processing equipment required to separate the commingled materials into recoverable and marketable streams.

---

[6] Cookson, Craig, "Mixed Waste Processing: What it means for energy recovery and waste diversion," *Waste Today*, October 5, 2015, https://www.wastetodaymagazine.com/article/rew1015-mixed-waste-processing-market-update/

[7] Toto, Deanne, "City of Montgomery, Alabama, Purchases IREP Recycling Facility," *Recycling Today*, January 9, 2018, https://www.recyclingtoday.com/news/montgomery-alabama-buys-irep-mrf/

[8] Duffy, Daniel, "Transitions in the Stream," *Waste Today*, May 1, 2008, https://www.wastetodaymagazine.com/article/transitions-in-the-stream/

It is possible that lost revenue from unmarketable contaminated recyclables may exceed collection savings. In the case of IREP, the facility was built for $35 million in 2014. When it closed a year later, it owed the City of Montgomery, Alabama $2.5 million for unpaid tip fees from trash sent to the landfill in its first year of operation. The city forgave the debt and ultimately purchased the facility after IREP declared bankruptcy. IREP's CEO stated that buyers of their recovered materials were satisfied with the material, but the market prices for the commodities had dropped dramatically, in 2014-2015.[9]

Market Viability of Processed Commodities

The Recycled Materials Association (ReMA), formerly the Institute of Scrap Recycling Industries (ISRI), published a study in 2016 that identified disadvantages of mixed-waste processing for recycled paper products. ISRI surveyed paper mill buyers and found that 25% of survey respondents purchased paper from dirty/total MRFs, with 70% of these purchasers perceiving the quality of paper to be "worse than other recovered paper."[10] The study also found that none of the survey participants used dirty/total MRFs as a majority material supplier due to higher rejection rates of mixed-waste recovered paper compared to recovered paper from regular MRFs.[11]

Proponents of MWP may argue that it can be easier to alter the processed commodity output using mixed waste processing than with other methodologies. This type of processing largely depends on machinery, which can be altered to sort materials depending on their current market value.[12]

There are potential future technologies that may have the ability to overcome contamination concerns by processing received materials into new commodities at the molecular level or through chemical recycling. This is a new form of recycling with new commodities. Although these commodities may eventually prove to be marketable, the recycling processes to yield these commodities have yet to be proven at scale.

Environmental Impacts

MWP should, by design, recover more materials, thus reducing the amount of landfill space required for waste disposal. With state-of-the-art technology, more materials should be recovered for recycling, theoretically reducing the need for mining large quantities of raw materials for the manufacturing of plastics, metals, glass, and paper. However, if recovered materials are considered too dirty or contaminated to be marketed to end-users, the above-mentioned positive attributes may become negative outcomes of the system.

A one-stream collection system would reduce the number collection vehicles required to service a municipality, resulting in less greenhouse gas emissions, which improves air quality, water quality, plant and wildlife habitats, and more.

---

[9] Toto, Deanne, "City of Montgomery, Alabama, Purchases IREP Recycling Facility," *Recycling Today*, January 9, 2018, https://www.recyclingtoday.com/news/montgomery-alabama-buys-irep-mrf/

[10] *Waste Advantage*, "Dirty MRFs Produce Lower Quality, Higher Contaminated Recovered Paper According to New Report," June 13, 2016. https://wasteadvantagemag.com/dirty-mrfs-produce-lower-quality-higher-contaminated-recovered-paper-according-to-new-report/

[11] *Recycling Today*, "ISRI report finds dirty MRFs produce lower quality paper," June 10, 2016, https://www.recyclingtoday.com/news/isri-report-finds-dirty-mrfs-produce-lower-quality-paper/

[12] Flower, Will, "The Role of the Dirty MRF," *Waste 360*, December 2, 2015, https://www.waste360.com/industry-insights/the-role-of-the-dirty-mrf

Table 2 below provides a list of advantages and disadvantages to a one-stream collection and MWP system.

Table 2: Advantages and Disadvantages of Mixed Waste Processing

Advantage/Disadvantage	Category	Impact Description
Advantage	Financial/Operational	Reduced recycling education costs - No need to explain which materials are "acceptable"
Advantage	Financial	Reduced collection costs - Fewer collection routes required
Advantage	Environmental	Fewer collection vehicles required – reduction in GHG emissions
Disadvantage	Quality/Financial	Higher contamination rates – Recyclable materials mixed with waste decreases commodity quality/value
Disadvantage	Social	Negative public perception - Contradicts established recycling habits
Disadvantage	Operational	Employee safety risks - Exposure to sharps and chemicals
Disadvantage	Financial	High construction costs - Larger facility footprint required compared to traditional MRF
Disadvantage	Financial	High processing costs - Advanced sorting equipment needed

In summary, many dirty/total MRFs built in the 1990s and 2000s failed due to the inability to adequately sort the materials. As technology evolves and waste segregation improves, there is renewed interest in processing mixed waste.[13]

Two-Stream Wet/Dry System

Two-Stream wet/dry collection systems require source separation into two carts – wet waste (food scraps, coffee grounds, food-soiled paper/fiber, yard debris) in one cart and dry materials (recyclables including cardboard, paper, plastics, glass, metal, clean wood) in a second cart. This two-stream wet/dry collection system differs from the two-stream trash/recycling collection system utilized by most municipalities because it does not preserve a dedicated garbage cart and a dedicated recycling cart. Instead, residents

[13] Flower, Will, "The Role of the Dirty MRF," *Waste360*, December 2, 2015, https://www.waste360.com/industry-insights/the-role-of-the-dirty-mrf

are asked to sort materials based on moisture and processing pathway: organics and other wet, compostable materials are placed in the wet cart, while dry recyclable and recoverable materials are placed in the dry cart. As a result, the system changes both the resident sorting instructions and the downstream processing needs. Trash/recycling systems typically send garbage to disposal and recyclables to a MRF; wet/dry systems require separate processing capacity for wet organics and dry recoverable materials, with additional sorting needed to remove contamination from both streams.

The City of San Jose, California currently operates a wet/dry collection and processing system for the commercial sector, demonstrating that the model can achieve high diversion when supported by dedicated processing infrastructure. San Jose's MSW processing facility achieved diversion rates between 72% and 75% in 2013 using the two-stream wet/dry processing system, in part because organic materials recovered on the MSW line are sent to a composting facility located about 35 miles south of the recovery facility.[14]

However, San Jose’s experience may not translate directly to Miami-Dade County’s residential collection system. Replacing the County’s existing two-cart trash/recycling program with a different two-cart wet/dry approach could confuse residents and require substantial education and behavior change. For this reason, a wet/dry system is not recommended as the preferred approach for increasing recyclable and organic material capture and processing.

Three-Stream System

Three-Stream collection programs provide residents and small businesses with three carts (often color-coded) to place separated MSW, recyclable materials, and organic waste (either yard debris, food scraps, or both). The carts are collected via fully automated side-load collection vehicles, semi-automated rear-loaders with cart tippers, or fully-automated front-loaders with a container and cart tippers. When combined with volume-based fee structures, residents can reduce garbage bills by downsizing MSW carts and properly separating recyclables and organic waste into respective carts. More details regarding volume-based collection are provided below in the Variable Rate Pricing section of this report.

Municipalities that have added an organics cart to their collection program have used the third cart in a variety of ways, including:

- Yard debris only
- Food scraps only
- Yard debris and food scraps commingled
- Yard debris (loose) with food scraps (bagged)

For the County’s Zero Waste Master Plan, it is assumed the third cart will be used to collect food scraps (bagged) and yard debris (loose) commingled in the same cart. A four-stream option is provided later in this section and assumes separate carts for yard debris and food scraps. The County may consider instructing residents to initially use the third cart for yard debris only. Then gradually, perhaps by

[14] McKenna, Lisa, “Single-Bin Scenarios,” *Recycling Today*, March 11, 2013, https://www.recyclingtoday.com/article/rt0313-mrf-processing-trash/

municipality, introduce food scraps collection by informing residents that food scraps can be added to the yard debris cart.

This three-stream collection method requires curbside collection be operated with three separate collection vehicles and have three receiving areas at the transfer station for MSW, recyclables, and organic waste, or recyclables and organics can be delivered directly to dedicated facilities. This collection method assumes the organics processing facility accepts yard debris and food scraps mixed.

There are multiple municipalities throughout the US that have adopted the 3-cart system; a few examples are listed below.

- City and County of San Francisco, California – MSW, Recyclables, and Composting (food scraps and yard debris combined). All collected weekly.
- City of Austin, Texas – MSW, Recyclables, and Composting (food scraps and yard debris combined). MSW and composting are collected weekly; recycling is every-other-week.
- City of Portland, Oregon – MSW, Recyclables, and Composting (food scraps and yard debris combined). MSW is collected every-other-week; recycling and composting are collected weekly.
- City of St. Paul, Minnesota – MSW and Recyclables; Yard Debris (no food scraps) carts are provided by subscription. All collected weekly. Drop-off sites are available for food scraps.
- City of Lexington, Kentucky – MSW, Recyclables, and Yard Debris (no food scraps). All collected weekly.
- City of Fort Lauderdale, Florida – MSW, Recyclables, and Yard Debris (no food scraps). MSW collected twice per week, recycling and yard debris weekly.

Commercial food scraps are typically collected separately, as a separate stream using carts or dumpsters, under this system. Many commercial accounts do not have green waste (yard waste), so their three streams are MSW, recyclables, and food scraps.

Contamination Rate

For recyclable materials processing, WSP and other industry subject matter experts often use 40% as a conservative contamination rate for single-stream (commingled) curbside residential recycling programs. Miami-Dade County's recyclable materials processor, Waste Management Inc. indicated to the County in early 2026 that their new MRF in Pembroke Pines is averaging approximately 30 percent contamination after processing. That is an overall contamination rate; the facility processes recyclables from Broward, Collier, and Monroe counties, in addition to Miami-Dade County.

The County's Residential Recyclable Materials Composition Study conducted in May 2026 (as part of the County's recyclable materials processing contract with Waste Management Inc.), showed an overall contamination percentage of 36.5%, based on the average contamination from the County's three residential recycling collection zones.

Contamination includes Non-Contract Materials (i.e., non-targeted materials) as well as Contaminated Contract Materials (recyclable materials that are contaminated too much to be accepted for processing).

The percentage of Non-Contract Materials in the County's recycling stream totaled 32.2%; the materials and their mean composition are shown in Table 3 below.

Table 3: Non-Contract Composition

	Non-Contract Materials	Mean Composition
Plastics	Bulk Rigid, Film, Expanded Polystyrene (EPS)	5.7%
Bagged Materials	Contained Clean Recyclable Materials	2.5%
	Contained Trash/Solid Waste	9.1%
Textiles	Fabric, Cotton, Polyester, etc.	2.2%
Hazardous Materials	Medical, Chemical, and Other HHW	0.2%
	Electronics	1.0%
Various	Non-Contract Materials that do not fit into another category	6.8%
Tanglers	Hoses, rope, string, etc.	0.9%
Fines	Fine material too small to sort	3.8%
	Subtotal:	**32.2%**

The Contaminated Contract Materials include recyclable materials that were contaminated either during resident preparation or during the collection and transportation process. These materials are not considered acceptable as part of the County's processing contract and are not baled or shipped to market, but rather disposed as garbage. The Contaminated Contract Materials found in the samples of recyclables from the May 2026 composition study made up a much smaller percentage of the overall recyclable materials stream (when compared to the Non-Contract Materials) at 4.3 percent as shown in Table 4.

Table 4: Contaminated Contract Materials Composition

	Contaminated Contract Materials	Mean Composition
Paper	Corrugated Cardboard (OCC)	2.5%
	Pizza Boxes	0.1%
	Sorted Residential Papers and News (SRPN)	0.5%
	Paperboard	0.2%
	Poly-Coated Containers	<0.1%
Plastics	#1 - #7 Bottles and Tubs	0.6%
	#5 PP Containers	<0.1%
Metal	Tin/Steel/Aluminum Containers	0.1%
	Non-UBC Aluminum	<0.1%
Glass	Glass Food/Beverage Containers	<0.1%
	Subtotal:	**4.3%**

For comparison, a survey of curbside recycling programs in cities with populations of more than 50,000 conducted by The Recycling Partnership in 2019,[15] resulted in the following inbound contamination rates:

- California: Contamination rates ranged from 8 to 46% with an average of 20%
- Oregon: Contamination rates ranged from 9 to 15% with an average of 11%
- Washington: Contamination rates ranged from 5 to 20% with an average of 9%

Correlations between program attributes and contamination were not inferred because of the small number of data points available (176 programs in California, 24 in Washington, and 12 in Oregon).

Capture Rate for Organic Materials

Capture rate is a key indicator of how effectively a collection system materials that are already present in the waste stream. For a three-stream system, higher capture rates depend on universal access to collection services, clear source separation requirements, consistent resident participation, and ongoing education to reduce contamination and direct materials to the appropriate recycling or organics processing pathway.

By implementing an organic waste collection program, it is estimated the County could capture over 50% of all organics generated in the county, as the program matures. The capture rate is calculated by dividing

[15] "2019 West Coast Contamination Initiative Research Report," The Recycling Partnership, April 2020, https://recyclingpartnership.org/wp-content/uploads/2020/04/The-Recycling-Partnership_WCCI-Report_April-2020_Final.pdf

the weight of all organic material collected (not including contaminants) by the weight of all organic materials estimated to be in the waste stream. Using the tonnage estimates of residential Yard Debris in Table 21 and the residential Food Scraps in Table 24 of the Organics Management section, WSP estimates the capture rate increasing over time as more residents participate, as shown below.

Table 5: Estimated Capture Rates for Organic Materials in the DSWM Service Area

Program Year	Capture Rate
2028	7.52%
2029	12.23%
2030	18.06%
2031	23.71%
2032	29.36%
2033	35.57%
2034	42.35%
2035	49.69%
2036	57.60%
2037	66.08%

Diversion Rate

The City and County of San Francisco has one of the longest running three-stream collection systems in the country which started as a pilot program in 1999 and by 2004 had expanded citywide. The three-cart system has become a model for other cities nationwide. By 2007, San Francisco reached a 68% diversion rate, even before it passed a mandatory composting and recycling ordinance in 2009.[16] In 2013, the city's organic waste processor attributed the three-cart system to the 80% landfill diversion rate at that time.[17] The diversion rate is currently estimated to still be around 80%, however it should be noted that San Francisco includes C&D debris and biosolids in its landfill diversion calculations in addition to post-consumer recyclables (e.g., cardboard, plastics, glass, aluminum cans, etc.) and organic waste (yard debris, food scraps, and certain paper products).

[16] Karidis, Arlene, "San Francisco's Zero-Waste Story," *Waste360*, December 11, 2025, https://www.waste360.com/sustainability/san-francisco-s-zero-waste-story

[17] "NYC, many others copy SF compost program," *RecologySF.com*, July-September 2013, https://www.recology.com/wp-content/uploads/2016/10/RecologySF2013Q3v3.pdf

In March 2026, San Francisco estimated its recovery rate from residential and small business recycling and composting to be 57% (not including C&D or biosolids).[18] The city believes it is possible to reach its zero waste goals (set in 2018) of reducing MSW generation by 15% and reducing landfill and incineration disposal by 50% by 2030, all through waste reduction efforts aimed to decrease the amount placed in the three carts.[19]

Research shows that communities with mature 3-cart systems are achieving 50% to 60% diversion. If the County implemented a mandated organic waste collection program simultaneously with a variable rate collection fee structure, it is WSP's estimation that the waste diversion rate would reach 50% within ten years.

Participation Rate

Participation in a three-cart collection program typically depends on the requirements of the municipality via the municipal code. Communities with a voluntary (sign up) organics collection program have lower participation rates (30% to 60%) compared to those with a mandatory organics collection program in which every household is provided a cart (over 80%).[20]

Recent local pilots provide a useful benchmark for how residents may respond to voluntary food scrap diversion opportunities before a countywide curbside program is implemented. In May 2026, the City of Miami launched a three-month composting pilot at five public drop-off locations, using locked bins, resident registration, access codes, accepted material instructions, and community engagement events to test operational needs, participation, contamination challenges, costs, and long-term feasibility. The pilot engaged 185 registered participants and diverted 7,793 pounds of food scraps to composting.

Miami-Dade County has also conducted organics pilots through the Miami-Dade Innovation Authority's Public Innovation Challenge in July 2026. One of the awarded demonstration projects was for a Covered Aerated Static Pile (CASP) composting system at the South Dade Landfill, which expects to process approximately 100 tons of organic material every ten weeks using clean yard debris from DSWM operations and food scraps collected from participating residents through both curbside and public drop-off.

Together, these pilots suggest that free, convenient, and well-communicated food scrap collection can help build public awareness and generate participation data, but voluntary drop-off programs should be treated as transitional tools rather than substitutes for universal curbside collection service. For planning purposes, the County should use pilot data on sign-ups, repeat users, material quality, contamination, seasonal participation, and customer feedback to refine education, cart instructions, routing assumptions, and participation projections for a future mandatory three-cart organics collection program.

[18] "Recovery Rate," City and County of San Francisco website, July 9, 2026, https://www.sf.gov/data--recovery-rate
[19] "Making Zero Waste a Reality," San Francisco Environment Department's Zero Waste webpage, July 9, 2026, https://www.sfenvironment.org/zero-waste
[20] Lipson, B. and Shah, M., "Curbside Organics Success Stories," *BioCycle*, November 18, 2025, https://www.biocycle.net/curbside-organics-success-stories/

Social and Political Acceptance

A major concern affecting social and political acceptance of organics management projects involves the issue of nuisance odors. Such odors affect the living experience of residents, property values and potential of other types of development in the areas surrounding waste processing facilities.

The location of the proposed organics facility that is the subject of this report is adjacent to the currently operating MSW landfill and a wastewater treatment facility, as well as the planned MSW transfer station, all approximately 1.1 miles away and upwind from residential areas.

The proposed CASP facility (default option) using an organic cover (i.e., finished compost) will have similar or lower nuisance odor issues as compared to the existing waste management infrastructure. Further odor mitigation can be achieved by extending the covered processing stage and moving the materials to windrow finishing at a later stage.

The proposed tunnel/bunker with membrane cover composting + AD facility will have a lower nuisance odor impacts due to majority of the process taking place in fully-enclosed environment. The largest potential odor impact is also related to any open-air finishing and compost storage steps, which can be fully addressed during the detailed design of the facility.

Under either of the two organics processing scenarios under consideration, the waste going to the organics processing system will be diverted from the MSW stream and will not constitute additional putrescent material introduced to the area.

Overall, the proposed organics processing plan will have either no substantial impact to (the CASP option), or constitute an improvement (the tunnel/bunker with membrane cover composting +AD option) of the current odor mitigation practices.

Operational Cost

Single-stream recycling MRFs incur capital costs of approximately $17-23 per ton and operations and maintenance costs of $70-131 per ton. Tipping fees cover most of these costs while revenue from the sale of marketable recovered materials provides a partial offset. In DSWM’s single-stream recycling program, any revenue generated from commodity sales are retained by the County.

Table 6: MRF Operational Costs

	Tonnage Cost Range	Average Tonnage Cost
Operations & Maintenance	$70-131	$100.50
Total MRF Costs	$87-154	$120.50

Four-Stream System

Four-Stream collection programs require waste generators to source-separate MSW, single-stream recyclable materials, yard debris, and food scraps into four separate carts or containers. Similar to the three-stream system, carts are collected via fully or semi-automated collection vehicles. Some communities use 5-gallon (Fayetteville, Arkansas)[21] or 7-gallon (Alexandria, Virginia)[22] buckets with lids for manual curbside collection of food scraps, rather than use a fourth cart. Even more prevalent are drop-off programs for food scraps; a drop-off pilot program in Plantation, Florida began in March 2026.[23]

Another solution used in some communities is to instruct residents to place food scraps in plastic bags and dispose of the bags in either the MSW cart or the yard debris cart, allowing easy separation of food scrap bags on the tipping floor or at the compost site.

- A program in Ramsey and Washington Counties in Minnesota,[24] requires biodegradable bags be used to contain the food scraps, then the bag is placed in the MSW cart. When the MSW load is delivered to the Ramsey/Washington Recycling & Energy Center in Newport, MN, the bags are removed from the MSW using AI-powered sorting machines.
- Harrison Industries, a hauler in California servicing the City of Ventura (and others), allows residents to use any type of plastic bag.[25] The bagged food waste is placed in the yard debris cart. The food waste is de-bagged at the Mountain View Organic Waste Processing Facility in Oxnard, CA.

Both composting and AD processes require plastic contamination be removed from the finished product. The bag approach combines the simplicity and low cost of the three-cart system with the benefits of four-stream collection.

Capture Rate for Recyclable and Organic Materials

Organics capture rates vary significantly across different program types and jurisdictions. Seattle achieved a curbside organics capture rate of 60%, while New York City's residential organics program reached a recycling capture rate of nearly 50%. These rates demonstrate the potential effectiveness of dedicated organics collection programs when implemented at scale.

According to the U.S. EPA, at least 73.5 million tons of organics are disposed annually nationwide, with food scraps accounting for two-thirds of the tons. In 2018 (the most recent year the EPA analyzed waste data), approximately 25% of recoverable organics were beneficially used (composted). Yard trimmings were recovered at a higher rate (63%) than food scraps (4%).[26] This disparity reflects the relative maturity of yard debris collection programs compared to newer food scrap initiatives.

[21] "Residential Food Waste Collection Program," City of Fayetteville, Arkansas website, July 2026, https://www.fayetteville-ar.gov/4418/Residential-Food-Waste-Collection-Progra
[22] "Curbside Food Waste Composting," City of Alexandria, Virginia website, July 2026, https://www.alexandriava.gov/waste/project/curbside-food-waste-composting
[23] "Composting Pilot Program," City of Plantation, Florida website, July 2026, https://www.plantation.org/residents/go-green/composting
[24] Food Scraps Pick Up Program website, Ramsey/Washington Recycling & Energy, July 2026, https://foodscrapspickup.com/
[25] "Residential Food Waste Services," Harrison Industries website, July 2026, https://ejharrison.com/residential-food-waste/
[26] MacBride, Samantha, "The Organics Capture Rate and What it Tells Us," *BioCycle*, October 8, 2024, https://www.biocycle.net/the-organics-capture-rate-and-what-it-tells-us/

Participation Rate

The City of Minneapolis implemented a citywide organics (food scraps) collection program in 2015, achieving 50% program participation by 2022 (7 years after launch). In 2017, 43% of eligible households in Minneapolis participated (more than 45,000 households), though volumes were approximately 4,000 tons per year, below the anticipated 8,000 tons per year. Hennepin County, where Minneapolis is located, mandated curbside organics (food scraps) collection in 2022. Yard debris is collected separately on a weekly basis in Minneapolis (April through November). Residents may use their own reusable containers or compostable bags for yard debris collection; the city does not provide carts for yard debris. Minneapolis found that three 64-gallon carts serviced once per week are sufficient for every 150 residents at multi-family drop-off sites where curbside service is unavailable.

Social and Political Acceptance

The Social and Political Acceptance of an organics collection program are outlined above in the Three-Stream System discussion.

The acceptance of a four-stream system tends to be negative because of residents' lack of space for storing four collection carts. In the example above, Minneapolis has four streams but only three carts (the city does not use carts for yard debris).

Operational Cost

The City of Minneapolis reported organics collection costs in 2024 of $4.92 million, not including overhead, administrative, and educational costs.

Variable Rate Pricing

MSW and recycling collection systems are most successful when paired with a variable rate pricing structure, also referred to as volume-based, Pay-As-You-Throw (PAYT), or as in the case with Miami-Dade County's Zero Waste Master Plan, Save-As-You-Throw (SAYT). This approach charges households for solid waste collection services based on the volume of waste they set out for collection. Similar to a utility such as electricity or water, the user pays for their consumption, in this case, how much waste is generated. Under this type of program, the less waste a household produces, the less the household pays. It is generally accepted as a best management practice that residents should be charged more for increased volumes of MSW setouts, but not for increased volumes of recyclable materials set out for collection.

The goals of a municipally-operated SAYT system include:

- Raise sufficient revenues to pay for the cost of collection, delivery, and disposal of all residential MSW at the disposal facility, as well as associated administrative costs and recycling collection and processing net costs.
- Encourage increased recycling (e.g., a reduction in MSW disposed) through price incentives.
- Convey to residents the opportunity they have to control their fees.
- Keep the program simple to use and operate.

Potential Benefits of SAYT

A properly designed SAYT program with an equitable rate structure will ideally encourage residents to generate less waste. When residents become more aware of their disposal habits, they tend to look for opportunities to generate less or recover a greater portion of the waste stream that is recyclable or compostable. Through waste minimization habits (e.g., consuming less, reading newspapers online, etc.), residents often become more conscientious and develop a greater understanding of environmental issues and the impact of their behavior on the environment. From a municipal, regional, and global aspect, a reduction in MSW generated, equates to less waste landfilled, thereby creating fewer greenhouse gases (GHGs).

Potential Drawbacks of SAYT

While there are clearly benefits associated with SAYT programs, there are also potential drawbacks that must be overcome to successfully implement this system. These potential drawbacks include:

- A perception of increased costs to residents for the same level of service.
- Logistical challenges associated with changing a service.
- Increased need for education and enforcement with the new system, especially in the beginning.
- A potential increase in administrative costs such as increased efforts in billing and an increase in customer inquiries.
- A potential increase in illegal dumping.

SAYT Approaches

SAYT systems can take many forms such as a bag system or a tag/sticker system in which the cost of collection is built into the cost of the bag or the sticker that the resident must purchase and use for garbage collection. These types of programs often work best in rural areas or cities/counties with populations much smaller than Miami-Dade County. Because the County is already using a cart system for the collection of MSW and recyclable materials, only the cart system is discussed below as a SAYT method.

Wheeled Carts

This approach utilizes standardized two-wheeled, lidded trash carts that are lifted mechanically. The carts are typically sized in the range of 35, 65 or 96 gallons. Prices for collection services are established based on the size of the cart that is used and the frequency of collection, typically once per week for MSW. The use of different colored carts for recyclables and organic waste collection is standard practice. Often, any out-of-cart setouts require a pre-paid tag or sticker.

Examples of Pricing Schedules

In an attempt to provide a larger financial incentive to recycle and reduce quantities of MSW set out for collection, some municipalities in the U.S. have implemented a more aggressive pricing schedule (i.e., with greater increments between service levels). The following examples highlight programs in which the results of volume-based pricing are noteworthy.

CITY OF AUSTIN, TEXAS

In the early 1990's, the City of Austin, Texas was one of the first cities in the country to implement a PAYT program. What began as a pilot program, the volume-based MSW collection system was implemented citywide by 1997. In 1991, Austin had a diversion rate of about 9.8 percent; in 2010, that number was around 35 percent.[27] The diversion rate at the end of Fiscal Year 2024 was 37 percent according to the city's 2024 Annual Report. While the rate of diversion increase has slowed, the city is committed to its zero waste goal to reduce the amount of trash sent to landfills by 90 percent by 2040.[28]

Residents are charged a flat base rate plus a cart charge depending on the size of the MSW cart. The base rate per month includes weekly garbage collection, every-other-week curbside single-stream recycling collection, weekly organics collection (food scraps, yard trimmings, food-soiled paper and natural fibers), and on-demand (up to 3 collections per year) bulk, brush, HHW, and clothing/textiles collections. (The on-demand service began as three pilot programs and was introduced citywide in January 2025.) Cart sizes and prices are shown in Table 7.

Table 7: Monthly Residential MSW Collection Rates - City of Austin, Texas(1)

Cart Size		Base Rate	Cart Charge	Total
Small	24-gallon	$ 23.80	$ 4.70	$ 28.50
Medium	32-gallon	$ 23.80	$ 6.25	$ 30.05
Large	64-gallon	$ 23.80	$ 12.50	$ 36.30
Extra Large	96-gallon	$ 23.80	$ 40.30	$ 64.10

(1) "Residential Services Rates and Fees," City of Austin website, July 2026, https://www.austintexas.gov/resource-recovery/residential-services-rates-and-fees

In Austin, the distribution of MSW cart sizes changed after single-stream recycling was implemented in October of 2008 and the monthly rates increased for the collection of larger-sized MSW carts as well as extra garbage (out-of-cart setouts). Table 8 is provided as an example of what Miami-Dade County could expect for cart distribution if volume-based collection rates are implemented.

Table 8: Distribution of MSW Cart Sizes - City of Austin, Texas(1)

	MSW Cart Sizes		
Timeframe	30-gal	60-gal	90-gal
Prior to Oct. 2008	13.3%	63.2%	20.5%
January 2010	16.9%	60.7%	19.3%
March 2011	19.0%	60.0%	18.2%

(1) Source: WSP staff research, 2011

[27] McHale, Richard, "The Pay-As-You-Throw Payoff," *Waste 360*, March 1, 2010, https://www.waste360.com/waste-collection-transfer/the-pay-as-you-throw-payoff
[28] "Austin Resource Recovery 2024 Annual Report," City of Austin website, July 2026, https://data.austintexas.gov/stories/s/Austin-Resource-Recovery-2024-Annual-Report/75x6-yx6i/

As an incentive or a “thank you” for diverting more waste, the City of Austin waives the cart exchange fee for customers seeking smaller MSW cart sizes. However, the city charges a $15.00 one-time fee to exchange a cart for a larger size and requires that a household must have an extra large MSW cart before requesting an additional cart.

The City of Austin charges residents an additional fee if they have excess MSW or if the lid on their MSW cart will not close completely. Residents can either purchase an “extra garbage sticker” for $5.00 (plus tax) for any excess garbage that will not fit in the cart (the stickers are sold at local retail stores), or the city will add $10.20 (plus tax) to the resident’s utility bill for each bag of excess garbage without a sticker. In fiscal year 2024, the city generated $820,773 from extra trash.

CITY OF SEATTLE, WASHINGTON

In Seattle, residents choose their subscription level for MSW collection service, which includes the collection of recyclable materials. The City of Seattle offers significant financial incentives to encourage diversion and waste prevention. A "micro-cart" level of service is a 12-gallon container at a price of $29.20 per month compared to one 96-gallon cart for $139.50 per month. Table 9 shows the City of Seattle’s current refuse collection rates, effective April 1, 2026. The collection of food scraps and yard debris has a separate rate schedule, see Table 10.

Table 9: Monthly Residential MSW Cart Rates[(1)] - City of Seattle, Washington

Service Level (weekly)	Cost per Month	% difference between levels
Micro-cart (12 gallon)	$29.20	n/a
Mini-cart (20 gallon)	$35.80	22.6%
One 32-gallon cart	$46.55	30.0%
One 64-gallon cart	$92.90	99.6%
One 96-gallon cart	$139.50	50.2%
Extra garbage (per bag, bundle, or 32-gallon cart)	$14.40	n/a
Special pickup fee (for collection of one container)	$57.05	n/a

(1) “Garbage Rates,” Seattle Public Utilities website, July 2026, https://www.seattle.gov/utilities/your-services/accounts-and-payments/rates/collection-and-disposal/garbage-rates

Seattle’s Municipal Code[29] does not allow food scraps, compostable paper, yard waste, or recyclable materials to be placed in the garbage. Seattle residents are required to subscribe to organic waste collection service unless they receive a backyard composting exemption from the city. Businesses that generate compostable materials must subscribe to a collection service or self-haul to a transfer station for processing.

[29] Commercial recycling (21.36.082) and Residential recycling (21.36.083) required.

Table 10: Monthly Residential Food & Yard Waste Cart Rates[(1)] - City of Seattle, Washington

Service Level (weekly)	Cost per Month	% difference between levels
Micro-cart (13 gallon)	$7.75	n/a
One 32-gallon cart	$11.60	49.7%
One 96-gallon cart	$14.75	27.2%
Extra yard waste (per craft bag, bundle, or 32-gallon cart)	$7.50	n/a
Special pickup fee (for collection of one container)	$57.05	n/a

(1) "Food and Yard Rates," Seattle Public Utilities website, July 2026, https://www.seattle.gov/utilities/your-services/accounts-and-payments/rates/collection-and-disposal/food-and-yard-rates

WASHINGTON COUNTY, MINNESOTA

The State of Minnesota required solid waste haulers to use volume-based pricing for MSW collection beginning in 1993. https://www.revisor.mn.gov/statutes/cite/115A.9301

In 2002, Washington County, Minnesota contracted for an independent analysis of the County's residential recycling system. As part of the study, the fees for MSW service levels between communities were compared, as well as the per capita recovery for each community. Although the data in Table 11 is over twenty years old, WSP believes it is a good example of the potential effect MSW collection pricing can have on the volume of recyclable materials collected.

Table 11: Variable Rate Pricing for MSW Service[(1)] - Washington County, Minnesota

	MSW Cart Sizes					Recycling Per Capita (lbs/person/year)
Municipality	30-gal	% difference	60-gal	% difference	90-gal	
Oak Park Heights	$10.20	12.0%	$11.42	14.3%	$13.05	123
Woodbury	$12.34	14.1%	$14.08	12.2%	$15.80	210
Afton	$10.98	19.9%	$13.17	16.6%	$15.36	364

(1) Source: "Recycling Program Analysis: A Technical Assistance Project for Washington County" by Dan Krivit and Associates; Emerge Knowledge Design, Inc.; and Mary Chamberlain of R. W. Beck, Inc.; May 2003.

When the price difference between container sizes is minimal (i.e., a difference of a few dollars), it does not send a strong price signal to the customer to incentivize them to reduce their waste volumes and/or recycle more. In fact, many residents may opt for a larger container to have on hand for those times when they do have more waste to set at the curb, if it will only cost a few dollars more per month. As shown in Table 11 above, the larger the price difference in container size, the higher the quantities of recyclables collected. It should be noted that other variables may have influence over the overall quantities recycled (i.e., program type, demographics, etc.).

Haulers may complain of potential revenue loss because of customers down-sizing their MSW container size, however the increase in pricing of the higher service levels (e.g., 90 gallons), may subsidize the lower level services (e.g., 30 gallons).

In addition, if the quantities of recyclable materials collected/recovered increases and the market prices are above average, additional revenue will be realized from the sale of the recyclable materials. Miami-Dade County's recyclable materials processing contract with Waste Management includes a revenue sharing agreement in which the County receives a share of the revenues from the sale of recyclable materials (after paying processing fees) based on market indices and Waste Management's average material value calculation.

Comparative Analysis and Recommendations

The four collection alternatives present distinct tradeoffs across operational complexity, environmental performance, and economic viability:

- One-Stream systems offer the simplest resident experience and lowest collection costs but suffer from high contamination (10-30% recovery), poor material quality, and limited long-term success in the United States.
- Two-Stream wet/dry systems demonstrated strong performance in San Jose (72-75% diversion) requiring moderate effort on the part of the generator, with proven infrastructure and technology.
- Three-Stream programs balance source separation benefits with manageable complexity, achieving contamination rates around 39-40%. When combined with variable-rate pricing, residents are incentivized to reduce the quantity of waste set at the curb. Additionally, a three-stream program significantly improves the marketability of the recovered recyclable materials. An organic waste collection program paired with compatible processing technology, will result in marketable compost.
- Four-Stream systems maximize source separation and material quality but require significant infrastructure investment ($4.92 million annually for Minneapolis organics collection alone), extensive public education, and long adoption timelines (Minneapolis reached 50% participation after 7 years).

For Miami-Dade County, maintaining source-separated recyclables while expanding organics diversion by adding a third cart represents the most viable pathway to reducing MSW quantities collected in WSP's opinion. Financial feasibility for a three-stream system requires once-per-week collection for MSW and organic waste (food scraps/yard debris) and continued every-other-week recycling collection to control operational costs. By reducing MSW collection from two days per week to one, the County could use that second day to collect organic waste with no major changes to its collection fleet.

IMPLEMENTATION PLAN

Organic Waste Collection

The Zero Waste Master Plan is intended to support the implementation of strategies and one of the most favorable strategies is the Universal Recycling and Composting Ordinance which requires:

- Single-family residents receive curbside collection of garbage, recycling, and organic waste (food scraps and yard debris).
- Multifamily condominiums and apartment complexes provide an appropriate number of collection containers for both recycling and organic waste, based on the number of units.
- Commercial businesses and institutional facilities have recycling and organic waste collection services with appropriate-sized containers for volumes generated.

It's recommended that the Universal Recycling and Composting Ordinance be implemented along with the following zero waste strategies:

- Mandatory Participation, Source Separation, and Enforcement
- Save-As-You-Throw (SAYT)
- Rate Structure Incentives and Reporting Requirements
- Curbside Materials Collection
- Organic Material Composting Infrastructure

A mandated organic waste collection program will require a well-coordinated, integrated and executed implementation plan to address the many components of providing a new collection service. The plan should provide efficient and cost-effective services, while meeting the sustainability and economic goals of the County.

This section identifies the necessary steps the County will need to consider for implementing a successful single-family residential organics collection program in the DSWM service areas, as well as the single-family and multi-family residential non-DSWM service areas, and the commercial sector.

The key components of the implementation plan are provided below in a bulleted list, followed by a detailed discussion of each component.

- Program Operations
    - Collection Schedule
    - Recommended Collection Plan
    - Cart Specifications and Procurement

    - Cart Distribution Plan
    - Fleet
    - Contamination Control and Enforcement
- Phased Rollout
    - Collection Operations
    - Processing and Transfer Requirements
    - Resident Education and Launch Materials
    - Timeline
- Financial Implications
- Performance Monitoring

DSWM Service Area

The County's DSWM currently provides garbage collection services twice per week from households with four (4) units or less in ten (10) municipalities and the unincorporated areas of Miami-Dade County. DSWM uses automated, side-load collection vehicles to collect garbage from lidded, wheeled carts. The County operates approximately 300 garbage routes, twice per week. The routes are divided into 7 collection areas; each area averages 44 routes, each route is a mix of municipalities and unincorporated areas.

DSWM provides curbside waste collection services to more than 350,000 households in unincorporated Miami-Dade County and 10 municipalities, including Aventura, Cutler Bay, Doral, Miami Gardens, Miami Lakes, Opa-locka, Palmetto Bay, Pinecrest, Sunny Isles Beach and Sweetwater.

WSP recommends the County reduce the number of residential garbage collection days from twice per week to once per week and replace the second garbage day with an organic waste collection day. Under this plan, the collection routes would not have to be reconfigured, and the staffing numbers should not be affected.

Organics Collection Program Design and Operations

COLLECTION SCHEDULE

The three-cart organics collection program should be designed as a three-stream residential system in which households receive separate carts for garbage, recyclables, and organics. For the DSWM service area, the recommended approach is to retain the first weekly garbage collection day, convert the second weekly garbage collection day to organics collection, and continue every-other-week recycling collection. This approach uses existing residential collection routes and aligns with the operational recommendation to reduce garbage collection frequency while adding a dedicated organics stream.

RECOMMENDED COLLECTION PLAN

- **Service frequency:** Collect organics once per week on the household's current second garbage collection day. Keep garbage collection once per week and recycling every other week unless future route balancing indicates a need for adjustments.

- **Cart system:** Provide one standard 65-gallon organics cart per eligible household, with an option to exchange cart size once the program is established (details under Cart Specifications).

- **Accepted materials:** Include fruit and vegetable scraps, meat, bones, dairy, grains, coffee grounds (and filters). Leaves, grass clippings, small branches, palm fronds, and other yard trimmings that meet size limits established by the County and/or processor. Note: food-soiled paper (e.g., napkins, paper towels, cardboard pizza boxes, etc.) should be assessed for potential inclusion in the future, once the processing technologies are operational.

- **Prohibited materials:** Exclude plastic bags, glass, metal, diapers, pet waste, treated or painted wood, rocks, dirt, concrete, hazardous waste, and non-beverage liquids.

- **Material preparation:** Encourage residents to place yard debris loose in the cart and require food scraps be placed in either brown paper bags or certified compostable plastic bags[30] (purchased by residents) before placing in the cart. Bagging food scraps allows the organics to easily come out of the cart, reducing the likelihood of food sticking to the sides of the cart which can cause odor and attract pests. Yard waste that has been collected in brown paper bags/kraft yard waste bags are acceptable; paper bags can be placed in the cart. Residents should be advised to keep cart lids closed, drain excess liquids, and place food scraps in the cart close to collection day to reduce odors and pests.

- **Out-of-cart material:** Limit out-of-cart organics to County-approved yard trimmings that cannot fit in the cart and establish clear requirements for bundling, maximum branch size, setout limits, and fees for excess material.

CART SPECIFICATIONS AND PROCUREMENT

For organic waste collection, the County will need to purchase new lidded, wheeled carts that are compatible with DSWM's current fleet of side-load trucks. It is recommended the County use 65-gallon carts as the standard or default size and consider giving residents the option to exchange their cart for a larger or smaller cart once the program is established. For example, residents with minimal yard debris (e.g., those with small yards, xeriscaping, or who contract with a landscape company) may opt for a 35-gallon organics cart, while residents with large yards or those who regularly have palm fronds, may opt for a 95-gallon cart.

The organics carts should be a color other than green or blue because the current DSWM-issued garbage carts are green and recycling carts are blue. The organics cart color should be standard Countywide, with municipalities and private haulers replicating the County's cart specifications.

---

[30] Most communities that have a compostable bag requirement for food scraps, ask residents to purchase BPI-certified bags. These bags meet ASTM standards for compostability and have been verified by a third party. https://bpiworld.org/bpi. Example cities include the City of Minneapolis (requires food scraps be bagged in BPI-certified bags or paper bags) and the City of Portland (bags are not required, but if used, they must be paper or BPI-certified).

Other cart specifications to consider:

- Recycled content – percent of post-consumer recycled material versus virgin plastic used in the cart body.
- Optional vented lids (can reduce moisture buildup versus a fully-sealed lid which suppresses odor).
- UV-stabilized plastic to withstand high outdoor temperatures and UV-protected color to prevent/slow fading.
- Hot stamp County name and/or logo on side of cart.
- Rubber wheels versus plastic molded wheels.
- Standard manufacturer color or specialty color.
- Cart assembly: attach wheels and lids. Cost will vary depending on who assembles the carts (County staff, subcontractors, or cart manufacturer).
- Cart distribution to residents. Cost will vary depending on who distributes the carts (County staff, subcontractors, or cart manufacturer).
- Wording for cart lid. The cart manufacturers typically hot stamp the material type on the lid such as “Organics Only” or “Food & Yard Waste Only.” Consider the wording to be used for the organic waste program in the County’s messaging and education. In the ZWMP strategies, the term “compost” is used to describe the material to be collected and “composting” is used for the Universal Recycling Ordinance amendment. Because compost is technically the finished product of processing organic waste, it is recommended the County use the term “organic waste” when referring to food scraps and yard waste.
- Optional in-mold label on cart lid. Most manufacturers offer a 4-color label that is molded into the cart lid, as opposed to a sticker. The advantage of the label is that it can be custom-made to provide instructions as to what materials are accepted/not accepted in the organics cart, along with pictures or graphics. The disadvantage is that once molded, the label cannot be changed. If the County revises its guidelines or makes changes to the organic waste program, the lid instructions become outdated.

CART DISTRIBUTION PLAN

Once carts are procured, the County will need to establish a plan for distributing the carts to residents. Most cart manufacturers offer the option to assemble (add wheels and lids) and distribute the carts as part of their bid/proposal. (The carts are typically shipped without wheels and lids attached to allow the carts to nest inside one another for maximum truckload quantities.) The County could request proposals with and without cart assembly and distribution to compare costs and/or the County may choose to assemble and distribute the carts using County staff or a subcontractor.

Each cart is hot-stamped with a serial number and the County will need to keep an inventory, matching each cart number with a specified household address.

The carts will be distributed by municipality, collection route, or collection area, to be determined by the County. (See Phased Rollout section below.)

FLEET

DSWM's residential garbage fleet includes approximately 213 automated side-load collection vehicles dedicated to garbage collection, supplemented by two hybrid side loaders, 35 rear loaders, four front loaders, 59 roll-offs, 83 trash trucks, and 52 trash dump cranes. The automated side-load trucks use a curbside robotic arm that allows the driver to remain in the cab and use a joystick to lift, empty, and return carts to the curb. This system is designed for efficient cart-based service and can collect up to approximately 1,500 households per day, depending on housing density and route configurations.

Based on the fleet review, DSWM already has the type of collection vehicles recommended for a third-cart organics program. Existing automated side-load trucks can be used for cart-based organics collection, which means the transition from two weekly garbage collection days to one garbage collection day and one organics collection day should not require a separate organics fleet, major route redesign, or substantial new driver training. Because the same vehicle platform would be used, the County can rely on existing maintenance practices, staffing assumptions, and fleet cost data for planning and budgeting.

WSP recommends the County install "smart cameras" or AI-enabled cameras in the hoppers of MSW/organic waste collection vehicles to assist drivers in identifying households that have contamination in their organic waste carts. When the camera captures an image of the contamination, some systems are programed to send photos and addresses to the city or county's customer service department for follow-up or photos can be sent directly to the resident in real time.

LaBrie Automizers, New Way Sidewinders, and McNeilus Zero Radius trucks are automated side-load vehicles commonly used in Miami-Dade County and broader North American markets. These vehicle types are designed for heavy-duty cart collection and have features that support organics collection, including strong automated arms, curbside reach for efficient cart service, sealed or sloped bodies, and cleanout areas intended to retain moisture and improve access for cleaning.

Because food scraps and wet yard trimmings can generate liquids, the County should inspect each side-load vehicle before launch to confirm that hoppers, cleanout boxes, drain plugs, tailgate seals, and related components are in working condition and capable of managing moisture. This inspection should be incorporated into standard preventive maintenance, along with existing checks for hydraulic leaks. The County should also confirm how liquids will be managed at the transfer station, tipping floor, or processing facility, including whether excess leachate can be directed to a wastewater treatment facility or requires separate liquid management infrastructure.

DSWM has a five-year vehicle replacement plan, and current heavy-duty replacement units are being purchased as diesel internal combustion engine vehicles. Electric vehicles are being added to the light-duty fleet in accordance with County policy, but heavy collection fleet electrification does not appear to be part of the current replacement approach. Fleet electrification or alternative fuels could be evaluated separately as a long-term sustainability strategy, particularly if future organics processing produces biogas, compressed natural gas, or renewable natural gas that could support fleet fuel use.

CONTAMINATION CONTROL AND ENFORCEMENT

The County should establish a contamination control protocol before launch, including cart tags, driver and supervisor reporting, customer service follow-up, repeat-violation notices, and a graduated enforcement process. Early enforcement should emphasize education and correction, while the ordinance should authorize service refusal, fees, or corrective action for repeated contamination. Contamination should be tracked at the route, transfer station, and processing facility levels to focus outreach where it is most needed.

The program should begin before the first collection day and continue through phased rollout. Before cart delivery, the County should work with the organics processor to define accepted and prohibited materials, confirm allowable contamination thresholds, and reflect the same standards in trilingual mailers, cart labels, cart tags, and 311 guidance.

During launch, enforcement should be education-first. Drivers or inspectors should identify visible contaminants such as plastic bags, plastic foodware, glass, metal, and large amounts of garbage. Courtesy notices should explain the issue, identify corrective actions, and serve as the first step in DSWM's standardized curbside code enforcement process.

Technology should support field verification. Hopper cameras, onboard cameras, route management software, and cart serial numbers can document contamination and link events to addresses. Photos should be reviewed before formal enforcement, and the data should be used to identify recurring contaminants, routes, neighborhoods, and service areas for targeted education.

Miami-Dade County has already applied similar technology to recycling. In August 2025, DSWM announced new compressed natural gas collection trucks with AI, GPS, and video capabilities under its recycling vendor contract. The first phase began in spring 2025, with full deployment planned for early 2026. The AI-enabled trucks are intended to identify non-recyclable materials, support targeted education, reduce contamination costs, and improve material quality. County reporting in 2026 also noted that recycling contamination declined from nearly 50 percent in 2020 to 36.5 percent, with AI-powered cameras helping focus outreach where contamination was observed.

DSWM can apply this same framework to organics collection by using truck-mounted cameras, address-level documentation, route trend analysis, customer service follow-up, and targeted education to identify prohibited materials before they reach processing facilities. For organics, image review should focus on processor-specified contaminants such as plastic bags, plastic foodware, glass, metals, and large volumes of garbage. As with recycling, camera findings should initially support education, with enforcement reserved for repeat or significant contamination.

Contamination control should also include transfer station and processing facility monitoring. Facility staff should inspect tipped organics loads, document visible contamination, notify DSWM when loads exceed thresholds, and provide photos or reports when available. The processor should report contamination trends by route or delivery source when feasible, including contaminant type, estimated percentage, rejected loads, extra processing costs, and effects on compost or digestate quality.

To support long-term performance, the County should routinely track key contamination metrics, including:

- Number of tagged carts
- Number of rejected or un-serviced carts
- Repeat violation rate, most common contaminants

- Route-level contamination trends
- Customer service inquiries
- Processor-reported contamination levels
- Rejected load costs

A first-phase baseline will help the County evaluate whether education, cart tagging, inspections, and enforcement reduce contamination over time.

Phased Rollout

Implementation should be phased by municipality, collection route, or service area to manage cart procurement, cart distribution, resident education, customer service demand, processing capacity, and operational logistics.

The DSWM's garbage collection routes are grouped into seven service areas; each area has an average of 44 routes (the number of routes range from 40 to 51). Each service area collects a certain number of households or units as shown in Table 12 below.

Table 12: DSWM Service Area Details

Service Area	Number of Routes	Number of Households (units)
1	44	49,212
2	44	43,936
3	51	57,610
4	46	49,696
5	41	45,791
6	40	43,326
7	40	46,545
Totals:	306	336,116

The most efficient way to introduce organics collection, would be by service area. However, if the County chooses to roll out the program by municipality, it should be noted that some municipalities are in more than one service area (e.g., Miami Gardens is serviced by routes in both Service Area 1 and 2). Service area number 4 contains all unincorporated households while the others are a combination of unincorporated and municipal households.

Another option for the County to consider, is rolling out organic waste collection first to service areas, routes, or municipalities that have low contamination rates for recycling. Residents who are recycling correctly may adapt easily to proper organic waste preparation. This may provide a smooth start to the program, allowing drivers to get acclimated to organics collection without large amounts of contamination, as well as providing fairly clean material to the processing facility as it begins operations.

A limited first phase should be used to test cart delivery, routing, transfer or direct-haul logistics, contamination inspection procedures, driver reporting, and customer service scripts before expanding to the full DSWM service area. The County may also consider a staged materials approach in which residents initially use the organics cart for yard trimmings, followed by the addition of food scraps (and potentially food-soiled paper) once processing contracts, facility readiness, and public education materials are finalized.

The County should attempt to have organic waste collection service rolled out to the entire DSWM service area by the end of 2028.

Collection Routing and Field Operations

Collection routes should be developed using existing garbage route geography where feasible, then refined after the County collects actual setout, tonnage, travel time, and disposal/tip time data. Organics routes should be balanced to account for seasonal yard trimming volumes, higher participation periods, and areas with large lots or extensive landscaping. Route supervisors should monitor the first several collection cycles to identify overloaded carts, frequent out-of-cart setouts, contamination hotspots, missed collections, and areas where residents may need additional outreach.

Processing and Transfer Requirements

Before collection begins, the County should confirm processing capacity, material specifications, contamination thresholds, load rejection procedures, delivery locations, operating hours, seasonal capacity, odor management requirements, and compost or end-product markets. Transfer stations or direct-haul facilities should have designated receiving areas for organics to prevent cross-contamination with garbage and recyclables. As residential food scraps are added to the CASP operation, the County should require a facility readiness review, including leachate control, vector control, odor prevention, neighbor communication, permitting, stormwater protection, and phased acceptance of food material.

Resident Education and Launch Materials

Education should begin at least three to six months before the first collection day and continue after launch. At cart delivery, each household should receive a welcome letter, collection calendar, accepted and prohibited materials list, odor and pest prevention tips, cart setout instructions, and customer service contact information. Program materials should use consistent colors, plain language, pictures, and multilingual content. The County should repeat the same core messages through direct mail, the DSWM website, social media, cart decals, cart tags, instructional videos, public meetings, and customer service scripts.

Additionally, the County will need to consider a grace period under which it will continue to dispatch crews to service customers who forgot that garbage is only collected once per week. A grace period of no more than two weeks is recommended. There are a few options for notifying residents of the collection changes including cart tags, the DSWM website, social media platforms, or broadcast texts or emails to residents based on their collection day (if they sign up for this method of communication).

Public education will be critical to a successful organic waste collection program. The County will need to develop a systematic approach to notifying residents of the County's plans and how it will impact them. Specific public education action items will need to be addressed as a part of the implementation process.

There will be a need to effectively communicate to residents the reasons for the change in collection operations, the benefits of the change, how it will affect the residents, and the specific timeline for which implementation of organics collection will occur. These communications should include general information such as:

- Purpose and goals of the organic waste collection program;
- Personal and community benefits of organic waste collection;
- Rules and restrictions regarding setouts, including penalties for non-compliance (reference ordinance); and
- Customer service contact information.

As the County moves toward implementation in each new service area, there will also be a need to communicate with all impacted residents regarding exactly how to participate in the new collection system. Details should include:

- Collection days and times (special emphasis on the elimination of the second garbage day per week);
- List of what is acceptable/not acceptable to be placed in the cart;
- How to prepare items for collection: mandated requirement that food scraps need to be bagged, either in brown paper bags or compostable plastic bags (purchased by residents);
- Rules and restrictions regarding out-of-cart set-outs; and
- Instructions and process for changing cart sizes.

It will be important to begin actively educating customers on these specific items well in advance of the new organic waste collection start date. There are a variety of ways to communicate important information to residents including, but not limited to:

- News releases and print articles;
- Direct mailing of postcards and/or more detailed information packets;
- Postings on all County social media platforms;
- Detailed information on DSWM website and/or social media might include:
    - FAQ page
    - Instructional video (tutorial)
    - Option to opt in to texts or emails from the County regarding DSWM information
    - Dedicated phone number for organics collection questions

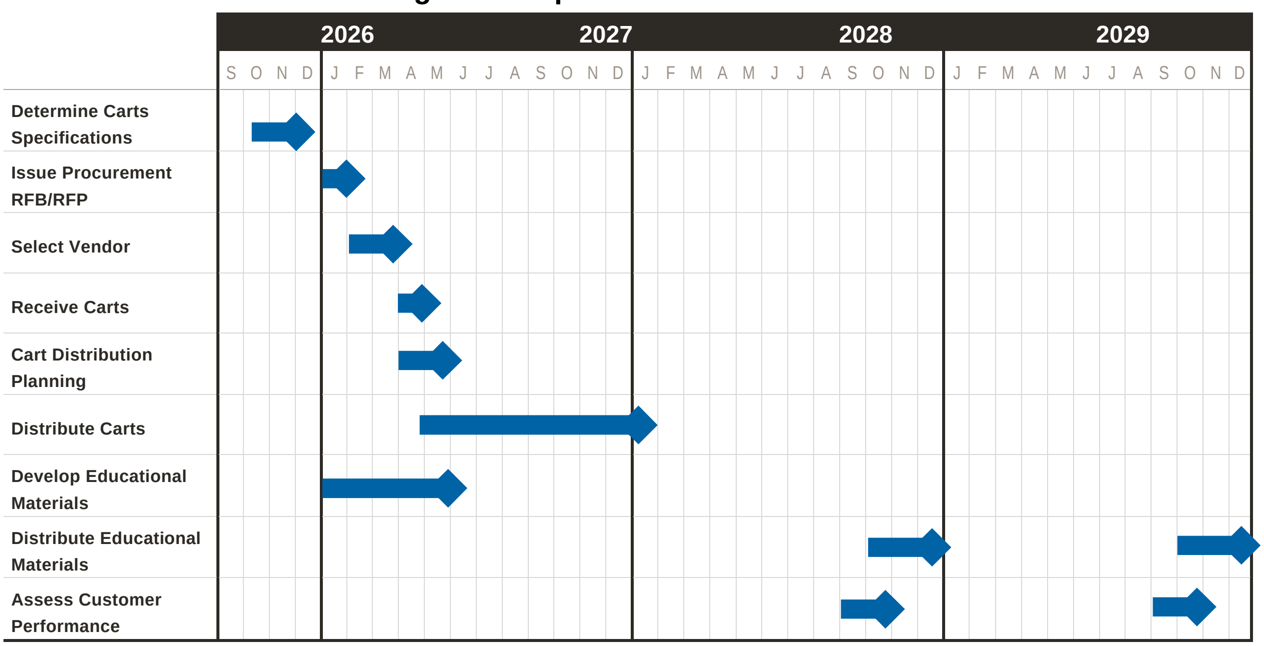
- Public meetings;
- Radio and television public service announcements (PSAs); and
- Signage (e.g., billboards, signs on buses and bus shelters, signs on public benches, etc.).

The County may consider using a slogan, catchy program name, mascot, etc., so residents associate that image/slogan with the organics collection program. An example of this is already underway – the County's organic waste public drop-off program is using the slogan "Be Scrappy" on its containers.

Implementation Timeline

The introduction of residential organic waste collection by the DSWM will require a phased roll-out as previously mentioned to manage cart procurement & distribution, resident education, customer service demand, processing capacity, and overall operational logistics. The following planning-level timeline, Figure 1, is designed to provide the County with a roadmap for accomplishing all of the steps in the implementation process by the targeted program inception date, assumed to be 2028.

Figure 1: Implementation Timeline



In the list below, tasks are shown in the general order in which they should be executed, with the exception of educational initiatives, which should begin three to six months prior to roll-out, to provide residents enough time to prepare for the changes.

- Develop Cart Specifications
- Procure Carts
- Develop Requirements for Bagging Food Scraps (and the use of Compostable Bags)
- Ordinance Development, Review and Revision
- Adopt Ordinances

- Develop a Cart Distribution Plan
- Develop Educational Materials/Marketing Plan
- Distribute Educational Materials
- Deliver Carts
- Collect Data to Monitor Performance

Financial Implications

The DSWM will need to prepare an annual budget/amend its current budget to include the costs associated with implementing an organic waste collection program. This includes, but is not limited to the following expenditures:

- The purchase of a third cart for each single-family address (four-units or less) that has garbage collection provided by the DSWM.
    - Cart costs vary and are dependent on many factors including those listed above in the Cart Specifications and Procurement section. With input from County staff, WSP estimated $63.92 per cart for planning level purposes. A one-time purchase of 350,353 carts is estimated to be $22,394,564 as shown in Table 14: Payback Analysis Inputs.
    - Rather than purchase all 65-gallon carts, the County should order a percentage of 90-gallon and 35-gallon carts for residents who will request larger or smaller organics carts.
    - Cart assembly: attach wheels and lids. Cost will vary depending on who assembles the carts (County staff, subcontractors, or cart manufacturer).
    - Cart distribution to residents. Cost will vary depending on who distributes the carts (County staff, subcontractors, or cart manufacturer).
- Hire additional staff, if necessary, to enforce the amended ordinance and investigate non-compliance issues.
- Public education and marketing (printing, billboards, tutorial video for website, etc.).
- DSWM staff time for program implementation (from planning to rollout logistics), public education/marketing material development, website design/revisions, etc.
- Establish collection fees based on garbage cart size. Introduce variable rate pricing or SAYT, with fixed fees for recycling and organics collection (regardless of cart size) plus fee for garbage collection according to cart size. See SAYT section in this document for more details.
- Establish fines for non-compliance with the amended ordinance mandating organic waste collection. DSWM staff will be instrumental in drafting the amendment language and setting the fees for organics collection violations such as repeated contamination of organics/recycling/garbage carts (i.e., improper separation), out-of-cart setouts, etc.

Table 13: Cost of Carts for Rollout

Input	Cost
Number of Households	350,353
Cart Cost per Unit	$63.92
Total Cart Cost (one-time purchase)	$22,394,563.76
Annual Cart Maintenance Cost (third cart, incremental)	$1,086,500

Performance Monitoring

For the County, an evaluation of the current garbage and recycling collection program performance will serve as the baseline for quantities of waste disposed and diverted (through curbside recycling) prior to implementing organic waste collection. Once the composting ordinance is enacted and organic waste collection is established, the same evaluation should be conducted, to measure the impact organics collection has on waste disposal and diversion. It is recommended the County collect the following data:

- **Diversion rate**: Tons of material collected for recycling and composting divided by the tons of all waste collected.
- **Setout rate:** Average number of carts set out for collection. This can affect the length of time spent on a route.
- **Uncontained material**: Out-of-cart setouts that detract from productivity and necessitate additional time per stop. While it may take extra time to leave an educational tag or ordinance enforcement notice, it is important to address what materials are accepted and how specific types of materials should be placed for collection.

Performance data should be reviewed after the first 30, 60, 90, and 180 days of service, then at least annually. The County should use these data to adjust routes, refine education, modify cart options, evaluate processing contracts, and determine whether additional ordinance enforcement or customer support is needed. Examples of performance data include:

- Organic waste tons collected by route, municipality, and/or collection area;
- Setout rate and average pounds per household per week;
- Contamination rate by route and/or by delivered load;
- Number of rejected or downgraded loads and the reason for rejection;
- Missed collections, customer complaints, and cart repair or replacement requests;
- Route completion time, number of loads per route, tip time, and travel time;
- Out-of-cart setouts and bulky yard trimming volumes; and
- Program diversion impact compared with the pre-launch garbage and recycling baseline.

WSP recommends collecting performance data at least annually for each route to determine if routes need to be adjusted or levelized to maximize efficiency.

Non-DSWM Service Areas

Organic waste collection in non-DSWM service areas will need to be implemented through a coordinated countywide framework because Miami-Dade County's solid waste system is divided among DSWM, municipal collection departments, municipal contracts, interlocal agreements, and private haulers. DSWM provides residential garbage collection in the unincorporated area and ten municipalities, while the remaining municipalities either operate their own collection systems or contract with private haulers. DSWM also provides residential recycling in its service area and through interlocal agreements with additional municipalities, with contracted haulers providing curbside recycling service in those communities. Commercial and multifamily properties are generally served by private haulers through franchises, permits, contracts, or open-market arrangements.

Program Operations

Each non-DSWM serviced municipality should prepare an implementation plan before the effective date of the amended Universal Recycling and Composting Ordinance. The plan should identify the current residential collection provider, contract terms, collection frequency, cart ownership, billing method, available vehicle types, multifamily and commercial service requirements, and the local ordinance or franchise provisions that may need to be amended. Municipalities that provide collection directly will need to update municipal operating procedures, staffing plans, and fleet schedules. Municipalities that rely on private haulers should update franchise agreements, service contracts, licenses, or permit conditions to require organics collection, standardized customer education, contamination controls, and reporting.

The County should use the Zero Waste Master Plan strategies as the implementation framework for non-DSWM areas:

- The Universal Recycling and Composting Ordinance would establish the basic requirement that single-family residents receive garbage, recycling, and organic waste collection; multifamily properties provide appropriately sized recycling and organics containers; and commercial and institutional generators subscribe to adequate recycling and organics service.

- The Mandatory Participation, Source Separation, and Enforcement strategy would require generators to separate recyclable and compostable materials from garbage.

- The Save-As-You-Throw strategy would provide a volume-based pricing signal for single-family garbage service, while

- Rate Structure Incentives and Reporting Requirements would establish minimum service levels and require haulers to report garbage, recycling, and organics quantities.

Collection Schedule and Service Frequency

Municipalities should determine how to add organics collection based on existing service frequency, housing patterns, route structure, and contract requirements. Cities with a schedule similar to DSWM may choose to retain the first weekly garbage collection day, convert the second weekly garbage collection day to organics collection, and continue recycling on the current schedule. Municipalities that provide three or more garbage collection days per week should evaluate whether those service levels remain necessary once food scraps and yard debris are diverted to a separate organics cart. In most cases, adding organics collection should be paired with reduced garbage collection frequency to limit cost increases, avoid adding unnecessary truck trips, and reinforce source separation.

For single-family areas, the recommended baseline is weekly organics collection, weekly garbage collection, and recycling at least every other week, unless a municipality elects to provide more frequent recycling or organics service. Communities with high-density housing, alley service, side-yard service, constrained setout areas, or limited cart storage may need modified approaches such as smaller carts, shared carts, split-body vehicles, containerized collection, or food scraps drop-off during the transition period. Any modification should still meet the ordinance's intent by providing convenient access to organics diversion and maintaining a clear separation between garbage, recyclables, and organic materials.

Countywide Standards for Carts, Signage, and Accepted Materials

To avoid confusing residents and businesses, the County should establish minimum universal standards cart color, signage, and accepted and prohibited materials. Municipalities and private haulers should be allowed to add local branding, but the core instructions should remain consistent across the county. This is particularly important because residents may live, work, attend events, or manage properties in different municipalities. Standardized signage and material lists will also help processors manage contamination risk and maintain quality feedstock for composting operations and anaerobic digestion facilities. The County should also provide model outreach materials that municipalities can adapt for local demographics, including trilingual mailers, web content, social media posts, cart tags, multifamily templates, and commercial technical assistance materials.

Municipal and Private-Hauler Coordination

Municipalities that already regulate haulers through franchise, license, or contract systems should use those authorities to incorporate organics requirements.

Key policies and programs identified in the Municipal Summaries (Appendix A) provide examples of initiatives that can support implementation, including Miami Lakes' solid waste franchise requirement for commercial and multifamily collection, Opa-locka's recycled materials licensing ordinance for nonresidential recovered materials haulers, and South Miami's commercial recycling, mandatory separation, and construction debris hauling requirements. These local authorities can be updated to require organics service, processor-compatible material lists, contamination notices, customer education, and quarterly or annual reporting.

For municipalities using private haulers, contract amendments or future solicitations should require haulers to provide organics collection whenever garbage collection is provided, right-size garbage, recycling, and organics containers, universal cart color and signage, train drivers to identify contamination, and report service data to the municipality and County. Contracts should also specify who owns carts, who distributes and maintains containers, how contamination will be documented, how rejected loads will be handled, and how new service costs will be passed through to customers.

Hauler Permitting, Reporting, and Data Management

Miami-Dade County's existing hauler permitting and Disposal Facility Fee reporting framework can support organics implementation outside the DSWM service area. A County general hauler permit is required for businesses that remove, collect, or transport solid waste or recyclable material for hire over public rights-of-way within incorporated and unincorporated areas. Private haulers operating in the Disposal Facility Fee Area must file monthly reports and pay the applicable fee based on solid waste collection and disposal receipts. The County could build on this structure by requiring permitted haulers and compost haulers to report organics tons, service areas, customer sectors, rejected loads, contamination incidents, and corrective actions through a standardized reporting system leveraging technology and AI for efficiency.

Reporting should be structured to protect customer confidentiality while still allowing the County to evaluate program performance. At a minimum, reports should summarize:

- Garbage, recycling, and organics tonnage by municipality, sector, and service provider
- Container volumes and service frequency
- Contamination levels
- Rejected loads
- Participation rates (where available)

These data should be used to calculate progress toward the Zero Waste Master Plan, identify service gaps, support enforcement, and prioritize outreach or technical assistance.

Contamination Control and Enforcement

Non-DSWM programs should use the same contamination control framework recommended for the DSWM service area: education first, consistent cart tags or curtesy notices, documented follow-up, and graduated enforcement for repeat or significant contamination. Municipalities and private haulers should coordinate with the County and organics processors to define unacceptable materials, contamination thresholds, load rejection procedures, and documentation requirements. Where feasible, private-hauler contracts should require route-level contamination tracking, photo documentation, and processor feedback so local programs can target education to specific routes, neighborhoods, multifamily properties, or commercial accounts.

Because several municipalities and private haulers already use different collection frequencies, cart colors, customer service systems, and enforcement processes, the County should establish a minimum enforcement template that can be applied locally. The template should include standard courtesy notices, repeat-violation letters, customer education scripts, processor rejection forms, and a shared list of common contaminants such as plastic bags, plastic foodware, glass, metal, and large volumes of garbage. Consistent documentation will help the County compare contamination trends across DSWM, municipal, and private-hauler systems.

Implementation Steps

The following implementation steps identify the short-term actions needed to extend organics collection beyond the DSWM service area while maintaining consistency with countywide zero waste goals. These priorities focus on aligning municipal ordinances, private-hauler contracts, cart and signage standards, processor requirements, contamination controls, and reporting systems so each service provider can implement organics collection locally while contributing comparable data toward countywide diversion, contamination reduction, and performance monitoring.

- Inventory current municipal collection providers, contracts, cart systems, service frequencies, and franchise or licensing authorities.
- Develop model ordinance language, contract provisions, hauler permit conditions, and enforcement procedures for organics collection.
- Establish countywide cart color, label, signage, accepted materials, and contamination notice standards.
- Require haulers to report garbage, recycling, and organics service data by municipality and sector through a standardized reporting system.
- Coordinate processor specifications, transfer requirements, contamination thresholds, and rejected-load procedures before launch.
- Phase implementation by municipality, service provider, or contract cycle to manage costs, customer education, cart procurement, and processing capacity.

TIPPING FEES AND ORGANICS DIVERSION PAYBACK

As a supplemental exercise to the LCCA, WSP evaluated the payback period associated with using potential annual savings generated by diverting organic waste to compost and/or AD facilities (Baseline and Alternative Scenarios) to fund the investment required to procure a third organics collection cart for each single-family household in the DSWM service area. Thus, this analysis estimates how long it would take for the disposal savings generated by diverting organics away from landfill to recover the upfront cost of purchasing the new organics carts.

Methodology

The payback analysis compares the cost of diverting organic material to a processing facility against the cost of continuing to landfill that same material at the County's current disposal rate of $76.12 per ton. For each ton of organics diverted, the County realizes a per-ton savings equal to the difference between the landfill disposal rate and the organic processing facility tipping fee (the per-ton fee charged to accept and process the material). These per-ton savings accrue each year as organic material is diverted.

The tipping fee assumptions used for the Baseline Scenarios assume that the composting and AD facilities would be developed, owned, and operated by a third party. This third party would would be responsible for handling, treating, and converting the waste to a marketable product (e.g., compost, natural gas). The third party would charge DSWM a tipping fee to receive the waste at the facilities affiliated with either the Baseline or Alternative scenarios. Note that DSWM has not decided that organic conversion facilities developed under these scenarios would be developed using the third-party owner operator model; the appropriate model would be determined in a future phase. This business model was assumed to simplify this payback analysis.

The analysis also assumes that third carts would be provided to approximately 350,000 single-family households, consistent with the DSWM service area population used throughout the organics feedstock projections in this report. This represents the households that would receive a new organics cart under the collection program. The cumulative annual savings are measured against the upfront cost of purchasing the organics carts, along with the ongoing cost of maintaining them. The payback period is the number of years it takes for the accumulated savings to fully cover the initial cart investment. Because the collection program is rolled out gradually, with participation and diverted tonnage growing over time, the early years generate smaller savings than later years. The analysis accounts for this by using each year's projected tonnage rather than a single flat average, providing a more realistic payback period.The analysis was run across a range of Low, Medium, and High tipping fees for both the Baseline and Alternative Scenarios to test the sensitivity of the payback period to the assumed processing fee.

Benchmark Tipping Fees

Composting tipping fees were benchmarked using a 2024 national composting facility survey, applying a planning-level range of $30 to $50 per ton to reflect variation across facility types and feedstocks.[31] AD tipping fees were benchmarked against comparable municipal AD facilities, applying a range of $70 to $95 per ton.

Results

Table 14 below shows the Payback Analysis Inputs while Table 15 shows the Payback Analysis Results.

Table 14: Payback Analysis Inputs

Inputs	
Number of Households	350,353
Cart Cost per Unit	$63.92
Total Cart Cost (one-time purchase)	$22,394,564
Annual Cart Maintenance Cost (third cart, incremental)	$1,086,500
Landfill Disposal Rate ($/ton)	$76.12
Baseline Tipping Fee - Low ($/ton)	$30
Baseline Tipping Fee – Medium ($/ton)	$40
Baseline Tipping Fee – High ($/ton)	$50
Alternative Tipping Fee – Low ($/ton)	$70
Alternative Tipping Fee – Medium ($/ton)	$85
Alternative Tipping Fee – High ($/ton)	$95

[31] https://erefdn.org/wp-content/uploads/2025/01/Fact-Sheet_composting_FINAL.pdf

Table 15: Payback Analysis Results

Scenario	Tipping Fee Level	Savings per Ton ($/ton)	Payback Period (Years)
Baseline	Low	$46.12	5.44
Baseline	Medium	$36.12	6.30
Baseline	High	$26.12	7.61
Alternative	Low	$6.12	14.63
Alternative	Medium	-$8.88	No Payback
Alternative	High	-$18.88	No Payback

Under the Baseline Scenario, the cart investment is recovered within approximately 5 to 8 years across the full range of benchmark tipping fees. Under the Alternative Scenario, the payback period extends beyond 14 years at the low-end tipping fee, and no payback is achieved at the medium and high tipping fees. At those levels, the AD processing fee exceeds the current landfill disposal rate, meaning each ton diverted costs more than landfilling. However, it is important to note that under the third-party owner model assumed for this analysis, it is also assumed that the third-party owner does not share any of the revenues from compost or renewable natural gas with DSWM. Such shared revenues may help to reduce the payback periods for the two alternatives.

Limitations and Intended Use

This payback analysis is a high-level conceptual exercise intended to illustrate the relative order of magnitude of the cart investment against potential disposal savings. It is not a comprehensive financial or procurement analysis. Specifically, it considers only the cost of cart procurement and maintenance weighed against disposal savings; it does not account for collection route costs, vehicle and labor costs, facility capital and operating costs, or facility revenues. It also relies on benchmark tipping fees drawn from other jurisdictions rather than specific pricing for Miami-Dade County, and assumes a single flat landfill disposal rate held constant over the analysis period. Actual payback outcomes would depend on the delivery and ownership model ultimately selected, negotiated tipping fees, site-specific costs, and market conditions at the time of implementation. A more detailed evaluation of these factors is recommended as a next step should the County advance an organics diversion program.

Regional Economic Impact Analysis

An Economic Impact Analysis (EIA) has been conducted to quantify the broader economic effects of the proposed organics management infrastructure investments on the Miami-Dade County and Florida regional economies. While the Life Cycle Cost Analysis presented below evaluates the total cost to the County of implementing each scenario, the EIA measures the economic activity generated by that investment such as jobs supported, wages and income, and total economic output.

Economic multipliers have been applied to translate capital and operational expenditures into estimated jobs, labor income, and economic output. Multiplier data will be sourced from a recognized regional economic modeling dataset.

The EIA follows the standard Input-Output modeling framework using multipliers from the U.S. Bureau of Economic Analysis Regional Input-Output Modeling System (BEA RIMS II), specifically for Miami-Dade County using 2017 U.S. Benchmark I-O data and 2024 Regional Data. Two industry categories were applied: 1) Construction (Industry 7) for capital expenditures, and 2) Waste Management and Remediation Services (Industry 53) for operating expenditures. Multipliers are applied to the direct expenditures from the LCCA model to estimate three tiers of economic impact:

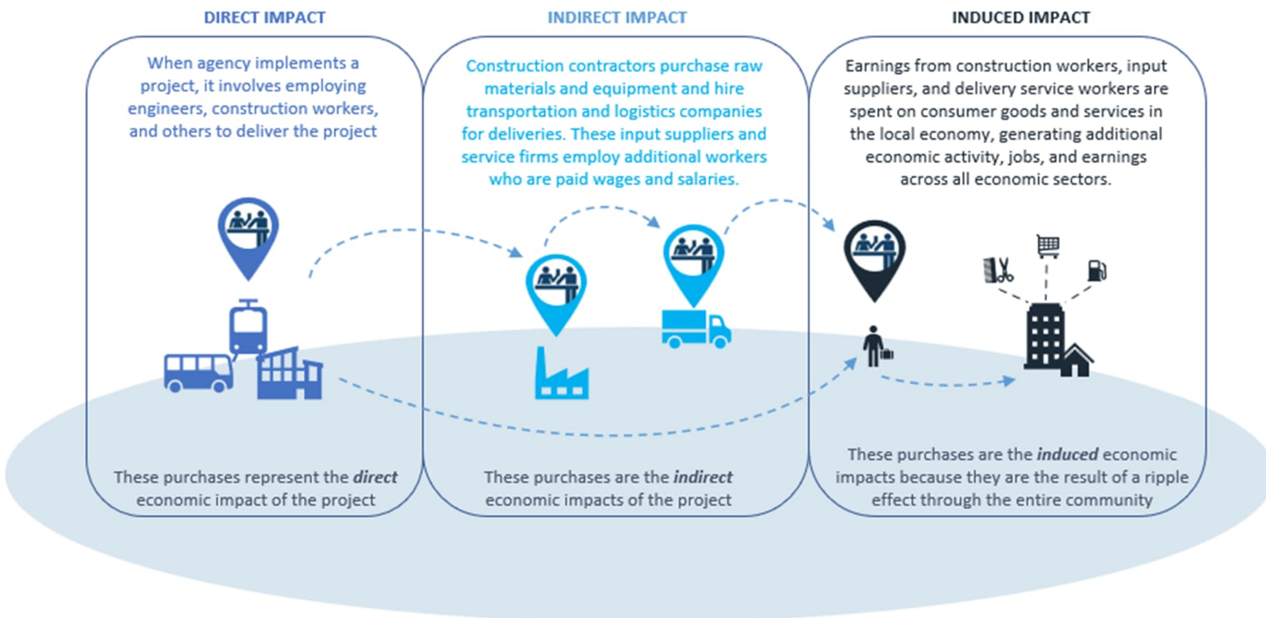
- Direct Impacts: economic activity generated by the project spending itself, including facility construction, operations, and staffing.
- Indirect Impacts: economic activity generated through the supply chain supporting facility development and operations, such as equipment manufacturers, construction materials suppliers, and transportation providers.
- Induced Impacts: additional consumer spending by workers whose incomes are supported by the direct and indirect activity, such as retail, food services, and housing.

Impacts are reported in four categories:

1. Employment (person-year jobs);
2. Labor Income (wages and salaries paid to workers);
3. Value Added (net contribution to regional GDP, similar to the sum of profits and wages); and
4. Output (total economic activity, including intermediate inputs).

Figure 2 illustrates how direct project spending ripples through the regional economy to produce indirect and induced impacts.

Figure 2: Economic Impact Analysis Overview



The following tables present the estimated economic impacts of each scenario over the Project Period, applying BEA RIMS II multipliers to the direct expenditures modeled in the Life Cycle Cost Analysis (see next section). Impacts are broken out by expenditure type (construction vs. operations & maintenance) and by impact tier (direct, indirect, induced). All values are reported in real 2025 dollars and represent cumulative activity over the full Project Period. Employment figures are expressed as person-years, where one person-year equals one full-time job for one year.

Table 16: Baseline Scenario Economic Impacts

Impact Category	Employment (Job-Years)	Labor Income	Value-Added	Output
		Construction		
Direct	406	$29.4 M	$71.6 M	$145.0 M
Indirect	258	$14.6 M	$28.8 M	$58.3 M
Induced	262	$12.3 M	$29.2 M	$48.0 M
Construction Subtotal	**926**	**$56.3 M**	**$129.6 M**	**$251.4 M**
		O&M		
Direct	2,230	$177.5 M	$272.9 M	$400.0 M
Indirect	618	$31.5 M	$79.3 M	$116.2 M
Induced	1,275	$58.3 M	$138.9 M	$228.3 M
O&M Subtotal	**4,122**	**$267.3 M**	**$491.0 M**	**$744.4 M**
TOTAL	**5,048**	**$323.6 M**	**$620.6 M**	**$995.8 M**

The Baseline Scenario generates an estimated 5,048 person-years of employment, $323.6 M in labor income, $620.6 M in value added to regional GDP, and $995.8 M in total regional economic output over the 2028–2047 Project Period. The majority of these impacts stem from ongoing operations and maintenance of the CASP system, which represents ~80% of the total economic activity. Construction related impacts, driven by modular CASP expansions every 2 years, contribute the remaining 20%.

Table 17: Alternative Scenario Economic Impacts

Impact Category	Employment (Job-Years)	Labor Income	Value-Added	Output
		Construction		
Direct	1,335	$96.6M	$235.2 M	$476.7 M
Indirect	847	$48.0 M	$94.6 M	$191.8 M
Induced	861	$40.3 M	$96.1 M	$158.0 M
Construction Subtotal	**3,043**	**$184.9 M**	**$425.9 M**	**$826.4 M**
		O&M		
Direct	1,813	$144.3 M	$221.9 M	$325.2 M
Indirect	502	$25.6 M	$64.5 M	$94.5 M
Induced	1,037	$47.5 M	$112.9 M	$185.7 M
O&M Subtotal	3,352	$217.4 M	$399.3 M	$605.4 M
TOTAL	**6395**	**$402.3 M**	**$825.2 M**	**$1,431.8 M**

The Alternative Scenario generates an estimated 6,395 person-years of employment, $402.3 M in labor income, $825.2 M in value added, and $1.4 B in total regional economic output over the same Project Period. Unlike the Baseline Scenario, construction and O&M impacts are roughly balanced in the Alternative Scenario, reflecting the substantially higher upfront capital investment in the phased AD and Tunnel/Bunker Composting facilities.

Table 18: Comparative Summary

Category	Baseline (CASP Only)	Alternative (CASP + AD + TC)
Total Direct Project Expenditure	$554.5 M	$809.7 M
Total Regional Economic Output	$995.8 M	$1,431.8 M
Total Employment (Job-Years)	5,048	6,396
Direct Project Employment	2,636	3,148

Figure 3: Total Economic Activity Chart

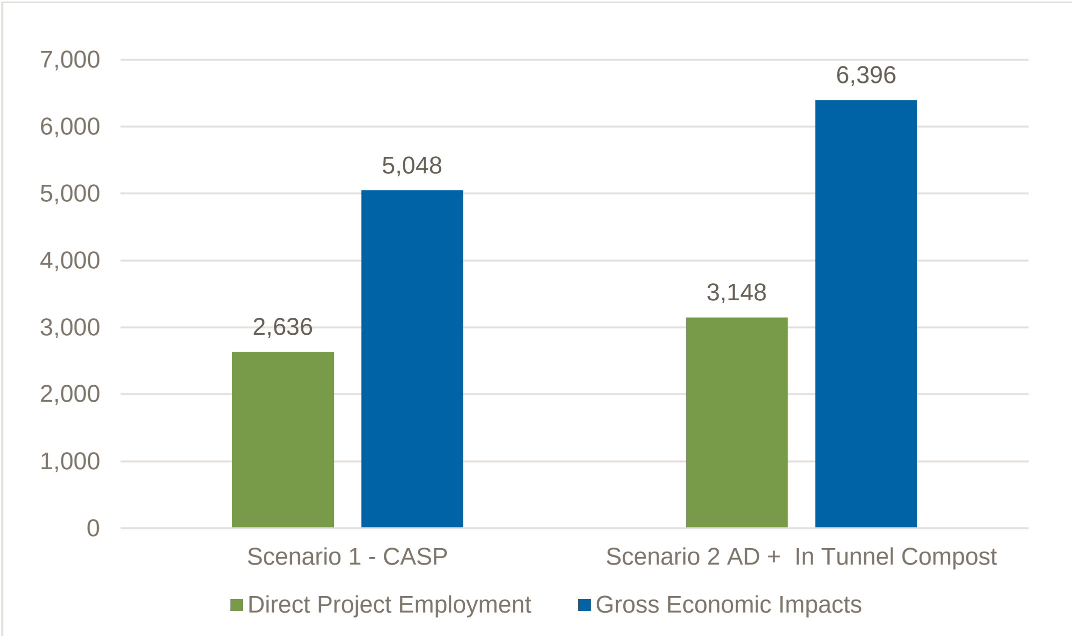
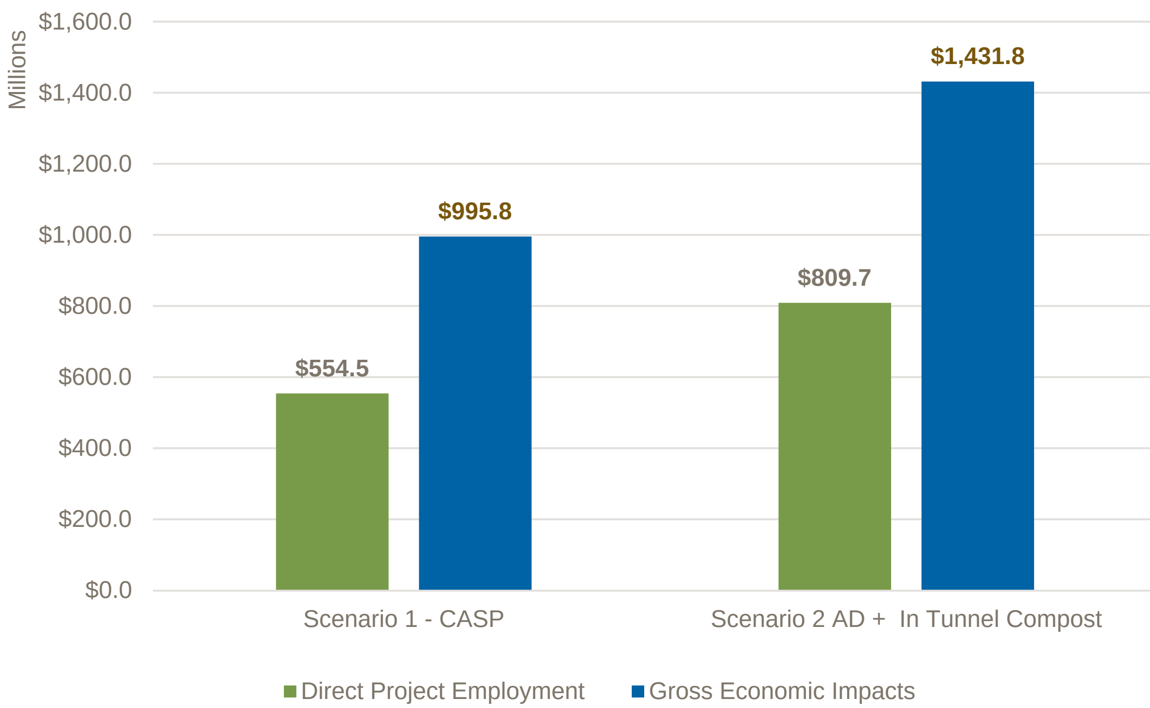


Figure 4: Total Employment Chart



The Alternative Scenario generates approximately 2,300 more person-years of employment and $436 M more in total regional economic output than the Baseline Scenario. While the Alternative Scenario has a higher direct cost to the County (see Life Cycle Cost Analysis), it generates substantially greater regional economic activity, especially through construction spending. These regional economic benefits are one of several qualitative factors (alongside greater long-term processing capacity, food scrap diversion, and RNG revenue potential) that should be considered alongside the direct financial cost when the County evaluates infrastructure investment decisions.

Conclusions

While there is a significant gap between the lifecycle costs of the two alternatives, this is not the only driver that should determine which of the options is recommended for execution by DSWM. For example, as stated earlier in the Qualitative Analysis section, In-tunnel/bunker composting is generally considered to be more efficient (higher throughput for a given footprint) than CASP, better manages higher ammonia and moisture content associated with dry digestate, and is a long-term permanent solution constructed using concrete/steel vessels or bunkers.

As another example mentioned earlier in this section, the Alternative Scenario also delivers substantially greater landfill diversion than the Baseline Scenario, particularly in the outer years. Its phased AD and Tunnel/Bunker Composting build-out enables beneficial processing of a larger share of the organics stream, including food scraps. By contrast, the Baseline Scenario does not process the full stream. The CASP system can only compost green waste/yard debris and food scraps up to a 1:1 blend ratio, so food scraps exceeding that ratio, along with contamination materials that the CASP cannot accept, continue to be sent to landfill throughout the Project Period. As a result, the Baseline Scenario diverts considerably less material from landfill than the Alternative Scenario.

Finally, the Regional Economic Impact Analysis shows that the Alternative Scenario has greater economic impact than the Baseline Scenario. The Alternative Scenario generates approximately 2,300 more person-years of employment and $436 M more in total regional economic output than the Baseline Scenario.

It is recommended that DSWM build on the qualitative analysis that reviews more of the advantages and disadvantages of the considered scenarios. It is also recommended that DSWM further refine the assumptions used in this LCCA and revise the calculations as the agency is able to collect more accurate data, particularly on cost and revenue estimates. For example, revenues generated from RNG sales are based on a conservative $2.50/MMBtu net rate. Additional upside could exist if market conditions or off-taker agreements improve. The addition of available Renewable Identification Number (RIN) credits could also significantly boost revenue from RNG.

Recommended Next Steps

As organics management planning advances, it is recommended the County take the following next steps:

- Refine cost and revenue assumptions in the LCCA as more site-specific and market data become available, particularly compost sale prices, RNG revenue (including potential RIN credit value), and facility-specific capital and operating costs.
- Evaluate alternative delivery and ownership models (e.g., public ownership, design-build-operate, or third-party ownership/operation). This evaluation would determine how costs, revenues, risks, and responsibilities are allocated between the County and a private partner, and would establish an appropriate tipping fee structure if facilities are third-party operated.
- Conduct a more detailed engineering and procurement assessment of the recommended scenario, including site-specific design, permitting timelines, and phasing.
- Perform a more extensive qualitative evaluation of the scenarios that weighs factors not captured in the lifecycle cost comparison, such as landfill diversion performance, greenhouse gas reduction, community and environmental impacts, and alignment with the County's long-term Zero Waste goals.
- Select a preferred organics management solution and move into the implementation phase.

ORGANICS MANAGEMENT

Introduction

This section provides DSWM with information on the organic waste stream and options to process this waste to significantly reduce the amount of organic waste sent to landfill. These options also produce marketable products, such as compost and biogas, or Renewable Natural Gas (RNG).

Before defining and evaluating options for treating organic waste, this section first provides information on the characterization and volumes of organic waste produced in the DSWM wasteshed. Specifically, this section provides the following information:

- Amount of residential yard debris and food scraps generated, number of single-family households estimated to participate each year, and information on the assumed contamination rates for the residential organic waste collected.
- Amount of commercial food scraps generated.

This section then provides an overview of the technical options and required supplemental infrastructure for processing residential and commercial organic waste. This section considers the following technologies:

- Covered Aerated Static Pile Composting (CASP)
- In-Vessel/Tunnel/Bunker with Membrane Cover Composting
- Anerobic Digestion (AD)
- Biochar

Next, this section provides both a qualitative and quantitative analysis of the considered options (note biochar is not included in this analysis and will be considered in future phases of work). The qualitative analysis considers the advantages and disadvantages of the options with regards to social and political acceptance and environmental impacts. The quantitative analysis includes a Life Cycle Cost Analysis of two different scenarios to implement organic waste technologies to process the anticipated organic waste streams from 2028-2047: Baseline and Alternative Scenarios.

The Baseline Scenario evaluates a composting-only pathway over the full Project Period. Construction of the initial Covered Static Aerated Pile (CASP) facility begins in 2028, with the modeled facility building on the ongoing pilot CASP operation. As the curbside organics collection program is rolled out and feedstock volumes grow, additional capacity is added through 2047.

The Alternative Scenario evaluates a phased implementation pathway, starting with a CASP facility identical to the Baseline Scenario, switching to In-Tunnel/Bunker with Membrane Cover Composting for yard debris starting in 2029, and adding a High-Solids (“dry”) AD facility for food scraps by 2030.

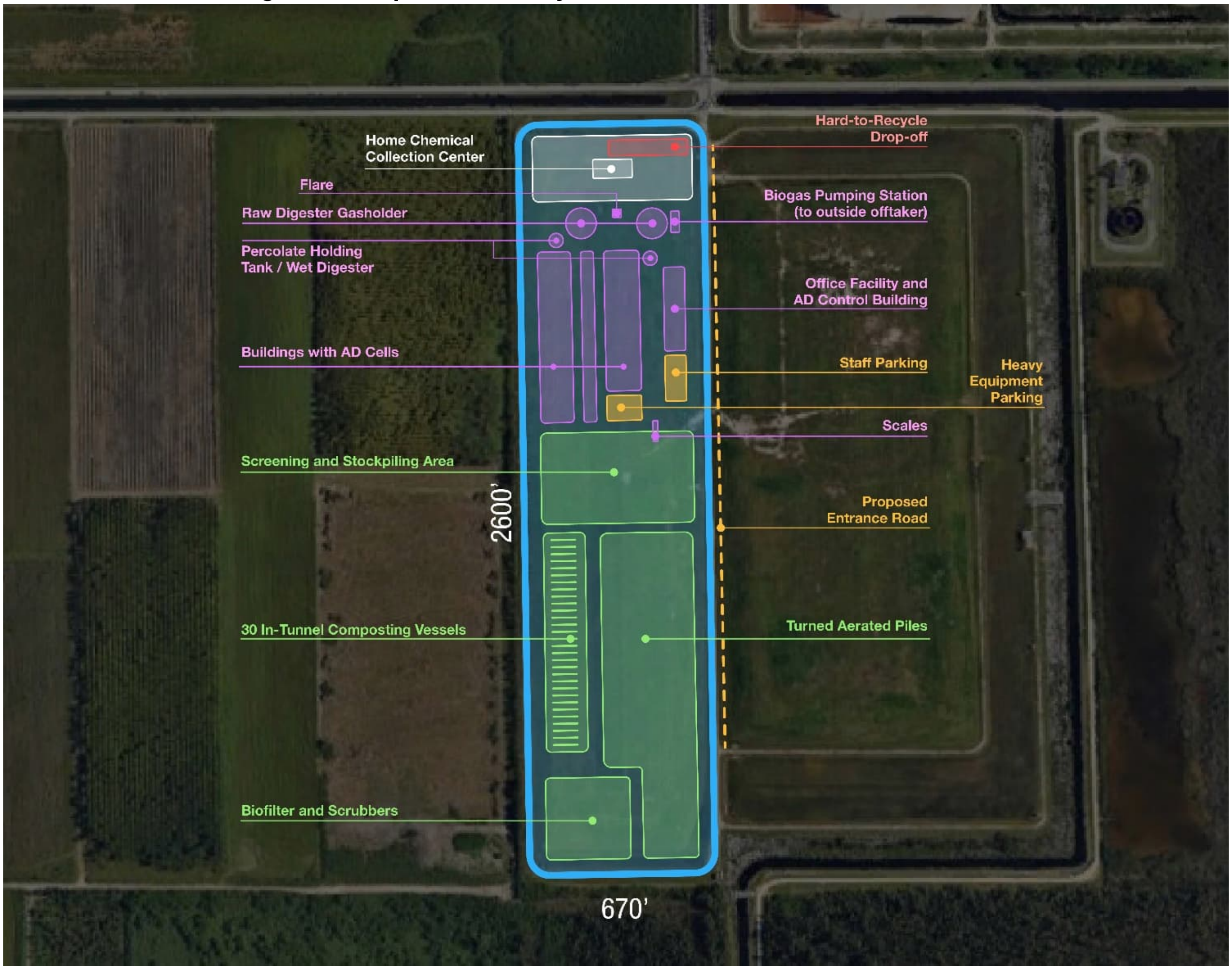
Finally, the quantitative analysis considers the economic impact of the two potential options assessed in the LCCA. The section then provides conclusions and recommended next steps.

Figure 5 shows the proposed site layout for the Baseline Scenario. It utilizes a portion of the total available area and leaves room for potential expansion.

Figure 5: Proposed Site Layout for the Baseline Scenario

Figure 6 shows the proposed site layout for the Alternative Scenario. It utilizes the entirety of the total available area.

Figure 6: Proposed Site Layout for the Alternative Scenario



Waste Flow Characterization and Volumes

The organics management program assessment begins with the quantities of organic material identified in the County's waste stream as reported in the 2024 Miami-Dade County Waste Stream and System Characterization Study (Appendix D).

For this assessment, residential yard waste is referred to as Yard Debris and commercial yard waste is referred to as Green Waste. Yard Debris and green waste generated in the County can be disposed by residents and businesses as MSW (garbage) and the material is disposed in a Class I (MSW) landfill. Residents may also take Yard Debris to any of the thirteen Trash and Recycling Centers (TRCs) or schedule a bulky waste pickup. Bulky waste is disposed in a Class III (C&D, bulky, yard trash) landfill. Residents and businesses may also contract with landscape companies to remove Yard Debris/Green Waste from their property. Most landscape companies self-haul the material to private composting facilities.

WSP determined the single-family population of the DSWM service area and calculated the estimated annual tons of total waste disposed by municipality and the unincorporated area using the estimated 1.19 tons/capita/year reported in Figure 2 of the Waste Characterization Study. These tons were then applied to the percentage of Class I (56.7%) and Class III (27.9%) tons disposed in 2024 as reported in Table 4 of the Waste Characterization Study. The estimated single-family residential tonnage generated in the DSWM service area is detailed below in Table 19.

Table 19: DSWM Service Area Estimated Single-Family Residential Tons of Total Waste Disposed in 2024

Municipality(1)	Single-family HHs with DSWM MSW Service(1)	Avg # Persons per HH(2)	Estimated single-family population(3)	2024 Estimated Annual Tons(4)	Class I (MSW)	Class III (Bulky)(5)
Aventura	603	2.91	1,755	2,088	1,183	583
Cutler Bay	12,760	3.33	42,491	50,564	28,658	14,106
Doral	12,249	3.30	40,422	48,102	27,262	13,419
Miami Gardens	26,895	3.88	104,353	124,180	70,380	34,642
Miami Lakes	7,594	3.17	24,073	28,647	16,236	7,992
Opa-Locka	2,652	3.48	9,229	10,982	6,224	3,064
Palmetto Bay	7,561	3.40	25,707	30,592	17,338	8,534
Pinecrest	5,452	3.52	19,191	22,837	12,943	6,371
Sunny Isles Beach	392	2.87	1,125	1,339	759	373
Sweetwater	2,114	3.40	7,188	8,553	4,848	2,386
Unincorporated MDC	262,627	3.33	874,548	1,040,712	589,835	290,325
	340,899	**3.33**	**1,150,081**	**1,368,596**	**775,667**	**381,794**

(1) Source: "Serviced Municipalities" Excel file provided by Miami-Dade County (MDC), May 2025.
(2) The Waste Characterization Study reported Tons per Capita. To determine tons per household (HH), WSP used the average number of people per household in each of the municipalities where DSWM collects MSW. Source: U.S. Census Bureau. https://www.census.gov/data.html
(3) Number of single-family HHs collected by DSWM multiplied by number of persons per HH. (Does NOT include multi-family dwelling HHs; multi-family dwellings with 5 or more units are collected by private haulers.)
(4) Per Waste Characterization Study, 2024 MSW + Bulky Waste Disposed = 1.19 tons per capita per year. The tons per capita/yr multiplied by the population of single-family HHs equals 2024 estimated annual tons.
(5) Does not include C&D that is directly hauled to landfills.

The Class I and Class III tons were applied to the estimated composition of waste disposed in 2024 (Tables 7 and 9, respectively, in the Waste Characterization Study) to determine the quantities of Yard Debris and food scraps disposed in the DSWM service area from single-family households.

Yard Debris totaled 263,657 tons (87,650 or 11.3% of the MSW and 176,007 or 46.1% of the bulky waste streams) and food scraps totaled 160,563 tons (20.7% of the MSW stream). These tonnages were used as the baseline for determining organic feedstock availability in this section.

The year 2028 is highlighted in the tables below to indicate the available feedstock (tons) in Year 1 of operations. 2028 was chosen in anticipation that there would be at least an 18-month lead time needed to develop the program and infrastructure from July 1, 2026.

Residential Yard Debris

TONS GENERATED

Table 20 below shows the estimated available Yard Debris generated from single-family homes in the DSWM service area. Estimated tons per capita per year is based on projected population increase (Table 20). As shown, there is an estimated 270,867 tons of Yard Debris available beginning in 2028.

Table 20: Estimated Single-Family Yard Debris Tonnage Generated[1] in the DSWM Service Area

	Source		Tons/capita/yr[2]	2024 Tons[3]	2025	2026	2027	2028[4]
	Class I (MSW)	Class III (Bulky)		Total				
Yard Debris	87,650	176,007	0.23	263,657	265,441	267,236	268,929	**270,867**
Lbs/yr				527,314,697	1,058,196,481	1,592,668,873	2,130,526,649	**2,672,259,922**
Lbs/capita/yr				458.5	913.9	1,366.3	1,816.2	**2,261.7**
Lbs/HH/yr				1,546.8	3,083.0	4,608.5	6,125.5	**7,627.3**
Lbs/HH/week				29.7	59.3	88.6	117.8	**146.7**

	2029	2030	2031	2032	2033	2034	2035	2036	2037
Yard Debris	272,702	274,549	276,409	278,282	280,167	282,064	283,975	285,899	287,835
Lbs/yr	3,217,663,765	3,766,762,690	4,319,581,136	4,876,144,297	5,436,477,540	6,000,606,404	6,568,556,598	7,140,354,009	7,716,024,696
Lbs/capita/yr	2,705.0	3,145.3	3,582.6	4,017.0	4,448.5	4,877.1	5,302.8	5,725.6	6,145.6
Lbs/HH/yr	9,121.4	10,605.2	12,078.7	13,542.0	14,995.2	16,438.3	17,871.5	19,294.9	20,708.3
Lbs/HH/week	175.4	203.9	232.3	260.4	288.4	316.1	343.7	371.1	398.2

(1) Projected tons per capita/yr multiplied by population increase + previous year's tons.
(2) Tons/capita/yr calculated from 2024 tons of yard debris divided by 2024 DSWM single-family population estimate.
(3) Estimated tons of yard debris available in 2024 based on tons/capita/yr disposed from Waste Characterization Study.
(4) 2028 - Anticipated year the curbside collection of yard debris begins. The County will need to roll out the program in stages or by municipality.

To estimate the per capita increases in Table 21 for the single-family households in the DSWM service area, WSP applied the percent increase by year for each municipality's entire population from Attachment C of the Waste Characterization Study,[32] to WSP's estimate of single-family households only (Table 10), in order to not include multi-family households which are collected by the private sector. The results are shown in Table 13.

Table 21: Single-Family Household Projected Population Increase DSWM Service Area (2024 – 2037)

Year	MDC DSWM # of Single-Family HHs	# of HH increase per year	MDC DSWM Single-Family Population	Pop increase per year
2024	340,899		1,150,081	
2025	343,238	2,339	1,157,861	7,780
2026	345,592	2,354	1,165,692	7,831
2027	347,812	2,220	1,173,075	7,384
2028	350,353	2,541	1,181,528	8,453
2029	352,760	2,407	1,189,533	8,006
2030	355,182	2,423	1,197,592	8,059
2031	357,621	2,439	1,205,705	8,112
2032	360,076	2,455	1,213,872	8,167
2033	362,548	2,472	1,222,095	8,223
2034	365,037	2,489	1,230,373	8,278
2035	367,543	2,506	1,238,707	8,334
2036	370,065	2,523	1,247,098	8,391
2037	372,605	2,540	1,255,546	8,448

[32] The population projections in the Waste Characterization Study did not go beyond 2030. To estimate population increases through 2037, WSP used the average from years 2025 – 2030 (0.68%).

PARTICIPATION

Thirty percent (30%)of households is estimated to participate in Yard Debris collection by setting out the organics cart weekly. This percentage is projected to increase over time (as shown in Table 22) as the organics collection program is rolled out and more residents become aware of the program. WSP used conservative annual participation rates assuming not all households will set out Yard Debris every week and not everyone will participate, either because not all homes will have Yard Debris or they may contract with landscapers to remove Yard Debris from the premises.

WSP conservatively estimated eight (8) pounds of Yard Debris, on average, would be collected per household per week the first year of the program as indicated in Table 22. This is based on research of other municipalities as well as U.S. EPA's estimates.

- The City of Minneapolis has a source-separated curbside yard waste program. Based on their annual Solid Waste and Recycling Statistics,[33] approximately 10.4 pounds of yard waste were collected per household per week in 2024 during the seven months of the year when yard waste is collected (April – November).
- Seattle Public Utilities (SPU) has a curbside organics collection program in which food and yard waste are commingled. SPU collected an average of 19 pounds per household per week in 2021.[34]
- The EPA estimated 0.42 pounds of yard trimmings are generated per capita per day nationally.[35] (When 0.42 pounds are applied to the estimated 3.33 persons per household in the DSWM service area, the result is 9.8 pounds per household per week).

The pounds are expected to increase over time as the program is rolled out and residents become educated and more familiar with the yard debris program.

[33] "Minneapolis Solid Waste & Recycling Annual Statistics (archived)," from City of Minneapolis Solid Waste & Recycling website, March 2025. Data is no longer on City's website.
[34] "City of Seattle 2021-22 Residential and Commercial Organics Composition Study," Cascadia Consulting Group, July 2023. https://www.seattle.gov/documents/Departments/SPU/Documents/Reports/SolidWaste/2021-22-OrganicsStreamCompositionStudy.pdf
[35] "National Overview: Facts and Figures on Materials, Wastes and Recycling," U.S. EPA website, December 19, 2025. https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials

Table 22: Estimated Pounds of Yard Debris Collected Per Single-Family Household in the DSWM Service Area

Participation	% of Single-Family HHs partic	# of Single-Family HHs partic	Est. Lbs/HH Collected/week	Est. Lbs/HH Collected/year	Est. Tons Collected
Year 1 (2028)	30%	105,106	**8.0**	43,724,042	21,862
Year 2	40%	141,104	**10.0**	73,373,998	36,687
Year 3	50%	177,591	**12.0**	110,816,902	55,408
Year 4	55%	196,692	**14.0**	143,191,518	71,596
Year 5	60%	216,046	**16.0**	179,750,185	89,875
Year 6	65%	235,656	**18.0**	220,574,472	110,287
Year 7	70%	255,526	**20.0**	265,747,034	132,874
Year 8	75%	275,657	**22.0**	315,351,625	157,676
Year 9	80%	296,052	**24.0**	369,473,107	184,737
Year 10 (2037)	85%	316,714	**26.0**	428,197,462	214,099

CONTAMINATION

The estimated contamination of Yard Debris collected from a new curbside organics collection program is based on research of other municipalities as well as WSP's institutional knowledge. Year 1 of program rollout assumes 10% contamination (by weight) as shown in Table 23. For planning level purposes, the contamination in Table 23 remains constant during the rollout of the residential Yard Debris collection program. The percentages should decrease over time once all residents have an organic waste cart and they become educated & more familiar with the program.

After contamination is factored in, the total amount of Yard Debris available for processing is estimated to be 19,676 tons in 2028 (Year 1) from DSWM's single-family residential collection service area.

Residential Food Scraps

TONS GENERATED

Table 24 below shows the available (non-contaminated) food scraps generated in DSWM's single-family residential collection service area. Projected tons per capita per year is based on population increase. As shown, there is an estimated 164,953 tons of food scraps available beginning in 2028.

Table 23: Estimated Contamination Rates and Available Yard Debris (Tons/Year)

Yard Debris	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
# of HHs participating	105,106	141,104	177,591	196,692	216,046	235,656	255,526	275,657	296,052	316,714
Lbs/HH/week	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0
Lbs/HH/yr	43,724,042	73,373,998	110,816,902	143,191,518	179,750,185	220,574,472	265,747,034	315,351,625	369,473,107	428,197,462
Tons/yr	21,862	36,687	55,408	71,596	89,875	110,287	132,874	157,676	184,737	214,099
Est Contamination %	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Contam. tons	2,186	3,669	5,541	7,160	8,988	11,029	13,287	15,768	18,474	21,410
Total Tons Yard Waste Available	**19,676**	**33,018**	**49,868**	**64,436**	**80,888**	**99,259**	**119,586**	**141,908**	**166,263**	**192,689**

Table 24: Municipalities collected by MDC DSWM - Estimated Single-Family Food Scraps Tonnage Generated[1]

	Source		Tons/capita/yr[2]	2024 Tons[3]	2025	2026	2027	2028[4]
	Class I (MSW)	Class III (Bulky)		Total				
Food Scraps	160,563	-	0.14	160,563	161,649	162,743	163,773	**164,953**
Lbs/yr				321,126,296	644,424,892	969,910,111	1,297,456,976	**1,627,363,957**
Lbs/capita/yr				279.2	556.6	832.0	1,106.0	**1,377.3**
Lbs/HH/yr				942.0	1,877.5	2,806.5	3,730.3	**4,644.9**
Lbs/HH/week				18.1	36.1	54.0	71.7	**89.3**

	2029	2030	2031	2032	2033	2034	2035	2036	2037
	166,071	167,196	168,329	169,469	170,617	171,773	172,936	174,108	175,287
Lbs/yr	1,959,506,257	2,293,898,803	2,630,556,478	2,969,494,626	3,310,728,693	3,654,274,234	4,000,146,904	4,348,362,469	4,698,936,797
Lbs/capita/yr	1,647.3	1,915.4	2,181.8	2,446.3	2,709.1	2,970.1	3,229.3	3,486.8	3,742.5
Lbs/HH/yr	5,554.8	6,458.4	7,355.7	8,246.8	9,131.8	10,010.7	10,883.5	11,750.3	12,611.0
Lbs/HH/week	106.8	124.2	141.5	158.6	175.6	192.5	209.3	226.0	242.5

(1) Projected tons per capita/yr multiplied by population increase + previous year's tons.
(2) Tons/capita/yr calculated from 2024 tons of food scraps divided by 2024 DSWM single-family population estimate.
(3) Estimated tons of food scraps available in 2024 based on tons/capita/yr disposed from Waste Characterization Study.
(4) 2028 - Anticipated year the curbside collection of food scraps begins. The County will need to roll out the program in stages or by municipality.

PARTICIPATION

The number of households in the DSWM service area estimated to participate in food scraps collection the first year is 40 percent, based on WSP's institutional knowledge and research of other municipalities, including:

- The City of Minneapolis (opt-in program, not mandatory) reported 43% participation among eligible single-family and small multi-family households in the first year of rolling out its citywide curbside organics program.[36] The average pounds per household per week was 3.4 the first year.
- In its 6th year, Minneapolis reported 51% of households participated with an average of 8.1 pounds per household per week.[37]
- The Town of Bedford, Massachusetts conducted a voluntary six-month curbside organics pilot study that ended in July 2025. While the town reported only 14% of eligible households opted to participate, the average quantity of organics collected per household was 9.5 pounds. The pilot resulted in a decrease of total trash volume by approximately 3.7 pounds per household per week.[38]

Table 25 indicates the estimated pounds of food scraps per household per week is expected to increase over time as the organics collection program is rolled out and residents become educated & more familiar with the program.

Table 25: Estimated Pounds of Food Scraps Collected Per Single-Family Household in the DSWM Service Area

Participation	% of Single-Family HHs partic	# of Single-Family HHs partic	Est. Lbs/HH Collected/week	Est. Lbs/HH Collected/year	Est. Tons Collected
Year 1 (2028)	40%	140,141	**4.0**	29,149,361	14,575
Year 2	50%	176,380	**5.0**	45,858,749	22,929
Year 3	60%	213,109	**6.0**	66,490,141	33,245
Year 4	70%	250,335	**7.0**	91,121,875	45,561
Year 5	75%	270,057	**8.0**	112,343,866	56,172
Year 6	80%	290,039	**9.0**	135,738,136	67,869
Year 7	85%	310,282	**10.0**	161,346,414	80,673
Year 8	90%	330,788	**11.0**	189,210,975	94,605
Year 9	95%	351,562	**12.0**	219,374,657	109,687
Year 10	100%	372,605	**13.0**	251,880,860	125,940

[36] "Minneapolis reports strong participation but low volumes in curbside organics collection," *WasteDive*, July 17, 2017, https://www.wastedive.com/news/minneapolis-reports-strong-participation-but-low-volumes-in-curbside-organi/447224/
[37] "Minneapolis Solid Waste & Recycling Annual Statistics (archived)," from City of Minneapolis Solid Waste & Recycling website, March 2025. Data is no longer on City's website.
[38] "Final Report: Curbside Organics Pilot Project," Town of Bedford, MA, July 2025, https://www.bedfordma.gov/DocumentCenter/View/5615/2025-Curbside-Organics-Pilot-Final-Report-PDF

CONTAMINATION

The estimated contamination of food scraps collected from a new curbside organics collection program is based on WSP's institutional knowledge as well as research of other municipalities, described below.

Because Seattle's organics collection program is not new (it was started in 2005), the city has large quantities of data. The city has conducted three composition studies of the organics stream since 2012. From the 2021-2022 composition study:[39]

- Contaminants in the single-family organics totaled 1.7%
- Contaminants for all sectors combined totaled 2.1%

In 2021, BioCycle magazine conducted a nationwide survey of residential food scraps collection programs.[40] Contamination rates were asked of 51 curbside organics collection programs:

- 29 reported a contamination rate of less than 5%
- 11 reported a contamination rate of less than 10%
- Only a handful reported higher rates in materials set out at the curb

In post-consumer organic waste streams, contamination consists mostly of low-density material (e.g. plastics) as compared to the heavier, high-moisture target material. For this reason, WSP set the County's Year 1 of program rollout at 10% contamination (by weight) as shown in Table 26.

For planning level purposes, the contamination rate remains constant during the rollout of the residential food scraps collection program. The contamination should decrease over time as residents become educated & more familiar with the program.

---

39 https://www.biocycle.net/whats-in-seattles-collected-organics-streams/
40 https://www.biocycle.net/residential-food-scraps-collection-access-in-the-u-s-the-programs/

Table 26: Estimated Contamination Rates and Available Food Scraps from Single-Family Residential Households in DSWM Service Area

Food Scraps	**2028**	**2029**	**2030**	**2031**	**2032**
# of HHs participating	140,141	176,380	213,109	250,335	270,057
Lbs/HH/week	4.0	5.0	6.0	7.0	8.0
Lbs/HH/yr	29,149,361	45,858,749	66,490,141	91,121,875	112,343,866
Tons/yr	14,575	22,929	33,245	45,561	56,172
Est Contamination %	10%	10%	10%	10%	10%
Contam tons	1,457	2,293	3,325	4,556	5,617
Total Food Scraps Tons Available	**13,117**	**20,636**	**29,921**	**41,005**	**50,555**

Food Scraps	**2033**	**2034**	**2035**	**2036**	**2037**
# of HHs participating	290,039	310,282	330,788	351,562	372,605
Lbs/HH/week	9.0	10.0	11.0	12.0	13.0
Lbs/HH/yr	135,738,136	161,346,414	189,210,975	219,374,657	251,880,860
Tons/yr	67,869	80,673	94,605	109,687	125,940
Est Contamination %	10%	10%	10%	10%	10%
Contam tons	6,787	8,067	9,461	10,969	12,594
Total Food Scraps Tons Available	**61,082**	**72,606**	**85,145**	**98,719**	**113,346**

After removing an estimated 1,457 tons of contaminants from the residential food scraps collected from DSWM's service area, approximately 13,117 tons of food scraps would be available for AD and/or composting in 2028 (Year 1).

Commercial Green Waste

TONS GENERATED

The estimated quantities of green waste generated in the County by commercial businesses is provided in Table 27. These tons are based on the quantities of commercial green waste disposed as MSW in 2024, provided in Table 7 of the Waste Characterization Study (21,591 tons/year). Because the Waste Characterization Study's commercial tons were comprised of both business and multi-family waste, WSP had to first calculate the tons disposed by each generator type. Using several sources of data provided by the County,[41] WSP estimated that approximately 60% of the commercial tons were generated by businesses and 40% were generated by multi-family households (living in buildings with 5 or more units).

---

[41] Data sources included business data from the Miami-Dade Department of Regulatory and Economic Resources and tonnage data by generator type from the 2024 Solid Waste Management Report Workbook used to submit the County's annual report to the Florida Department of Environmental Protection.

Table 27: Estimated Green Waste Generated from Commercial Businesses – Countywide

	Year 1	Year 2	Year 3	Year 4	Year 5
Green Waste	**2028(3)**	**2029**	**2030**	**2031**	**2032**
# of businesses participating	5,342	13,623	25,011	39,685	54,212
Lbs/week	21,150	53,933	99,020	157,112	214,626
Total lbs/yr	1,099,802	2,804,495	5,149,053	8,169,831	11,160,573
Tons/yr	550	1,402	2,575	4,085	5,580
Est Contamination %	10%	10%	10%	10%	10%
Contam tons	55	140	257	408	558
Total Green Waste Tons Available	**495**	**1,262**	**2,317**	**3,676**	**5,022**

	Year 6	Year 7	Year 8	Year 9	Year 10
Green Waste	**2033**	**2034**	**2035**	**2036**	**2037**
# of businesses participating	70,779	89,492	110,458	133,792	159,612
Lbs/week	280,216	354,298	437,305	437,305	631,906
Total lbs/yr	14,571,243	18,423,516	22,739,883	22,739,883	32,859,130
Tons/yr	7,286	9,212	11,370	11,370	16,430
Est Contamination %	10%	10%	10%	10%	10%
Contam tons	729	921	1,137	1,137	1,643
Total Green Waste Tons Available	**6,557**	**8,291**	**10,233**	**10,233**	**14,787**

Commercial Food Scraps

TONS GENERATED

To determine the tons of food scraps potentially available from commercial businesses in the County, WSP used data provided by the Miami-Dade County Department of Regulatory and Economic Resources (RER) in April 2026. The RER reported 125,853 businesses *with employees*,[42] out of 165,364 *total* businesses in the County.[43] WSP used the lower number of 125,853 because it includes only businesses with employees, not kiosks. (Kiosks are businesses with no employees and include ATMs, electric vehicle charging stations, video rental machines, and donation drop boxes; all of which would not be expected to generate food scraps.)

The Miami-Dade Beacon Council[44] website provided the number of employees, by industry type, in the County. WSP reviewed the Beacon Council data and selected business categories that would most likely generate large quantities of food scraps including:

- Accommodation & Food Services
    - Restaurants
    - Banquet & Catering
- Education
    - Community Colleges
    - Elementary, Middle & High Schools
    - Vocational Institutes
    - Colleges & Universities
- Health Care & Social Services
    - Hospitals
    - Nursing Homes
- Manufacturing – Processed Food
- Public Administration – Correctional Facilities
- Retail Food – Grocery Stores & Markets
- Wholesalers – Fish, Fruit, Meat, and Grocery

WSP estimated there are 14,362 businesses in the County that generate large quantities of food waste, which equates to 11% of businesses with employees.

The employee count for each business type was entered into the Business Group Waste Stream Calculator developed by California's Department of Resources Recycling and Recovery (CalRecycle).[45]

---

[42] Per the RER, source: U.S. Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW).
[43] Per the RER, source: Esri-Data Axle, a point-of-interest source, integrated into Esri's ArcGIS platform.
[44] A public-private partnership that is the official economic development organization for Miami-Dade County, https://www.beaconcouncil.com/trade/
[45] "Business Group Waste Stream Calculator," CalRecycle website, https://www2.calrecycle.ca.gov/WasteCharacterization/BusinessGroupCalculator

The calculator provides an estimate of the tons of food waste generated per year, by business type, based on the size of the business (number of employees) and is considered a credible planning-level tool used by solid waste and recycling industry analysts nationwide.

The tons of food scraps expected to be generated from these 14,362 businesses was conservatively estimated to be 11 tons per business per year. WSP estimated the tons of food scraps available Countywide based on an increasing number of businesses participating in organic waste collection starting in 2028 and increasing each year for the next ten years as shown in Table 28.

Table 28: Estimated Food Scraps Generated from Commercial Businesses – Countywide

Food Scraps	2028[1]	2029	2030	2031	2032
Tons/yr	6,446	16,115	29,008	45,123	60,433
Tons/week	124	310	558	868	1,162
Est Contamination %[2]	10%	10%	10%	10%	10%
Contam tons	645	1,612	2,901	4,512	6,043
Total Tons Food Scraps Available	**5,802**	**14,504**	**26,107**	**40,611**	**54,390**
Food Scraps	**2033**	**2034**	**2035**	**2036**	**2037**
Tons/yr	77,354	95,887	116,032	137,787	161,155
Tons/week	1,488	1,844	2,231	2,650	3,099
Est Contamination %(4)	10%	10%	10%	10%	10%
Contam tons	7,735	9,589	11,603	13,779	16,115
Total Tons Food Scraps Available	**69,619**	**86,298**	**104,428**	**124,009**	**145,039**

[1] 2028 - Anticipated year commercial food scraps collection begins. The County will need to roll out the program in stages, by business type.
[2] Seattle and San Francisco both have Food & Yard Waste commingled. Seattle reported a contamination rate of 5.6% for commercial organics collected (2022).
https://www.biocycle.net/whats-in-seattles-collected-organics-streams/

Total Inbound Feedstock for Processing

FEEDSTOCK

Table 29 shows the available feedstock generated in DSWM's residential, commercial, and multi-family establishments that are within DSWM's service area.

Table 29: Potential Inbound Feedstock of Green Waste and Food Scraps (Class I and Class III) - Tons/Year

RESIDENTIAL	2028	2029	2030	2031	2032
Green Waste	19,676	33,018	49,868	64,436	80,888
Food Scraps	13,117	20,636	29,921	41,005	50,555
TOTAL	**32,793**	**53,655**	**79,788**	**105,441**	**131,442**
COMMERCIAL	**2028**	**2029**	**2030**	**2031**	**2032**
Green Waste	495	1,262	2,317	3,676	5,022
Food Scraps	5,802	14,504	26,107	40,611	54,390
TOTAL	**6,296**	**15,766**	**28,424**	**44,287**	**59,412**
MULTI-FAMILY	**2028**	**2029**	**2030**	**2031**	**2032**
Green Waste					
Food Scraps	9,602	18,134	29,212	38,601	49,351
TOTAL	**9,602**	**18,134**	**29,212**	**38,601**	**49,351**

RESIDENTIAL	2033	2034	2035	2036	2037
Green Waste	99,259	119,586	141,908	166,263	192,689
Food Scraps	61,082	72,606	85,145	98,719	113,346
TOTAL	**160,341**	**192,192**	**227,053**	**264,981**	**306,035**
COMMERCIAL	**2033**	**2034**	**2035**	**2036**	**2037**
Green Waste	6,557	8,291	10,233	10,233	14,787
Food Scraps	69,619	86,298	104,428	124,009	145,039
TOTAL	**76,176**	**94,589**	**114,661**	**134,242**	**159,826**
MULTI-FAMILY	**2033**	**2034**	**2035**	**2036**	**2037**
Green Waste					
Food Scraps	61,487	75,037	90,027	106,485	124,439
TOTAL	**61,487**	**75,037**	**90,027**	**106,485**	**124,439**

Organics Processing Technologies and Supporting Infrastructure Considered

This section provides an overview of the technical options and required supplemental infrastructure for processing organic waste.

Covered Aerated Static Pile Composting

A Covered Aerated Static Pile (CASP), as shown in Figure , is an industrial composting method where Yard Debris is run through a grinder, mixed with de-packaged food scraps, and then placed in large, unmoving piles and supplied with forced oxygen through pipes beneath the material. The pile is entirely sealed with a specialized cover or a thick layer of finished compost to trap heat, control odors, and manage moisture.

Unlike traditional windrow composting techniques, the pile is not physically turned. Instead, automated blowers push or pull air through the mass to keep it highly aerobic and to precisely control the temperature. This design accelerates decomposition, ensures pathogens are destroyed, and reduces odors and greenhouse gas emissions.

Key components of the system include:

- **Aeration System:** Blowers connected to perforated pipes or a grooved concrete floor to distribute air evenly.
- **Cover:** Organic or synthetic covers are used to insulate the pile and acts as a natural scrubber for emissions.
- **Sensors & Timers:** Automated controls that adjust airflow based on temperature readings within the active compost core.

SG Mobile Units were selected for the CASP operations as part of the ongoing pilot project. These units are based on positive aeration control (aerated static pile) in combination with a specialized GORE® Cover to create a CASP. The CASP process with GORE® Cover is more advanced than a traditional CASP unit and delivers "in-vessel" performance without the need for roofed or enclosed building structures. In-Vessel systems are generally more efficient, less weather dependent, takes less space, and requires less labor than CASP systems. See the "In-Vessel/Tunnel/Bunker with Membrane Cover Composting" section below for more information on these systems.

The SG Mobile® system is modular, and its proprietary system precisely controls oxygen, temperature and moisture levels to maximize decomposition and to reduce odors and greenhouse gases. Composting is performed in two phases:

- **Phase 1: Primary Active Composting –21-28 Days**

  The composting process begins with a front-end loader moving the material from the mixing area to a heap in the Phase 1 section to begin the composting period. Once a heap is built, it is covered with the GORE® Cover, the temperature and oxygen probes are installed, and the material undergoes the composting process.

- **Phase 2: Secondary Curing Composting – 14-21 Days**

  After 28 days in Phase 1, the GORE® Cover is removed from the heap, and the compost is moved by front end loader to a heap in the Phase II area. The material remains in the Phase 2 area for approximately two (2) weeks.

Once composting is complete, the material is passed through a screen and stockpiled for reuse as a soil amendment or landscape mulch. Residuals or "overs" are either used as a bulking agent in future composting or sent off site for disposal often used as alternative daily cover at the landfill. Leachate generated as part of the composting process is re-used up front in the composting process to moisture condition incoming feedstock or sent to the wastewater treatment facility.

Figure 7: Covered Aerated Static Pile CASP Flow Chart, Phase 1

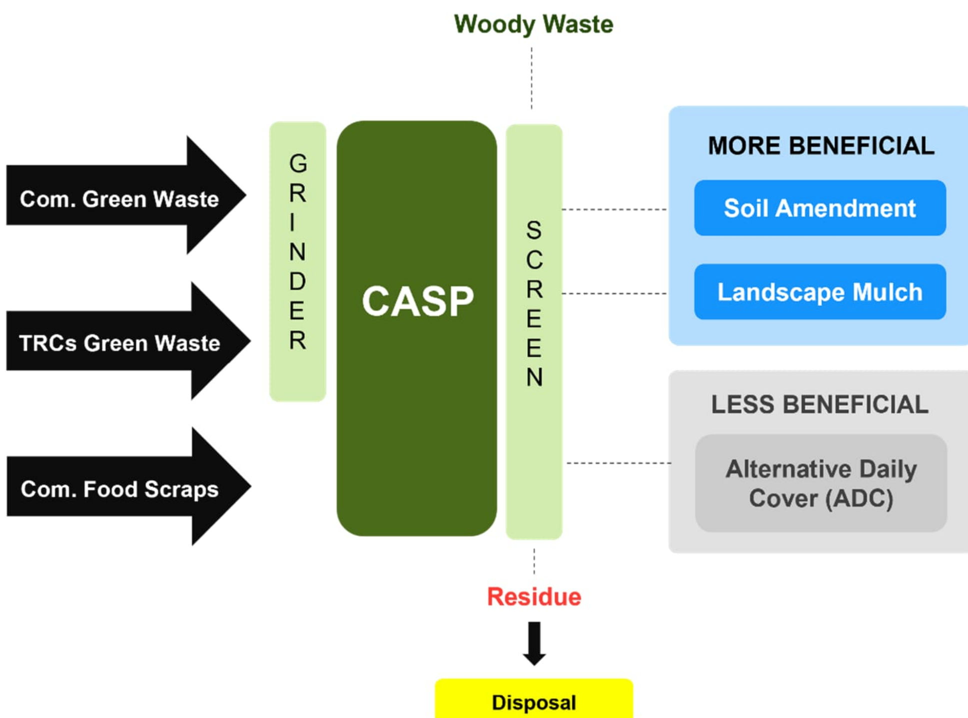
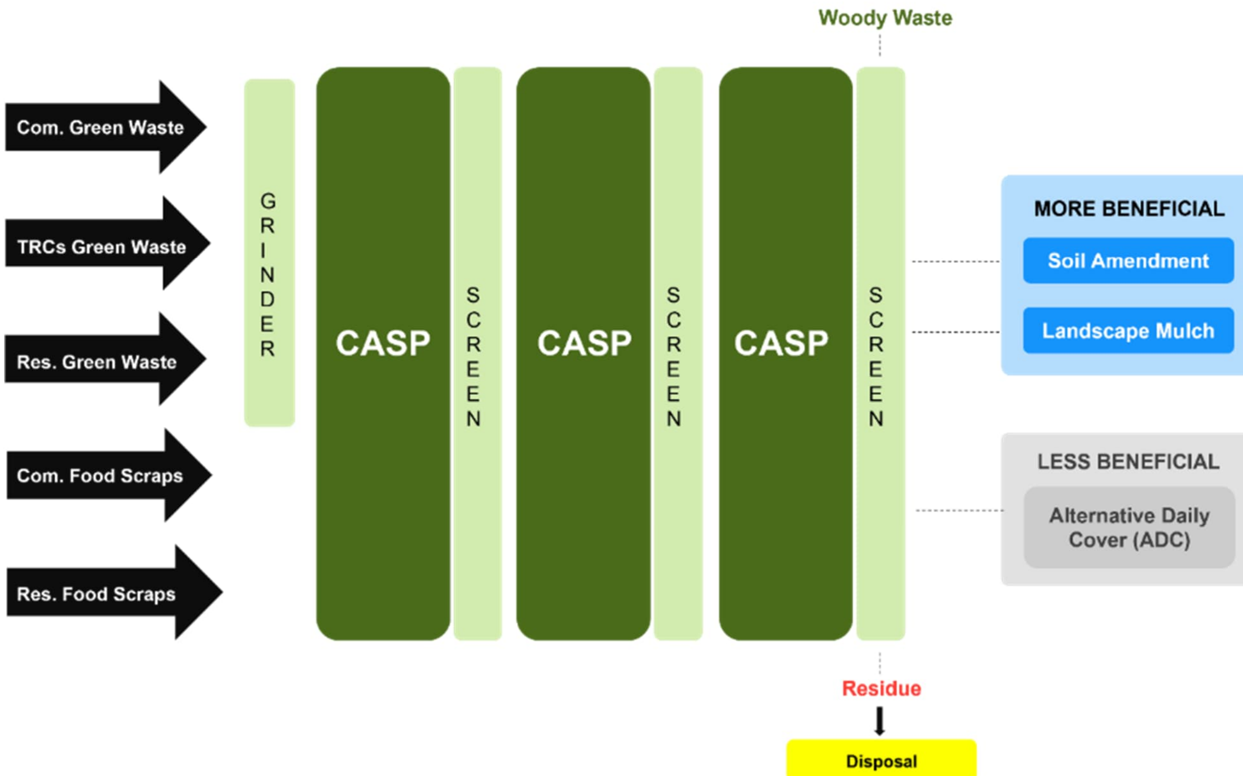


Figure 8 shows how the CASP system can be expanded to process organic feedstock as the amount increases over time.

Figure 8: Covered Aerated Static Pile CASP Flow Chart, Phase 2



In-Vessel/Tunnel/Bunker with Membrane Cover Composting

In-tunnel composting (a type of in-vessel composting) and bunker composting with a semi-permeable membrane cover are enclosed, industrial-scale composting methods that break down organic waste (such as food scraps, food-soiled paper, yard debris, or biosolids) into nutrient-rich compost. The process takes place inside sealed concrete or steel tunnels or concrete bunkers covered with semi-permeable membrane covers where operators precisely control oxygen, temperature, and moisture levels to maximize decomposition to ensure pathogens are destroyed and to reduce odors and greenhouse gas emissions.

The process includes:

- **Loading**: Organic waste is loaded into modular, airtight tunnels or covered bunkers—often by a front-end loader or automated conveyor.
- **Controlled Aeration**: Computer-controlled blowers push or pull air through the floor of thetunnel/bunker to supply oxygen to the material, maintaining ideal aerobic conditions.
- **Pasteurization**: The composting material naturally generates high heat. The automated system maintains these temperatures to pasteurize the waste, destroying pathogens* and weed seeds.

- **Curing**: After several weeks of active composting inside the tunnel/bunker, the material is removed and sent to an outdoor or secondary area to cure and mature.

Compost tunnels/bunkers will be used for the first few weeks of composting - known as the active composting period. During active composting, most of the emissions are released, and the material is sanitized. Compost tunnels/bunkers with membrane covers control odors, reduce and treat emissions, and strip ammonia and moisture from the compost material (ammonia and moisture are often elevated when composting dry digestate). An acid scrubber or specially designed semi-permeable cover would likely be required due to the potential high ammonia content in the dry digestate. Any leachate generated from the processed material is fully captured and usually recycled within the process (as irrigation for incoming feedstock material). In case of leachate quantities exceeding the process needs, this excess is sent to a wastewater treatment facility.

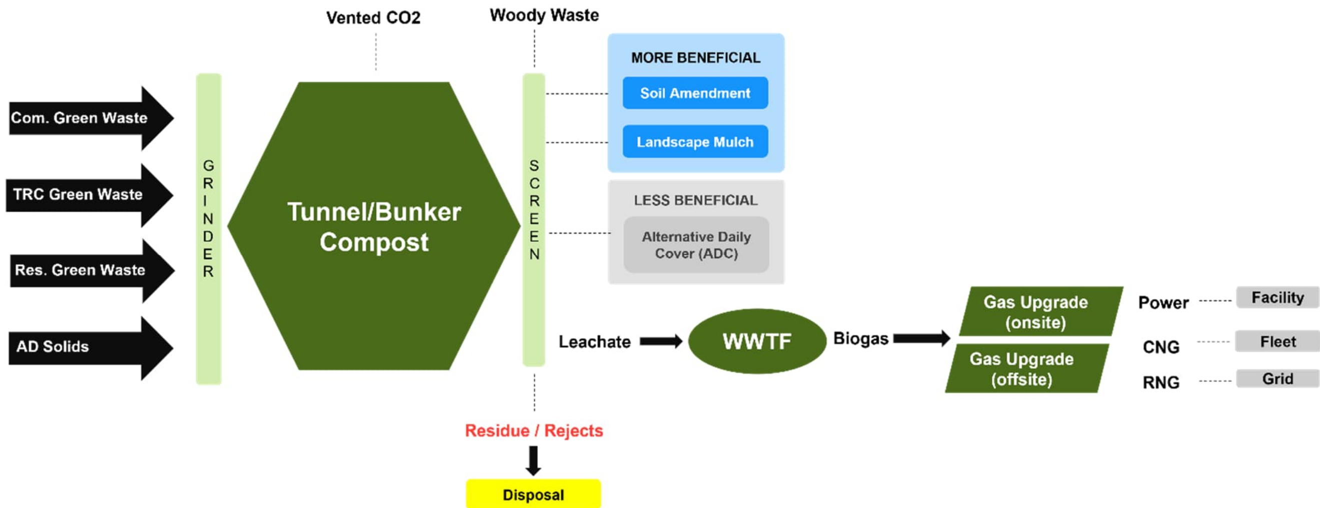
Afterthe initial few weeks of composting in the tunnels/bunkers, the material is ready for secondary curing either within additional tunnels/bunkers or using a secondary Turned Aerated Pile (TAP) curing process. TAP composting is an effective way to compost wet, dense, low energy feedstocks, creating better compost, on a smaller footprint with less bulking agent. This curing phase can take place outside or could also occur within an open-sided building, if necessary for controlling effects of precipitation and the resulting potential for production of unwanted leachate.

This composting process is broken down into the following stages.

- **Receiving & Pre-mix**: Fresh feedstocks are delivered and stored in a receiving area where the materials are blended and mixed. Primarily, dry digestate and inbound Yard Debris is processed in the in-tunnel/bunker compost facility.
- **Load Compost Tunnels/Bunkers**: As mixed material becomes available, it is moved from the receiving area into one of the tunnels/bunkers. Doors can be easily opened and closed as loaders run in and out of the building or bunkers. All exhaust air is extracted and treated through an acid scrubber and biofilter or with a semi-permeable membrane cover. The cover will be designed to handle and manage exhaust air from the piles. Depending on the final location of the receiving building, trucks may also be used to transport material to the tunnels/bunkers.
- **Active Composting**: After a tunnel/bunker is filled, temperature probes are inserted into the pile, and the controller begins delivering oxygen ensuring pathogens are destroyed, and degradation is optimized. All temperature data is logged, which can be used for compliance. The tunnels/bunkers will be positively aerated, to maximize ammonia stripping and evaporation with all emissions entrapped and treated in the biofilter and scrubbing system or the specially designed cover.
- **Load TAP System**: After initial and secondary composting in the tunnels/bunkers, the material is sanitized and most of the emissions scrubbed. At this point, it is transferred via front end loader into the closest available TAP zone. Once the zone is filled, a probe is inserted, and the pile is positively aerated for approximately four weeks to ensure aerobic conditions are met and degradation optimized.
- **Turning**: Roughly once per week the compost material is turned to volumize and aerate the material.

Once composting is complete, the material will be passed through a screen and stockpiled for reuse as either a soil amendment or landscape mulch, depending on the available markets. Residuals or "overs" will either be used as a bulking agent in future composting or sent off site for disposal. Residuals may also be used as alternative daily cover for the County's landfill. Leachate generated as part of the composting process will be sent to the wastewater treatment facility. Figure 9 presents a graphical flowchart of the in-tunnel/bunker compost process.

Figure 9: Tunnel/Bunker Composting Flow Chart



The space requirement for in-tunnel/bunker composting is about 5.5 acres per 100,000 tons per year of material composted. This includes space for the in-tunnel/bunker units, biofilter and scrubbers, access roads, TAPs, and area for screening and stockpiling finished compost. With the addition of the AD facility, the processing of inbound food scrap feedstock will be managed at a receiving area as part of this operation. Although it varies based on the inbound feedstock, the finished compost material as measured in tons is generally 55% of the inbound feedstock as mass is lost through microbial breakdown and moisture loss.

Additionally, about 10% of the material composted ends up as residue or reject material. Much of these rejects are expected to be recycled back to the beginning of the in-tunnel/bunker composting process. Reject material that is hauled off the site can often be used as alternative daily cover at the landfill or as input into a biochar operation.

There are several opportunities for selling compost in the Miami-Dade County area; however, it is anticipated that it will require time to develop quality certified compost that can be sold into the marketplace. Some prospective customers include farmers, nurseries, soil manufacturers, landscapers, etc. Initial market information indicates that DSWM will need to work closely with these industries and develop compost products that meet their needs, while also being cost-competitive versus other organic alternatives. It is envisioned that these markets will be developed over time as each industry discovers the value of using compost products as part of their operations.

Anaerobic Digestion

Dry (high-solids) anaerobic digestion (AD) is a biochemical process where microorganisms break down organic waste in the absence of oxygen. Unlike wet systems, dry AD handles high-solids, stackable biomass (usually 20%–40% dry matter) without dilution. It is highly suited for post-consumer and commercial food scraps, agricultural residues and other waste streams with high carbon contents. Unlike composting which relies on microorganisms that require oxygen and primarily generates gaseous CO_2, AD relies on methanogenic bacteria present in the feedstock and the process produces off-gases rich in methane, which after cleaning and conditioning can be turned into biogas or renewable natural gas. Unlike wet AD, the high-solids, "dry" AD produces very small quantities of liquid digestate.

The AD process description:

Dry AD typically operates in enclosed, gas-tight tunnels or boxes. The process relies on four distinct biological phases:

- **Hydrolysis:** Enzymes break down complex organic polymers (carbohydrates, proteins) into simple sugars and amino acids.
- **Acidogenesis:** Acid-producing bacteria convert these simple compounds into volatile fatty acids (VFAs), carbon dioxide, and hydrogen.
- **Acetogenesis:** Bacteria convert the VFAs into acetic acid, hydrogen, and carbon dioxide.
- **Methanogenesis:** Bacteria convert these products into biogas, which is primarily methane and carbon dioxide.

Depending on the AD plant manufacturer, AD can work in either batch or continuous mode. In the batch mode, a tunnel/vessel is loaded, sealed, and processed for 15–28 days before being emptied. Alternatively, some industrial designs use plug-flow systems for continuous operation.

Dry AD features leachate/percolate recirculation. This process allows the AD facility to sustain microbial activity without flooding the digester, by continuously collecting liquid (percolate) rich in bacteria and sprinkling it over the solid biomass feedstock.

The process outputs are as follows:

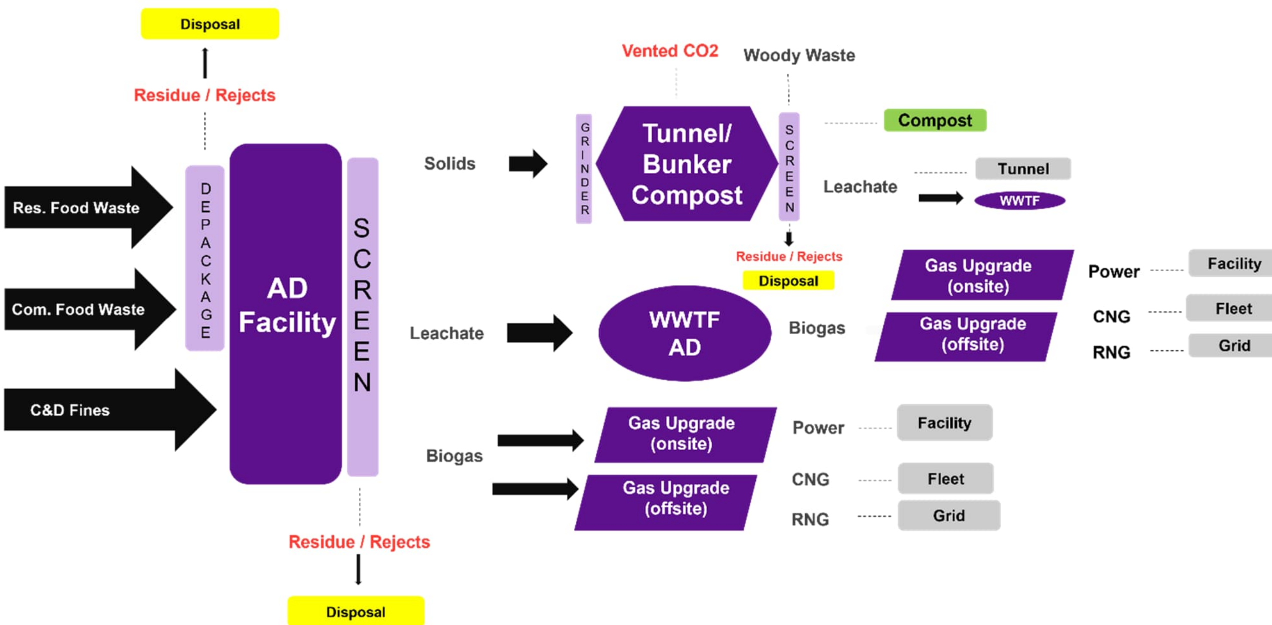
- **Biogas:** the resulting biogas is captured, treated (e.g., desulfurization to remove hydrogen sulfide, CO_2 removal through membrane systems), often upgraded to renewable natural gas (RNG) or used onsite to generate electricity or combined heat and power (CHP).
- **Solid Digestate:** solid material coming out of the process is a nutrient-rich digestate that is usually pasteurized and composted to create high-grade fertilizer. In this case it will be sent to a tunnel/bunker composting facility, to be processed and commingled with the green waste and yard debris. The combination of AD and tunnel/bunker composting will ensure the destruction of any accidentally introduced pathogens and the production of high-grade compost material.
- **Liquid Digestate:** excess liquid generated in the process is a nutrient-rich liquid digestate that can be processed to produce high-quality liquid fertilizer. However, the quantities are expected to

be low, which likely makes such upgrading unfeasible. It is therefore assumed that in this case, the digestate would be sent to the header of the nearby wastewater treatment plant.

- **Re-processed stream** (primarily woody material): this includes larger wood pieces that don't fully break down in the AD process and are screened out. It can either be run through the system a second time, or converted to mulch or biochar. It is a very small stream, and we can assume that it will be sent back to the feedstock input for additional processing, adding a benefit as a bulking input.

Figure 10 presents a graphical flowchart of the AD process.

Figure 10: Anaerobic Digester Flow Chart



Biochar

Biochar is a highly porous, carbon-rich material produced by heating organic waste in a low-oxygen environment (a process called pyrolysis). When mixed into soils, it acts as a permanent carbon sink while improving water retention, reducing fertilizer runoff and providing a permanent habitat for beneficial soil microorganisms. During pyrolysis, biomass is heated to temperatures between 900°F and 1300°F without enough oxygen for full combustion. This thermochemical breakdown drives off volatile gases and liquids (often captured for conversion into fuel gas in more sophisticated systems) and leaves behind a stable, solid carbon structure. Production methods can scale from small, mobile units to large industrial pyrolysis systems.

Biochar production can be a valuable addition to the overall organics management strategy, by providing the following benefits:

- Possibility of turning excess woody organic waste (for example, post-storm vegetative debris, etc.) into high-value product. Excessive proportion of woody material inputs can cause issues with the operation of composting facilities.
- Possibility of redirecting a portion of the yard debris to the biochar process to balance the waste flow against the available on-line composting capacity.
- Possibility of processing un-sold compost (or woody fraction of it) into biochar, avoiding landfill disposal of usable material that did not find a customer before the compost storage capacity may be exceeded.

At the same time, financial viability is primarily dependent on carbon credit and biochar revenues, which carries significant market uncertainty and is not a reliable assumption for a planning-level business case. Biochar market is highly localized and variable. The county would need to engage directly with potential off-takers (soil blenders, agricultural and nursery operators) to determine the demand and the pricing that can be used for financial modeling.

A pilot project was conducted by the County using a BET-PRD 1000 Pyrolysis System. The pilot was conducted at the South Dade Landfill and occupied less than 0.5 acres. Over the course of approximately four months, 150 tons of yard debris was processed and yielded 30 tons of biochar. Energy recovery for fuel usage was not deployed as part of this pilot.

Wastewater Treatment Facility

Wastewater facility is expected to accept excess leachate flow from the composting and AD operations. The quantity of this liquid waste is relatively minor and will not affect the available capacity of the wastewater system.

Biosolids from the wastewater treatment facility will not be commingled with the food scraps and yard debris AD and composting streams, to avoid limitations to the end use of the compost product.

There is a potential efficiency gain of combining digest gas flows from the wastewater treatment plant with that of the AD at the organics processing facility as well as landfill gas and routing all to a single gas upgrade facility and/or power generation facility.

Infrastructure to Upgrade Methane Gas to Renewable Natural Gas

Digester gas from an AD system can be upgraded for the use as Renewable Natural Gas (RNG), blending with pipeline natural gas or for direct use in power generation and/or as CNG vehicle fuel. Upgrading AD gas involves scrubbing raw biogas to remove impurities like hydrogen sulfide (H_2S), moisture, and carbon dioxide (CO_2). This converts it into a high-purity, pipeline-quality RNG. Common upgrading technologies include membrane separation, amine scrubbing, and pressure swing adsorption (PSA).

Upgrading raw digester gas to biomethane/RNG requires specific, sequential phases:

- **Pre-treatment / Cleaning:** Raw digester gas contains 6 to 12% water by weight, H_2S, siloxanes, and volatile organic compounds (VOCs). Pre-treatment removes these corrosive and harmful compounds, often using biological desulfurization, carbon filters, or compression.

- **Separation (Upgrading):** After cleaning, the gas goes through an upgrader to separate the methane (CH_4) from CO_2. The most common technologies include:
  - **Membrane Separation:** Uses selective polymer membranes that allow CO_2 to pass through while capturing the CH_4.
  - **Pressure Swing Adsorption (PSA):** Uses specialized adsorbent materials under varying pressures to trap CO_2 and release high-purity CH_4.
  - **Water/Amine Scrubbing:** Uses chemical or water absorption to dissolve the CO_2 while leaving pure CH_4 behind.
- **Compression & Injection:** The purified CH_4 is then compressed to meet strict utility-interconnection specifications (usually 95 to 98% pure CH_4) so it can be injected into natural gas pipelines or compressed for CNG fueling stations.

As noted above in the wastewater section, there is a potential efficiency gain of combining digest gas flows from the wastewater treatment plant with that of the AD at the organics processing facility as well as landfill gas and routing all to a single gas upgrade facility and/or power generation facility. This should be analyzed programmatically, in conjunction with the master planning efforts related to the wastewater and landfill operations.

Qualitative Analysis of Considered Options

This section considers the advantages and disadvantages of the options with regards to social and political acceptance and environmental impacts.

Performance

In-tunnel/bunker with membrane cover composting is generally considered to be more efficient (higher throughput for a given footprint) than CASP, better manages higher ammonia and moisture content associated with dry digestate (from AD – see more information below), and is a long-term permanent solution constructed using concrete vessels or bunkers.

Social and Political Acceptance

Anaerobic digestion facilities are generally (and almost universally viewed) very positively by the public, regulators and politicians. High effectiveness of the process, the associated energy recovery and typically good odor, vector and safety controls normally associated with such facilities has allowed them to be permitted in most states and municipalities with little or no public opposition or undue permitting hurdles, including facilities near high-density urban centers. Unlike low-solids (“wet”) AD, the low solids (“dry”) AD facilities do pose a potential for odor impacts, so diligent process design must be clearly stated in the contract documents (for example, tipping floor and cell unloading areas with negative pressure and biofiltration).

Compositing is usually viewed positively by the public, regulators and politicians due to beneficial reuse of the material otherwise destined to landfills, and the avoidance of the methane emissions. However, composting facilities are known to have odor issues and are often opposed by the members of the neighborhoods in the immediate vicinity of the proposed facility.

CASP composting is an upgrade from simple windrow composting and provides comparatively better odor and vector control. However, due to typically employed open-air receiving and windrow compost finishing, some odor and vector impacts are possible. Since food scraps will be co-processed at the CASP facility under the baseline scenario, the potential for odor impacts can be elevated as opposed to composting facilities focusing on green waste/yard debris alone.

In-vessel/tunnel/bunker composting provides better odor and vector control than CASP and is often credited with reduced nuisance impacts. It's however important to provide controls in the receiving area and minimize any open-air finishing to compost that has undergone the pathogen reduction process already. Under the alternative scenario, only yard debris and AD digestate will be processed in the in-vessel/tunnel/bunker composting line, further reducing the possibility of negative odor impacts.

It's important to note that any waste management facility must be operated properly in order to minimize or eliminate nuisance odor and vector impacts. It's therefore important to provide both a solid design and a robust contractual framework under and Operation and Maintenance (O&M) and Long-Term Service Agreements (LTSAs) to ensure proper operating practices.

Environmental Impacts

CASP composting with organic covers (i.e., finished compost) significantly reduces methane emissions and odor compared to open windrows, while diverting organic waste from landfills, though it still produces controlled greenhouse gas and volatile organic compound (VOC) emissions that require emission controls.

AD provides several environmental benefits including reduced greenhouse gas emissions, mitigated odor pollution, and minimized nutrient runoff when the system is properly designed, operated, and paired with appropriate digestate management.

Quantitative Analysis

This quantitative analysis includes a Life Cycle Cost Analysis and an Economic Impact Assessment for two different scenarios to implement organic waste technologies to process the anticipated organic waste streams from 2028-2047: Baseline and Alternative Scenarios.

Life Cycle Cost Analysis

A Life Cycle Cost Analysis (LCCA) evaluates the total cost of implementing and operating infrastructure over its full useful life, expressed on a Net Present Cost (NPC) basis, enabling a direct comparison of alternatives. This LCCA compares two scenarios for the organics management and processing infrastructure, each evaluated over a defined planning horizon (2028-2047), or "Project Period." The methodology and scenarios used to conduct the LCCA are provided below.

METHODOLOGY

This LCCA follows standard economic analysis practices for planning-level infrastructure decisions. The LCCA determines the total cost of acquisition, ownership, and operation of a project alternative over its useful life. The steps involved in conducting the LCCA include:

- Defining the alternatives to be compared (Baseline and Alternative Scenarios);
- Determining activity timing (construction, operations, and phased build-out);
- Estimating costs and revenues (capital, operating, residual disposal, and revenues generated by output sales);
- Calculating lifecycle costs on a Net Present Cost (NPC) basis; and
- Analyzing and presenting results.
- Results of the LCCA are presented in three forms:
    - Discounted total cost (Net Present Cost) in 2025 dollars, enabling direct comparison of alternatives on a present-value basis; and
    - Uniform Annual Cost (UAC), which converts the discounted total into an equivalent average annual cost.

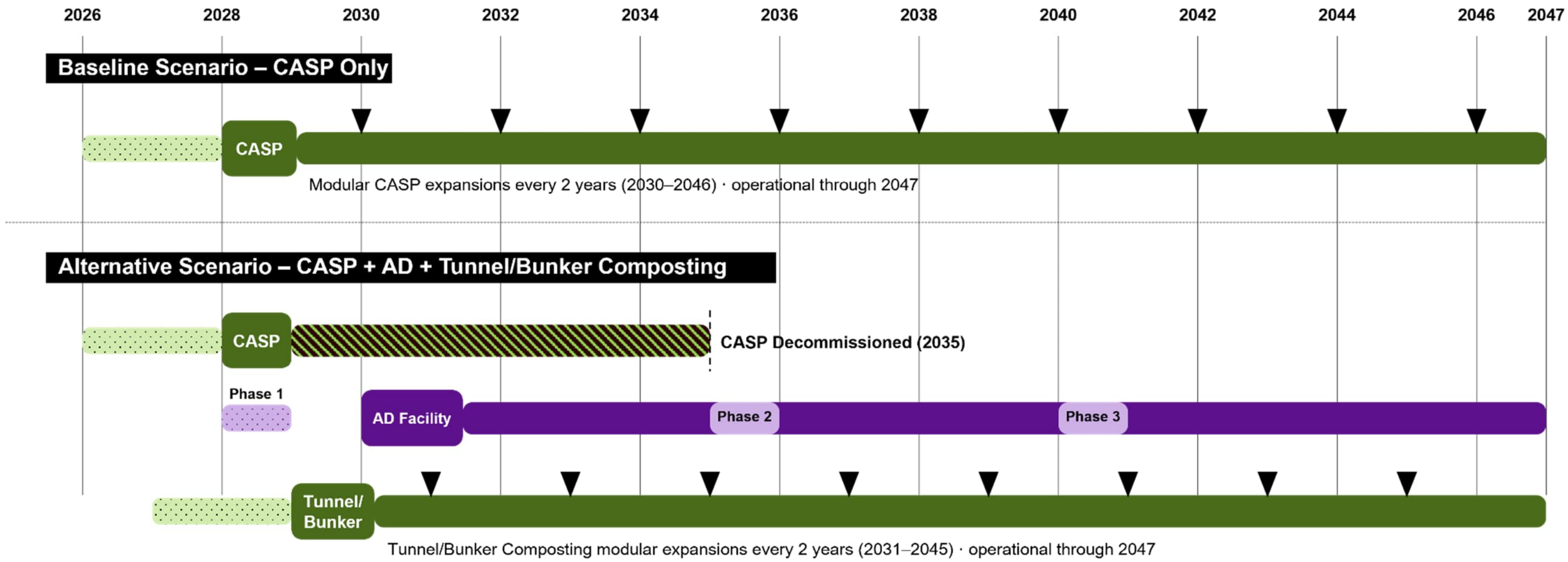
Organics Processing Scenarios

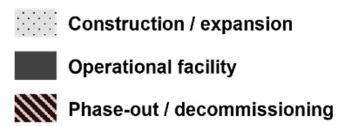
The LCCA evaluates two organics processing scenarios that represent different strategies for managing the County's projected organic waste stream over the Project Period: Baseline and Alternative Scenarios. Both scenarios begin with the same Covered Aerated Static Pile (CASP) composting operation and receive material from the same pool of available organic feedstock. They differ in the processing infrastructure deployed as feedstock volumes grow.

The Baseline Scenario represents a composting only pathway, relying on modular CASP expansions to process organics throughout the Project Period. The Alternative Scenario represents a phased transition to a more capital intensive system, adding AD and In-Tunnel/Bunker Composting to process a greater share of the organics stream (including food scraps and C&D fines) and to generate additional revenue from renewable natural gas (RNG).

Figure 11 presents a graphic showing the phasing of the Baseline and Alternative Scenarios.

Figure 11: Baseline and Alternative Scenarios Phasing





Green Waste Allocation — Transition Period

In the Alternative Scenario, green waste is split between CASP and Tunnel/Bunker Composting during the transition period. Tunnel/Bunker Composting receives 40% of green waste in 2029–2030, 60% in 2031–2032, 80% in 2033–2034, and 100% from 2035 onward once CASP is decommissioned. AD receives all food scraps and C&D fines starting in 2030.

The following subsections describe each scenario in detail, followed by the assumptions, results, and conclusions of the analysis.

Baseline Scenario: Covered Aerated Static Pile (CASP) Composting System

The Baseline Scenario evaluates a composting-only pathway over the full Project Period. Construction of the initial CASP facility begins in 2028, which will expand the CASP Pilot that began operations in 2026. The current CASP is using a temporary mobile system with semi-permeable GORE® Covers (these covers have a useful life of approximately seven years). As the curbside organics collection program is rolled out and feedstock volumes grow, additional modular CASP units are added every two (2) years through 2047 to maintain a lookahead on projected feedstock volumes. Each modular CASP expansion is sized to accommodate approximately 100,000 tons per two (2) years of additional feedstock capacity, sufficient to maintain a two-year lookahead on projected inbound volumes.

The CASP receives yard debris and food scraps at a maximum 1:1 ratio by tonnage. The primary CASP outputs are finished compost (soil amendment, landscape mulch, or alternative daily cover) and screened woody waste. Residuals and contaminants (approximately 10% of feedstock input) are either recycled in the composting process or disposed of at landfill.

The primary cost components in the Baseline Scenario are capital (CapEx) and operating (OpEx) costs of the CASP facilities, along with residual disposal costs. Potential revenue offsets include compost sales at an assumed screened compost market price for Florida of $35 per ton.[46]

Alternative Scenario: Transition CASP Composting to AD + Tunnel/Bunker Composting

The Alternative Scenario evaluates a phased implementation pathway over the same Project Period, in which the County develops three organics processing facilities that come online sequentially and operate in coordination.

Initial Phase (2028–2029): The CASP facility begins operations in 2028, identical to the Baseline Scenario, including building on the existing CASP Pilot. Green waste/yard debris and food scraps are processed at a 1:1 ratio, with excess food scraps sent to landfill.

In-Tunnel/Bunker Composting Comes Online (2029): Construction of the In-Tunnel/Bunker Composting facility (2027–2029) is completed and the facility begins operations in 2029. Additional modular expansions occur every two (2) years through 2045. Each modular Tunnel/Bunker Composting expansion is sized to accommodate approximately 100,000 tons per two (2) years of additional feedstock capacity. Once the facility is initially developed and the main infrastructure is in place, additional modular **c**omposting units are installed to align with the amount of green waste/yard debris to be processed. As In-Tunnel/Bunker Composting comes online, green waste/yard debris and residential food scraps are progressively shifted from CASP to In-Tunnel/Bunker Composting, with 40% going to Tunnel/Bunker Composting in 2029–2030, 60% in 2031–2032, 80% in 2033–2034, and 100% from 2035 onward. The CASP facility is decommissioned in 2035.

[46] Source: https://wellbuiltflorida.com/compost-cost-per-ton-practical-price-ranges-u-s-buyers/

AD Facility Comes Online (2030): The AD facility is constructed in 2028–2029 and operations begin in 2030. Once the AD facility is operational, commercial food scraps will be diverted from the composting facilities and directed to the AD facility for processing. AD is built out in three capacity phases: an initial phase sized for 2035 feedstock volumes, a second phase expansion in 2035 sized for 2040 volumes, and a third phase expansion in 2040 sized for 2047 volumes.

The AD facility produces three output streams:

- Dry digestate, routed to the Tunnel/Bunker Composting facility as additional feedstock;
- Leachate, routed to the wastewater treatment facility (WWTF); and
- Biogas, upgraded to renewable natural gas (RNG) standard and sold to a third-party off-taker. Revenue is calculated based on the biogas volume produced, a conversion factor from biogas to RNG energy content (MMBtu/Nm³), and a net RNG sale price ($/MMBtu) applied at the facility boundary.

Residuals and contaminants from all three facilities (approximately 10% of feedstock input) are sent to landfill. The primary costs in the Alternative Scenario include capital and operating costs for the CASP, AD, and Tunnel/Bunker Composting facilities, along with residual disposal and leachate handling costs. Revenues include compost sales and RNG sales from biogas.

The Alternative Scenario is structured as a phased implementation rather than a single large upfront build for two reasons. First, CASP has a relatively short useful life and is best used as temporary organics processing solution. Conversely, in-Tunnel/Bunker Composting is a permanent, industrial-scale facility better suited than mobile CASP units for long-term operation and for handling the higher moisture and ammonia content of AD dry digestate. Second, the AD facility is capital intensive, so building all capacity upfront would result in significant underutilization of expensive infrastructure in the early program years when feedstock volumes are still ramping up. Sizing AD in three sequential phases aligned to projected feedstock growth reduces upfront capital risk and matches infrastructure investment to actual program growth.

Lifecycle Cost Analysis Assumptions (LCCA)

Economic and Financial Assumptions

The following economic and financial assumptions provide the analytical framework for the LCCA. Each assumption represents a key input that materially affects the NPC result and the comparative outcome between scenarios. The values shown reflect industry benchmarks, federal guidance, and current municipal financing conditions appropriate for a planning-level analysis.

Table 30: Economic and Financial Assumptions

Assumption	Value	Notes
Analysis Period	2028 – 2047	Assumed based on 20-year operations period (starting with CASP Pilot operations).
Base Year for Costs	2025$	All cash flows expressed in real 2025 dollars.
Discount Rate – Real	2.0%	5.0% nominal borrowing rate minus 3.0% inflation. Applied to cash flows expressed in constant 2025 dollars.
Cost Escalation	3.0%	Long-term CPI expectations blended with construction cost escalation indices. Used to derive the real discount rate from the nominal borrowing rate.
Borrowing Rate	5%	Confirmed by the County.
Financing Structure	100%	Assumed 100% debt financing.

Overall, Table 30 summarizes the key planning-level assumptions used to compare organics management scenarios on a consistent basis. The values provide a common foundation for evaluating system costs, processing requirements, residual disposal, and potential revenue offsets. By applying the same assumptions across scenarios, the analysis supports a transparent comparison of relative financial performance and helps identify the conditions that most influence long-term implementation feasibility.

General Scenario Assumptions

Table 31 presents the general scenario assumptions used consistently across the lifecycle cost analysis for the Baseline and Alternative organics processing scenarios. These assumptions establish common values for compost sales, residual disposal, leachate management, and reject rates so that each scenario is evaluated on a comparable basis. By applying the same planning-level inputs to both scenarios, the analysis isolates the cost and performance differences associated with the selected processing technologies and phasing approach. This supports a transparent comparison of long-term costs, avoided disposal, and potential revenue offsets over the 2028–2047 project period.

Table 31: General Scenario Assumptions

Assumption	Value	Notes
Compost Sale Price	$35/ton	Screened compost market price for Florida/Southeast. Price was confirmed as reasonable by discussions with local farmers, growers, and other in the Miami-Dade County Agriculture Industry.[47]
DSWM Full Waste Disposal Cost	$76.12/ton	Applied to residuals routed to landfill.[48]

[47] Source: https://wellbuiltflorida.com/compost-cost-per-ton-practical-price-ranges-u-s-buyers/.
[48] Source: Miami-Dade County DSWM FY2025-26 Disposal Facility Fee Schedule

Assumption	Value	Notes
Leachate Acceptance Cost	$17/ton	Approximated based on DSWM SBR pre-treatment cost data ($5M over 8 years divided by 8.65M gal/yr average annual volume). Applied to AD leachate output routed to WWTF.
Residual/Reject Rate	10%	Percentage of feedstock input diverted to landfill as non-processable material. Applies to all processing facilities.

Baseline Scenario Assumptions

Table 32: Baseline Scenario – CASP Assumptions

Assumption	Value	Description
CASP CapEx Unit Cost	$93 / TPY of capacity	Capital construction cost per ton of annual facility capacity. Used to size total capital investment based on facility throughput design. Reflects components including controls, blowers, membranes, probes, electrical, asphalt pad, and heavy equipment.
CASP OpEx Unit Cost	$9.50 / ton processed	Annual operating cost per ton of feedstock processed. Used to scale annual operating costs with actual throughput.
CASP Useful Life	20 years	Expected operating lifespan; used for annualized depreciation of capital costs.
CASP Construction Start Year	2028	Year of construction of the CASP facility for the analysis, built on the ongoing pilot operation.
CASP Modular Expansion Cycle	2 years	Frequency at which additional modular CASP units are added to maintain capacity ~2 years ahead of projected feedstock volume.
CASP Compost Yield Rate	55%	Percentage of clean (post-rejection) feedstock recovered as finished compost. Applied after residues are removed.

Alternative Scenario Assumptions

Table 33: Anaerobic Digestion Facility Assumptions

Assumption	Value	Description
AD Construction Start – Initial Phase	2028	Year initial AD facility construction begins.
AD Construction End – Initial Phase	2030	Initial phase becomes operational.

Assumption	Value	Description
AD Sizing Capacity - Initial Phase	2035	Year of feedstock volume that the initial phase AD facility is sized to accommodate.
AD Construction Start - Second Phase	2035	Second phase capacity expansion.
AD Construction End - Second Phase	2036	Second phase expansion becomes operational.
AD Sizing Capacity - Second Phase	2040	Year of feedstock volume that the second phase AD facility expansion is sized to accommodate.
AD Construction Start - Third Phase	2040	Third phase capacity expansion.
AD Construction End - Third Phase	2041	Third phase expansion becomes operational.
AD Sizing Capacity - Third Phase	2047	Year of feedstock volume that the third phase AD facility expansion is sized to accommodate.
AD CapEx Unit Cost	$500 / TPY of capacity	Capital construction cost per ton of annual capacity. Approximately 6x higher than CASP due to added process complexity (digesters, gas cleanup, mechanical systems).
AD OpEx as % of CapEx	8%	Annual operating cost expressed as a percentage of total CapEx.
AD Useful Life	20 years	Expected operating lifespan; used for depreciation.
AD Biogas Yield Rate	69 Nm^3 / ton feedstock	Volume of biogas produced per ton of feedstock. Drives biogas output and downstream revenue calculations.
Biogas Density	0.0012 ton / Nm^3	Mass-to-volume conversion factor for biogas (equivalent to 1.2 kg/Nm^3). Used in mass balance calculations to convert biogas volume to weight.
AD Leachate Rate	10%	Percentage of feedstock output as liquid leachate routed to the wastewater treatment facility.
Biogas to RNG Conversion Factor	0.02 MMBtu/Nm^3	Energy content of methane in AD biogas. Derived from pure methane heating value (1,011 Btu/ft^3 ≈ 0.0377 MMBtu/Nm^3) adjusted for typical AD biogas methane content (~55%).
RNG Sale Price (Net)	$2.50 / MMBtu	Net revenue inclusive of downstream upgrading and transport. Benchmarked to DSWM landfill gas market research (~$2.07/MMBtu implied), with modest upward adjustment reflecting the higher methane content of AD biogas.

Table 34: Tunnel/Bunker Compost (TC) Assumptions

Assumption	Value	Description
TC Construction Start Year	2027	Year construction begins.
TC Construction End Year	2029	Year composting construction is complete and facility becomes operational.
TC CapEx Unit Cost	$110 / TPY of capacity	Capital construction cost per ton of annual capacity. Higher than CASP due to enclosed structure and mechanical process controls. Reflects components including controls, blowers, probes, doors, ducting, piping, scrubbers, concrete pads/walls, retention basin, heavy equipment, and PEMB steel roof structure.
TC OpEx Unit Cost	$9.50 / ton processed	Annual operating cost per ton of feedstock processed. Set equal to CASP for planning purposes.
TC Useful Life	20 years	Expected operating lifespan; used for depreciation.
TC Modular Expansion Cycle	2 years	Frequency at which additional tunnel/bunker composting capacity is added, following the same 2-year lookahead logic as CASP.
TC Compost Yield Rate	55%	Percentage of clean (post-rejection) feedstock recovered as finished compost.

Exclusions and Other Considerations

This LCCA is a planning level analysis and is not intended to substitute for detailed engineering, procurement, or financing analyses that would accompany project implementation. The following categories of costs are either not included or are included only on a simplified basis, due to limited data availability at this planning stage.

- **Curbside collection costs:** Because organics collection assumptions are consistent between the Baseline and Alternative Scenarios, incremental collection costs (carts, routes, fleet, labor) do not affect the comparative outcome and are excluded from the base analysis.
- **Tipping fees:** This analysis evaluates the cost to develop and operate the organics processing infrastructure. It does not model tipping fees. If the facilities are ultimately owned and/or operated by a third party, tipping fees would represent a revenue stream to that operator and a cost to the County, and the appropriate fee level would depend on the delivery and ownership model selected. Determining a tipping fee requires a separate analysis of alternative delivery models (e.g., public ownership, design-build-operate, or fully privatized), which is beyond the scope of this planning-level cost comparison and is better addressed as a next step (see Conclusions).

- **Program administration and public education:** Costs associated with rolling out and maintaining the residential organics program are excluded, as they are assumed to be equivalent between scenarios.
- **Real estate, permitting, and environmental compliance:** Land acquisition, permitting, environmental review, and mitigation costs are not included. The analysis assumes County owned land at the Old South Dade Landfill parcel is available for facility siting.
- **Carbon credit monetization:** Potential revenues from carbon credits or other environmental market instruments are excluded due to significant market uncertainty at planning level.
- **Biochar production:** Biochar was considered as a potential add-on but is not evaluated in this LCCA due to market uncertainty around biochar and carbon credit revenues.
- **Downstream biogas infrastructure:** For simplicity, biogas is valued as a net RNG sale price at the facility boundary. This net value is intended to capture all downstream economics including gas upgrading, transport, and RIN monetization.
- **Facility decommissioning:** Decommissioning costs at end of useful life are excluded from the base case.
- **Financing structure details:** The analysis assumes 100% debt financing at a single blended borrowing rate. Actual financing structure, debt service coverage requirements, and bond issuance costs would be evaluated during project implementation.

Capital costs, feedstock and material flows for each scenario

This section presents cost results and tonnage figures in the tables provided below. Both scenarios draw from the same total pool of organic feedstock generated over the Project Period. The scenarios differ in how that feedstock is routed, processed, and converted into outputs. Table 35 summarizes the total available feedstock, and Table 36 summarizes how each scenario processes that material into finished products, landfill residuals, and other output streams.

Table 35: Total Organic Feedstock Quantity (Tons, 2028-2047)

Feedstock Stream	Quantity
Green Waste and Yard Debris	4,109,551
Food Scraps	7,640,546
Total Feedstock	**11,750,097**

Table 36: Material Flow by Scenario (Tons, 2028-2047)

Material	Baseline Scenario (CASP Only)	Alternative Scenario (AD + Tunnel/Bunker Composting)
Total Organic Material Processed	8,219,103	15,561,899
Finished Compost	4,068,456	4,265,596
Total to Landfill	4,352,905	2,120,097
Leachate	N/A	531,109
Biogas	N/A	366,465,530 Nm^3
Dry Digestate	N/A	3,809,117

Note that biogas is reported in cubic meters (Nm^3) rather than tons, as it is measured by volume. Total Organic Material Processed for the Alternative Scenario exceeds total feedstock because dry digestate from the AD facility is subsequently processed again through Tunnel/Bunker Composting. It is counted at both processing steps. **The Alternative Scenario diverts substantially more material from landfill, processes substantially more material, and generates additional output streams in biogas for RNG.** The tables below present the lifecycle costs associated with processing this material under each scenario.

Results

This section presents the results of the LCCA. Table 37 shows the total lifecycle cost by category (CapEx, Financing, OpEx). Table 38 shows capital expenditure detail by facility and phase. Table 39 breaks out the totals for the different revenue streams over the Project Period and Table 40 shows the UAC. The UAC accounts for both cost and revenues, which are considered cost offsets for revenue offsets.

Table 37: LCCA Cost Summary (Real 2025$)49

Cost Category	Baseline Scenario (Undiscounted)	Baseline Scenario (Discounted)	Alternative Scenario (Undiscounted)	Alternative Scenario (Discounted)
Total Capital Expenditures (CapEx)	$145.0 M	$114.0 M	$476.7 M	$388.9 M
Total Operating Expenditures (OpEx)	$409.4 M	$299.8 M	$333.0 M	$256.6 M
Total Cost	$554.5 M	$413.8 M	$809.7 M	$645.6 M
Financing Costs	$63.0 M	$47.3 M	$234.1 M	$179.4 M
Total Revenue + Residual Value Credit	($211.0 M)	($148.9 M)	($371.9 M)	($256.5 M)
Net Lifecycle Cost	$406.4 M	$312.2 M	$671.9 M	$568.5 M

Note regarding the table above, "Undiscounted" columns sum the real dollar cash flows across the Project Period. "Discounted" columns apply the 2.0% real discount rate to express those cash flows in present value terms.

Note that residual disposal costs were included as part of OpEx for each facility. These disposal costs include both the estimated 10% residual/reject stream generated by each facility and any feedstock that is not routed to a processing facility (such as excess food scraps in the Baseline Scenario, where food scraps received in excess of the 1:1 green waste/yard debris to food scrap ratio are sent to landfill). Disposal costs become an increasingly significant driver of OpEx in later years as feedstock volumes grow, particularly for the Baseline Scenario where CASP throughput continues to expand.

Residual Value represents the remaining economic value of capital assets that still have useful life left at the end of the analysis period. Because several facilities, particularly the later AD expansion phases, are constructed toward the end of the Project Period, they have not fully depreciated by 2047. To avoid overstating the net cost of each scenario, the analysis credits back this remaining (or "residual") asset value at the end of the Project Period. Because the Alternative Scenario involves substantially more capital investment late in the Project Period, it receives a larger residual value credit than the Baseline Scenario.

[49] All cash flows in the LCCA are expressed in real 2025 dollars. Because costs and revenues are held in constant dollars rather than escalated year over year for inflation, they are discounted to present value using a real discount rate of 2.0%. The real rate is derived from the County’s nominal borrowing rate of 5.0% (per the DSWM Chief Financial Officer) minus an assumed inflation rate of 3.0%..

Table 38: Capital Expenditure by Facility and Phase (Real 2025$)

Facility / Phase	Construction Year(s)	Total CapEx (undiscounted)
Baseline Scenario		
CASP (initial + modular expansions every 2 years)	2028–2046	$145.0 M
Baseline Total CapEx		$145.0 M
Alternative Scenario		
CASP (initial, transitional facility)	2028	$5.4 M
AD Facility — Initial Phase	2028–2029	$97.2 M
AD Facility — Second Phase Expansion	2035	$71.9 M
AD Facility — Third Phase Expansion	2040	$98.4 M
Tunnel/Bunker Composting — Initial Phase	2027–2028	$15.3 M
Tunnel/Bunker Composting — Modular Expansions every 2 years	2031–2046	$188.4 M
Alternative Total CapEx		**$476.7 M**

As shown in the tables above, the Baseline Scenario requires substantially lower capital investment but has higher long-term operating costs. This is largely because residual disposal costs are included in OpEx. Under the Baseline Scenario, the CASP system processes the entire organics stream, and both process residuals and rejects (approximately 10% of inbound feedstock) and any food scraps exceeding the 1:1 ratio with green waste/yard debris are sent to landfill at the DSWM disposal rate of $76.12/ton. As feedstock volumes grow over the Project Period, these disposal fees add up and become a significant driver of operating cost.

The Alternative Scenario has significantly higher capital investment concentrated in three phased AD facility build-outs but incurs lower operating costs in part because food scraps are diverted to the AD facility. AD costs are also offset partially by greater revenue potential from biogas RNG and higher compost production.

The Alternative Scenario requires approximately $331.7 M more in capital investment than the Baseline Scenario. This capital is concentrated in the three phased AD facility build-outs (totaling ~$276.5 M) and the Tunnel/Bunker Composting modular expansions (~$203.7 M combined), while CASP investment is significantly lower ($5.4 M) since the facility is decommissioned in 2035.

Table 39: Revenue Streams (Real 2025$)

Revenue Source	Baseline Scenario (Undiscounted)	Alternative Scenario (Undiscounted)
Compost Sales	$142.4 M	$173.4 M
Biogas RNG Sales	N/A	$18.3 M
Total Revenue	**$142.4 M**	$191.7 M

Both scenarios generate compost sales revenue at the assumed $35/ton market rate. The Alternative Scenario also generates revenue from RNG sales from biogas produced at the AD facility, valued at a net $2.50/MMBtu.

Table 40: Uniform Annual Cost (Real 2025$)

	Baseline Scenario	Alternative Scenario
Total Annual Cost (with Financing)	$26.2 M / yr	$46.7 M / yr
Net Annual Cost (after Revenue)	**$17.7 M / yr**	**$32.2 M / yr**

The above table presents the UAC for the Baseline and Alternative Scenarios. UAC is a useful comparative metric because it expresses lifecycle cost in dollars-per-year terms.

The Baseline Scenario totals $17.7 M per year in net annual cost, while the Alternative Scenario totals $32.2 M per year. This represents an incremental annual cost of approximately $14.5 M per year for the Alternative Scenario relative to the Baseline, over a 20-year Project Period.

Table 41: Net Cost per Ton of Material Processed (Real 2025$)

	Baseline Scenario	Alternative Scenario
Net Lifecycle Cost (Discounted)	$312.9 M	$568.5 M
Total Material Processed	8,219,103	11,752,781
Net Cost per Ton	**$38.07 / ton**	**$48.37 / ton**

Table 41 presents the net cost per ton of organic material processed under each scenario, calculated by dividing the discounted Net Lifecycle Cost by the total tonnage of material processed over the Project Period. This metric normalizes the total lifecycle cost against the volume of material each scenario beneficially processes, enabling a per-unit comparison.

Note that for the Alternative Scenario, dry digestate routed from the AD facility to the Tunnel/Bunker Composting facility is counted only once in the total material processed here, avoiding the double-counting of internal transfers reflected in the "Total Organic Material Processed" figure shown earlier.

The Baseline Scenario has a lower net cost per ton (approximately $38 per ton) than the Alternative Scenario (approximately $59 per ton), reflecting its lower overall lifecycle cost. However, the Alternative Scenario processes substantially more distinct material over the Project Period (approximately 11.8 million tons versus 8.2 million tons), diverting a greater share of the organics stream from landfill.

Conclusions

Both undiscounted and discounted results indicate that the Baseline Scenario has a lower net lifecycle cost over the Project Period. This gap is driven primarily by the significantly lower capital investment required under the Baseline Scenario, which uses lower-cost modular CASP infrastructure rather than the more capital-intensive AD + Tunnel/Bunker Composting infrastructure of the Alternative Scenario.

SUSTAINABLE MATERIALS MANAGEMENT COMPLEX

Sustainable Materials Management Infrastructure

A Sustainable Materials Management Complex would provide Miami-Dade County with a coordinated, campus-style approach for recovering, processing, and returning valuable materials to productive use. The complex would move beyond traditional waste diversion practices by integrating reuse, repair, source-separated collection, construction and demolition debris recovery, and end-market development within a coordinated operational system and circular-style economy. Consistent with the County's Zero Waste Master Plan, this model for a Sustainable Materials Management Complex supports the following infrastructure strategies:

- Construction materials processing facility
- Reuse warehouse
- Reuse, repair, and recycling center

By co-locating these facilities in the same area, the County can use common access, circulation, utilities, staffing, education, and site infrastructure to direct recoverable materials toward higher and better uses.

The proposed complex directly supports zero waste strategies focused on expanding recycling access, increasing reuse opportunities, recovering construction materials, and advancing a circular economy. Facilities such as a hard-to-recycle drop-off center, reusable building materials warehouse, construction material recovery facility, and environmental education center would create multiple diversion pathways for materials that are not fully captured through the County's current curbside recycling program*.

For the purpose of this Plan, the co-located infrastructure includes the following components:

- Hard-To-Recycle drop-off center for residents
- Warehouse for reusable building materials open to the public
- Construction material recovery facility
- Environmental education center
- Shared site infrastructure

A Sustainable Materials Management Complex would typically include organics processing infrastructure as part of an integrated campus approach, particularly where the complex is intended to intercept and recover the full range of divertible materials generated by residents and businesses. Under that broader model, facilities such as depackaging, anaerobic digestion, and composting facilities would operate in coordination with transfer, recycling, reuse, and construction materials recovery operations. This is consistent with the broader concept described in the assessment, which identifies organics processing technologies including CASP, in-vessel/tunnel composting, anaerobic digestion, and related supporting infrastructure as key options for managing organic waste.

For the following Sustainable Materials Management Complex analysis, organics processing infrastructure is not evaluated again as a separate primary component because organics management infrastructure has been evaluated in earlier sections of the assessment. Additionally, because DSWM has an executed agreement with WM for processing recyclables, MRF operations are also omitted. Excluding those facilities from this portion of the analysis avoids duplicating prior technical and financial discussion and allows this section to focus on the remaining materials management functions that complement organics diversion, including transfer station routing, construction materials recovery, hard-to-recycle material collection, reuse infrastructure, depackaging support, and public education.[50]

Construction & Demolition (C&D) Recovery Facility

Construction Materials Management is an important component of the Sustainable Materials Management Complex because construction and demolition (C&D) debris represents a large, heavy, and infrastructure-driven waste stream that can consume substantial landfill capacity when it is not recovered for reuse, recycling, or beneficial use. Miami-Dade County's Zero Waste Master Plan establishes a long-term framework to reduce disposal dependency, expand waste diversion, increase reuse and recycling opportunities, improve organics and materials processing infrastructure, and advance a more circular economy. Within that framework, C&D management provides one of the most direct opportunities to shift high-volume materials such as concrete, asphalt, wood, metals, gypsum, cardboard, aggregates, soils, fixtures, and reusable building components away from landfill disposal and to uses with higher value.

A dedicated construction materials management program, supported by a mixed C&D recovery facility and a reusable building materials warehouse, would support and operationalize several zero waste strategies in one integrated system. Suitable construction loads can be directed to recovery operations, reusable materials can be separated before they are damaged or commingled, recoverable aggregate and wood can be routed to appropriate markets, and non-recoverable residuals can be consolidated for efficient disposal. This approach supports source reduction by encouraging deconstruction and salvage, expands reuse through public access to recovered building materials, increases recycling of bulky construction streams, improves data collection on C&D generation and recovery, and preserves landfill capacity. In 2024, 507,623 tons of C&D waste consumed approximately 121,830 cubic yards of landfill space, underscoring the importance of targeted C&D diversion infrastructure as part of the County's broader zero waste implementation strategy.

Based on the size, scale, and permitted daily capacity of other operating C&D recycling facilities that receive material from within Miami-Dade County, DSWM could seek a small to medium-sized mixed C&D processing facility permit to process 300-500 tons per day on a two-to-four-acre site.

A typical 1,200 TPD mixed C&D intake yields the following daily averages for fines and residuals:

- Total C&D Intake: 1,200 tons/day
- Total Fines Generated: 180 to 360 tons/day (15% to 30% of intake)

[50] *At the time of this report, DSWM is exploring approaches to curbside collection for hard-to-recycle plastics and other materials generated at the home using specialty on-call collection services providers.

- Recovered Aggregate & Soil: 45 to 180 tons/day
- Processed Residuals (Landfilled): 135 to 180 tons/day

Table 42: Local C&D Processing Facilities

Operator	WM C&D	WM Recycling	Coastal Waste & Recycling	Coastal Waste & Recycling	WM
Location	11695 SW 328th St. Homestead	3401 NW 110th St. Miami	3610 NW 50 St. Miami	1840 NW 33rd St. Pompano Beach	2281 NW 16th St. Pompano Beach
Facility Type	Open-Air	Enclosed Structure	Open-Air	Enclosed Structure	Enclosed Structure
Area	10 acres	2 acres	0.25 acre	5 acres	7 acres
Permitted TDP	1,000	1,200	298	2,160	2,400

The C&D recovery facility would be a key component of a Sustainable Materials Management Complex, helping recover C&D materials from the waste stream and significantly increasing Miami-Dade County's diversion rate. Disposal of C&D debris in Miami-Dade County costs $112 per ton, resulting in an estimated $58,376,645 in tipping fees based on the 507,623 tons of C&D disposed in 2024. Diverting even a portion of this material through a dedicated C&D recovery facility and reusable building materials warehouse could provide significant financial benefits by avoiding tipping fees, reducing the volume of dense material requiring landfill disposal, extending landfill capacity, and lowering long-term disposal cost exposure.

The facility would separate materials using manual sorting, mechanical screening, magnets, picking lines, grinders, crushers, and other processing equipment. Recoverable commodities could be directed to recycling markets or beneficial uses, reusable items could be transferred to the public warehouse, C&D fines could be evaluated for appropriate permitted management options, and non-recoverable residuals could be consolidated for efficient disposal. Coordinated onsite routing can reduce unnecessary hauling and improve operational cost control across the Sustainable Materials Management Complex.

Table 43 summarizes typical types and volumes of C&D fines material smaller than ¼ inch that are commonly generated at mixed C&D recovery facilities.

Table 43: Composition of C&D Fines

C&D Fine Material Type	Typical Description
Soil and Sand	Earth and fine aggregates tracked into the site or mixed during excavation.
Gypsum Dust	Pulverized drywall and plaster fragments from demolition.

C&D Fine Material Type	Typical Description
Mortar and Concrete Dust	Crushed cement, masonry matrix, and brick powder.
Organic Matter	Fine wood splinters, drywall paper backing, and decomposed cardboard.
Microplastics	Small fragments from insulation, plastic sheeting, and PVC piping.
Glass Cullet	Small shards of window glass and fiberglass insulation fibers.

Fines typically account for 15% to 30% of processed C&D material and are generally classified as residuals and are disposed of in landfills. In 2024, 507,623 tons of C&D waste consumed approximately 121,830 cubic yards of landfill space. If all the C&D waste generated in 2024 had been sent to a mixed C&D recovery facility and fines accounted for 30% of processed material, an estimated 126,905.75 tons (348 tons per day) could have potentially been recovered for beneficial reuse or recycling rather than sent directly to landfill.

Recovered C&D fines should be evaluated for the highest-value beneficial use or recycling pathway available, with careful screening to remove contaminants such as microplastics, fiberglass, gypsum dust, and other constituents that may limit reuse potential. Potential management options may include soil-like applications, aggregate blending, engineered fill, alternative daily cover, or other permitted beneficial uses where material quality and regulatory requirements can be met. For planning purposes, the County should further evaluate C&D fines characterization, contaminant thresholds, market demand, processing requirements, and permitting pathways before selecting a preferred long-term management strategy.

Warehouse for Reusable Building Materials

A warehouse for reusable building materials would provide a dedicated public-facing outlet for salvaged reusable construction materials, fixtures, furniture, cabinetry, doors, windows, lumber, hardware, appliances, and other durable items recovered from the C&D recovery facility, deconstruction projects, public facilities, and resident or contractor drop-offs. The warehouse would support Zero Waste Master Plan strategies related to reuse, repair, market development, and mandatory source separation by keeping useful products in circulation before they are damaged, commingled, or disposed of. By making recovered materials available for purchase, donation, or exchange, the facility could reduce disposal costs, support affordable access to building supplies, create local reuse jobs, and demonstrate the economic value of material recovery.

For siting and sizing, the warehouse should be located near the public entrance and adjacent to the C&D recovery facility so reusable materials can be transferred efficiently from recovery operations, deconstruction projects, public facilities, drop-offs, and salvage intake. A planning-level footprint of 2–4 acres, with an initial assumption of about 3 acres, should allow space for a public reuse store, covered receiving area, sorting and light repair space, inventory storage, loading and unloading areas, donation drop-off, customer parking, truck access, and safe separation from heavy processing areas. Final sizing should be refined based on expected material volumes, retail or donation model, inventory turnover, building configuration, operator requirements, queuing needs, and opportunities to reuse an existing warehouse or share infrastructure with other co-located facilities.

Center for Hard-To-Recycle Materials (CHaRM)

A Center for Hard-To-Recycle Materials (CHaRM) would serve as a practical, public-facing component of Miami-Dade County's Zero Waste Master Plan by giving residents a convenient location to source separate materials that are not typically accepted in the curbside recycling cart, such as tires, mattresses, electronics, appliances, plastic bags and film, textiles, books, expanded polystyrene, small scrap metal, and other bulky or difficult-to-manage items. Some of these materials are collected at the County's Trash and Recycling Centers (TRCs) and this CHaRM would provide an additional option for convenient public drop-off. The CHaRM could also include a designated public area for exchanging reusable items.

Applied within Miami-Dade County's Sustainable Materials Management Complex, a CHaRM would make zero waste participation easier for residents, improve source separation, reduce curbside recycling contamination, support reuse and recycling markets, preserve landfill capacity, and direct hard-to-recycle materials to appropriate reuse, repair, recycling, donation, refurbishment, or specialty processing outlets. Such a center should be designed to accept up to 25 or more source-separated materials including but not limited to:

Table 44: Source-Separated Materials

Bulky Items	Hard-To-Recycle	Electronics
Scrap Metal	Plastic Bags/Film	E-waste
Tires	Expanded Polystyrene	Printer Cartridges
Large Appliance	Hardcover Books	Others
Exercise Equipment	Glassware	
Carpet	Ceramics	
Furniture	Textiles	
Mattresses	Shoes	
Others	Others	

The CHaRM collection area should be designed for safe, efficient resident access, with a clear drive-through layout that allows vehicles to move easily from one material drop-off zone to the next. Upon arrival, residents should pass a staffed entry point, such as a small office or window, where materials can be identified, fees can be assessed if applicable, and vehicles can be directed to the appropriate lane. Dedicated lanes and clearly marked zones should be provided for different material categories, with drop-off containers sized and positioned based on expected material types and volumes.

A planning-level footprint of 1–3 acres should provide sufficient space for receiving, sorting, storage, service vehicle and truck circulation, and employee support areas such as administrative offices, breakrooms, and restrooms.

Environmental Education Center

An Environmental Education Center is a key component of Sustainable Materials Management Complexes for the students and community partners. The center could include classroom space, interpretive exhibits, demonstration areas, and space for repair clinics. By connecting education directly to working infrastructure, the center would support Zero Waste Master Plan strategies related to education and outreach. It would also provide a platform for partnerships with schools, universities, nonprofit organizations, businesses, and County departments to promote waste prevention, responsible consumption, and circular economy practices.

For planning purposes, the County may consider a 5,000–10,000 square-foot Environmental Education Center, with 1–2 acres reserved for parking, outdoor exhibits, demonstration areas, pedestrian circulation, and buffers.

Sustainable Materials Management Complex Site Plan (conceptual)

A conceptual site plan for the Sustainable Materials Management Complex should separate public-facing traffic from heavy commercial and County fleet traffic while keeping compatible recovery operations close enough to reduce internal hauling. Public-facing resources, including the CHaRM, reusable building materials warehouse, and Environmental Education Center, should be located near the site entrance with controlled access, clear wayfinding, parking, and safe circulation. Industrial processing uses, including the construction material recovery facility and residual staging areas, should be located deeper within the site where truck circulation, stormwater management, buffers, and operational security can be more effectively managed.

The acreage estimates below are planning-level assumptions intended to support early site screening and should be refined through engineering design, traffic analysis, odor modeling, stormwater calculations, utility planning, geotechnical review, and permitting. Actual acreage needs will vary based on daily tonnage, operating hours, building configuration, equipment selection, queue lengths, topography, stormwater requirements, fire access, setbacks, and whether certain functions can share buildings, scales, roads, maintenance areas, employee facilities, and administrative space.

Table 45 summarizes planning-level acreage assumptions for the conceptual Sustainable Materials Management Complex layout.

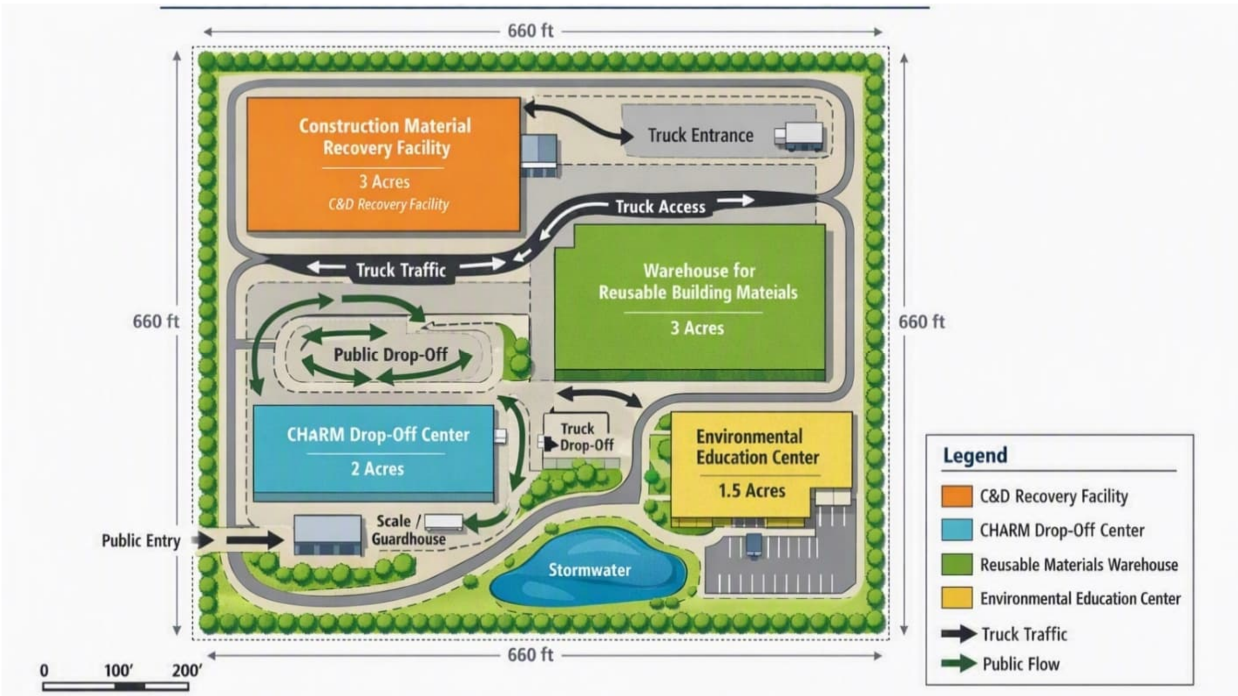
Table 45: Conceptual Facility Footprint (acres)

Facility	Conceptual Layout Function	Planning-Level Acreage Range	Acreage Assumption
Construction Material Recovery Facility	Mixed C&D receiving, enclosed or partially enclosed processing, picking line, screening, grinding or crushing, commodity bunkers, recovered	1–4 acres	3 acres

Facility	Conceptual Layout Function	Planning-Level Acreage Range	Acreage Assumption
	aggregate storage, residual staging, and truck circulation.		
CHaRM	Public drop-off lanes, greeter station, source-separated collection zones, roll-off staging, covered storage, small processing areas, staff support, and safe resident circulation.	1–3 acres	2 acres
Warehouse for Reusable Building Materials	Public reuse store, covered receiving, sorting, repair, inventory storage, loading area, parking, donation drop-off, and connection to C&D recovery and salvage intake.	2–4 acres	3 acres
Environmental Education Center	Classrooms, interpretive exhibits, observation areas, demonstration space, visitor parking, outdoor education features, and safe separation from industrial operations.	1–2 acres	1.5 acres
Shared Roads, Queuing, Parking, Maintenance, Utilities, Buffers, Stormwater, and Residual Staging	Internal roads, fire access, truck queuing, employee and visitor parking, fleet and equipment staging, maintenance, utilities, stormwater ponds, landscaping, perimeter buffers, and security setbacks.	TBD upon further assessment	TBD upon further assessment
Total Planning-Level Footprint		**6–13 acres**	**9.5 acres**

For early planning purposes, the Sustainable Materials Management Complex should be evaluated as an approximately 10-acre campus, with a planning range of 6 to 13 acres depending on final capacity assumptions and opportunities to share infrastructure. A larger site within this range would allow more flexibility for stormwater management, traffic separation, future expansion, buffers, phased construction, and changes in material volumes.

Figure 5: Conceptual Sustainable Materials Management Complex Site Layout Based on Planning-Level Acreage Assumptions



Dimensions are approximate and subject to engineering, permitting, traffic, and stormwater review.

The preferred conceptual layout would place public-facing facilities near the entrance and separate them from heavy truck circulation. The C&D recovery facility should be located near the reusable materials warehouse to shorten the internal movement of salvageable materials and improve recovery quality. Shared roads, parking, utilities, stormwater areas, maintenance functions, buffers, and residual staging should be sized to support phased implementation and future adjustments to material flows. The CHaRM, reusable materials warehouse, and Environmental Education Center should be grouped near the public entrance to create a visible zero waste hub while maintaining physical separation from industrial truck movements.

Sustainable Materials Management Complex Benchmarks

Comparable sustainable materials management complexes[51] provide useful benchmarks for Miami-Dade County as it evaluates potential scale, cost, phasing, and operating models. These examples include broader facility elements than the County's current proposed scope and are used only as reference points for planning, not as a recommendation to include every component described.

[51] Sustainable Materials Management Complexes may also be described using related terms, such as resource recovery parks or sustainability campuses. Regardless of terminology, this assessment envisions a Miami-Dade County complex focused on recovery, reuse, education, and circular economy infrastructure rather than disposal-oriented processing

Where benchmark examples include activities such as transfer, organics processing, home chemical collection, or other services outside the current concept, those activities should be understood as contextual references only. The current Miami-Dade County scope remains focused on CHaRM, a reusable building materials warehouse, C&D recovery, an Environmental Education Center, and shared site infrastructure.

Resource Depot (West Palm Beach, Florida)

Resource Depot in West Palm Beach provides a nearby Florida example of a nonprofit creative reuse center that diverts excess and discarded materials from the waste stream by making them available for reuse, upcycling, education, and community programming. The organization's model includes a materials marketplace, reuse-focused retail areas, workshops, events, partnerships with educators and community groups, and gallery programming that showcases upcycled art. For Miami-Dade County, Resource Depot demonstrates how a reuse and education function can begin at a community scale through donated materials, partnerships, public programming, and adaptive reuse rather than relying solely on a purpose-built County facility[52].

The Repurpose Project (Gainesville, Florida)

The Repurpose Project in Gainesville provides a Florida-based example of creative reuse, architectural salvage, building-material recovery, and community-scale circular economy development. The nonprofit describes its work as diverting useful resources from landfill disposal and redirecting them to the public for art, education, reuse, and resale. Its reuse system includes multiple related stores with different material focuses, including the original creative reuse and architectural salvage store, Reuse Planet for furniture, appliances, cabinets, and household goods, and Renovator Reuse for tools, hardware, lumber, doors, windows, plumbing, and other building materials. For Miami-Dade County, this example demonstrates how a reuse warehouse can begin as an adaptive reuse, nonprofit, or partnership-based model rather than a purpose-built public facility. It also illustrates how specialized reuse outlets can capture unconventional materials, support affordable access to recovered goods, create local reuse jobs, and build public familiarity with waste prevention and circular economy practices[53].

Austin Resource Recovery Reuse Warehouse and Recycle and Reuse Center (Austin, Texas)

Austin Resource Recovery provides a public-sector example of phased reuse and drop-off infrastructure. EPA announced a $4 million Solid Waste Infrastructure for Recycling grant to support construction and maintenance of a reuse warehouse, and the City later approved the purchase of a 13,200-square-foot building on a 0.98-acre lot for approximately $4.42 million to support reuse operations. Austin's broader Recycle and Reuse Drop-Off Center is located on a seven-acre parcel and accepts hard-to-recycle materials, household hazardous waste, reusable items, and other materials requiring separate handling.

---

[52] Resource Depot. "Creative Reuse | Resource Depot | United States" and "About Us." Accessed September 2, 2026. https://www.resourcedepot.org/

[53] The Repurpose Project. "The Reuse Art Store: Creative Reuse Center & Architectural Salvage Store." The Repurpose Project Organization Portal. Accessed August 26, 2026. https://www.repurposeproject.org/the-reuse-art-store/

For Miami-Dade County, this example is most relevant as a benchmark for grant-supported reuse warehousing, adaptive reuse, and phased public drop-off operations; services outside the current Miami-Dade scope should be treated as contextual examples only[54].

El Cerrito Recycling and Environmental Resource Center (El Cerrito, California)

The El Cerrito Recycling and Environmental Resource Center in California provides a practical public drop-off model for conventional recyclables, hard-to-recycle materials, reusable items, and environmental education. Publicly available information identifies the facility as an approximately $3.5 million, two-acre community recycling center designed to support high levels of public participation, including resident drop-off, material separation, reuse exchange, and educational features. The facility has also been described as incorporating high-performance sustainability features, including net-zero energy and water design elements. For Miami-Dade County, El Cerrito provides a useful order-of-magnitude comparison for the public-facing CHARM and education functions: a relatively compact, two-acre public drop-off center can still require several million dollars in capital investment once site work, traffic circulation, covered areas, utilities, sustainability features, staff support, and public-facing design are included. The example reinforces the need to budget not only for containers and drop-off lanes, but also for safe circulation, customer service, signage, stormwater, durable pavement, and long-term maintenance[55].

Urban Ore (Berkeley, California)

Urban Ore in Berkeley, California is a mature reuse-centered enterprise that recovers and resells household goods, furniture, fixtures, hardware, building materials, and other durable products. Public information focuses more on operating economics than on a single documented construction cost. Reported information indicates that Urban Ore has operated with a large reuse warehouse and retail footprint and has been compensated through a salvage service fee for recovering reusable materials from the transfer station stream, including reported per-ton service fee arrangements ($40/ton between 2012-2020). This is important for Miami-Dade County because it shows that reuse infrastructure should be evaluated not only as a capital project, but also as an operating model with revenue, avoided disposal costs, service contracts, staffing, inventory management, public retail activity, and salvage logistics. The long-term financial planning process should consider both up-front facility costs and ongoing operating support, including whether a nonprofit, private operator, or public-private partnership could operate the reuse function more efficiently than a traditional County-operated disposal facility[56].

---

54 Austin Resource Recovery reuse warehouse: U.S. Environmental Protection Agency, “EPA Announces a $4,000,000 Solid Waste Infrastructure for Recycling Grant to the City of Austin”; U.S. Environmental Protection Agency, “Austin, Texas — SWIFR Fact Sheet.” https://www.epa.gov/newsreleases/epa-announces-4000000-solid-waste-infrastructure-recycling-grant-city-austin

55 El Cerrito Recycling and Environmental Resource Center: Noll & Tam Architects, “El Cerrito Recycling Center”; City of El Cerrito, “El Cerrito Recycling + Environmental Resource Center.” https://www.e-architect.com/sanfrancisco/el-cerrito-recycling-environmental-resource-center

56 Source: City of Berkeley. (2020). Resolution authorizing salvage operations contract at the City's Transfer Station (Resolution No. 69,438-N.S.). Berkeley City Council. https://www.epa.gov/sites/default/files/2021-03/documents/berkeley_resolution_authorizing_transfer_station_salvage_operations_2020.pdf

San Jose Environmental Innovation Center (San Jose, California)

The San José Environmental Innovation Center is a useful example of an adaptive-reuse campus that combines public-facing environmental services, reuse retail, education, workforce development, and sustainability demonstration features. Reported project information identifies approximately 48,000 square feet of adaptive reuse, 10,000 square feet of new construction, and about $13 million in construction cost, while other summaries identify a broader initial project cost of approximately $31 million supported by public funds, grants, New Markets Tax Credits, and public-private partnership structures. For Miami-Dade County, this example is relevant because it demonstrates how an existing industrial or warehouse property can be converted into a visible reuse, education, and sustainability hub. Any services outside the current Miami-Dade facility scope should be treated as contextual references rather than proposed components[57].

Eco-Cycle (Boulder, Colorado)

The Eco-Cycle / City of Boulder Center for Hard-to-Recycle Materials provides one of the closest operating analogs to the CHaRM concept. Public information identifies the facility as the first of its kind in the United States and describes a public-facing layout with a staffed check-in window, central drive lane, material-specific drop-off zones, custom collection containers, and a facility fee plus material-specific fees that help cover operating, processing, and shipping costs. While publicly available sources do not identify a comprehensive construction cost, the available operating-fee structure is relevant to Miami-Dade County because it shows that CHaRM facilities often require ongoing cost recovery rather than relying solely on commodity revenue. This example supports evaluating user fees, extended producer responsibility partnerships, sponsorships, reusable material sales, and County operating support as part of the financial model[58].

Benchmark-Based Implementation Considerations

The benchmark examples above provide planning-level context for comparing potential facility costs, phasing options, and funding approaches. They are intended to inform conceptual planning and future due diligence, not as Miami-Dade County-specific cost estimates.

The cost comparison in Table 46 indicates resource recovery and sustainable materials management infrastructure can range from lower-cost adaptive retrofitting models to major capital-intensive processing facilities.

[57] Source: City of San José. (2015). San Jose Environmental Innovation Center [Technical project overview]. Santa Clara Valley Urban Runoff Pollution Prevention Program. https://scvurppp.org/wp-content/uploads/2019/05/5_Hartman_Chan_Hynes_SJEIC_6-16-15.pdf

[58] Eco-Cycle / City of Boulder CHaRM: Eco-Cycle, “Eco-Cycle/City of Boulder Center for Hard-to-Recycle Materials”; Eco-Cycle, “Guidelines Poster: CHaRM Fees.” https://ecocycle.org/services-and-facilities/charm/

Table 46: Cost Comparison of Sustainable Materials Management Complex Benchmarks

Example	Reported Cost or Funding	Size or Capacity	Cost Type	Planning Relevance for Miami-Dade County
Resource Depot	$826,213 annual expenses	Approximately 14,400 sf building on a 0.73-acre lot; reported to divert approximately 200,000 pounds of materials annually.	Annual nonprofit operating expense benchmark.	Nearby Florida benchmark for launching reuse, education, and creative materials recovery through nonprofit partnerships, donated materials, adaptive reuse, and phased public programming.
The Repurpose Project	Approximately $200,000 fundraising target toward building purchase.	Approximately 20,000 sf^2 building.	Adaptive reuse and acquisition benchmark.	Florida-based example supporting reuse start-up through acquisition, lease, renovation, or partnership.
Austin Resource Recovery	$4 million SWIFR[59] grant; approximately $4.42 million building purchase.	13,200 sf^2 reuse warehouse on 0.98 acre; broader drop-off center on about seven acres.	Grant, acquisition, adaptive reuse.	Supports phased CHaRM and reuse warehouse implementation; broader services are contextual only.
El Cerrito Recycling and Environmental Resource Center	Approximately $3.5 million.	Approximately two-acre community recycling center.	Public drop-off capital cost benchmark.	Useful scale and cost reference for CHaRM and education features.
San Jose Environmenental Innovation Center	Approximately $13 million construction cost; broader project summaries identify about $31 million initial cost.	48,000 sf^2 adaptive reuse plus 10,000 sf^2 new construction.	Adaptive reuse, public-private funding, New Markets Tax Credits, grants.	Strong benchmark for adaptive reuse, education, workforce, public-facing reuse, and sustainability demonstration features; services outside the current Miami-Dade scope are contextual only.

[59] EPA's Solid Waste Infrastructure for Recycling (SWIFR) Grant Program https://www.epa.gov/circulareconomy/solid-waste-infrastructure-recycling-grant-program

Example	Reported Cost or Funding	Size or Capacity	Cost Type	Planning Relevance for Miami-Dade County
Eco-Cycle / City of Boulder CHaRM	Construction cost not clearly reported; ongoing $3 facility fee plus material-specific fees.	Outdoor CHARM with central lane, zones, custom containers, and co-location with reuse partner.	Operating cost recovery and user-fee model.	Relevant to CHaRM design, operating fees, source separation, and specialty recycling logistics.
Urban Ore	Capital cost not clearly reported; public information emphasizes salvage service fee and resale economics.	Large reuse warehouse and retail operation with a salvage-based reuse recovery model.	Operating contract and reuse retail model.	Shows importance of operating model, staffing, inventory, revenue, and avoided disposal.

These cost comparison examples suggest that Miami-Dade County may consider a layered funding strategy tailored to the current scope of the Sustainable Materials Management Complex: CHaRM, reusable building materials warehouse, C&D recovery facility, environmental education center, and shared site infrastructure.

- Lower-cost, public-facing components can be launched through grants, adaptive reuse, partnerships, sponsorships, and phased County capital funding.
- The C&D recovery facility and shared site infrastructure will likely require a more structured capital approach that combines County capital planning, bond financing or phased appropriations, avoided disposal savings, recovered commodity revenue, processing fees, and public-private operating agreements.

Table 47: Cost Benchmarks and Funding Strategies by Sustainable Materials Management Complex Component

Complex Component	Relevant Cost Benchmark	Potential Funding Strategy	Funding Rationale
CHaRM and Public Drop-off Center	El Cerrito's approximately $3.5 million two-acre center and Boulder CHaRM's facility-fee and material-specific fee model.	Federal and state recycling grants, County capital funds, user fees, sponsorships, producer responsibility partnerships, and special material handling fees.	Provides high public benefit and visible service expansion, but may need ongoing support for staff, hauling, containers, specialty processing, and shipping of low-value materials.

Complex Component	Relevant Cost Benchmark	Potential Funding Strategy	Funding Rationale
Reusable Building Materials Warehouse	Austin's $4 million SWIFR grant and building acquisition; The Repurpose Project's adaptive reuse and building acquisition model.	Grant funding, adaptive reuse, building acquisition or lease, nonprofit or private reuse partnership, resale revenue, donations, sponsorships, and avoided disposal savings.	Can be phased through an existing warehouse or partner-operated model, with revenue potential from resale but likely need for start-up, staffing, inventory, and facility support.
C&D Recovery Facility	Local avoided disposal costs from reducing C&D landfilling and reuse models that recover materials before disposal.	County capital funds, bond financing or phased appropriations, tipping fee or processing fee revenue, avoided landfill cost savings, commodity revenue, private operator agreements, and design-build-operate procurement.	Has the strongest direct cost-offset potential because it can reduce disposal tonnage, preserve landfill capacity, recover commodities, and support measurable avoided tipping fee benefits.
Environmental Education Center	San Jose's integration of reuse, education, workforce, and sustainability demonstration functions.	County capital funds, philanthropic support, corporate sponsorships, school and university partnerships, environmental education grants, and inclusion within larger facility capital projects.	May not generate major direct revenue, but supports contamination reduction, participation, workforce development, public transparency, and long-term behavior change.
Shared Site Infrastructure	Large-scale recycling and resource recovery examples showing high costs for roads, utilities, stormwater, circulation, site preparation, security, and shared support facilities.	Capital improvement program funding, bond financing, phased appropriations, shared infrastructure cost allocation, grants, and public-private development agreements.	Shared roads, utilities, stormwater, buffers, parking, maintenance, security, and residual staging enable all facility components and should be planned as phased enabling infrastructure.

A practical funding strategy would sequence the development of the Sustainable Materials Management Complex into manageable phases that align capital commitments with demonstrated need, available sites, funding opportunities, operating partnerships, and measurable diversion benefits.

- **Phase 1: Public-facing reuse and diversion hub.** Launch CHaRM operations, reusable materials recovery, education programming, and pilot partnerships using grants, adaptive reuse, County capital funds, sponsorships, and fee-for-service options where appropriate.
- **Phase 2: C&D recovery and shared infrastructure.** Add the C&D recovery facility and expand shared site infrastructure once feedstock, permitting, site design, operating structure, and avoided disposal savings are validated.

- **Phase 3: Optimization and expansion.** Expand processing capacity, reuse operations, education programming, or specialty recovery services based on measured performance, market demand, funding availability, and long-term operating agreements.

This phased funding approach would allow the County to capture early zero waste benefits, demonstrate public value, reduce financial and operational risk, and make larger capital investments only after material flows, regulatory requirements, site constraints, stakeholder partner roles, and long-term cost recovery assumptions are better defined.

This approach would allow the County to begin with visible, lower-risk zero waste infrastructure development while reserving larger capital commitments for facilities with confirmed feedstock, permitting pathways, operating models, and long-term cost recovery potential.

These implementation considerations translate the benchmark examples into practical planning guidance for Miami-Dade County. They highlight how cost, facility scale, operating model, and available partnerships can inform phasing decisions for the development of a Sustainable Materials Management Complex.

Table 48 supports a phased implementation strategy beginning with lower-cost, public-facing reuse and CHaRM development using shared site infrastructure where possible, then advancing higher-cost C&D recovery as feedstock, funding, permitting, and partnerships are confirmed.

Table 48: Benchmark Takeaways Implementation Implications

Key Takeaway	Implication for Miami-Dade County
Reuse and CHaRM-style facilities can be phased at lower cost	The Repurpose Project and Austin Resource Recovery show that reuse operations can begin through building acquisition, grants, adaptive reuse, or partnerships instead of full new construction.
Public drop-off centers still require meaningful capital investment	El Cerrito demonstrates that even a compact two-acre public recycling and reuse center can cost several million dollars once site work, circulation, utilities, covered areas, signage, and sustainability features are included.
Adaptive reuse can reduce cost and accelerate implementation	San José and Resource Depot show the value of converting or using existing spaces for reuse, education, and public-facing sustainability programming.
Operating models matter as much as construction costs	Urban Ore and Boulder CHaRM highlight the importance of ongoing revenue, user fees, salvage service fees, resale activity, staffing, and processing or shipping costs.
Recovery infrastructure should be phased carefully	National investment benchmarks support a phased strategy using grants, County capital planning, public-private partnerships, avoided disposal savings, commodity revenue, and reuse revenue.

Conclusions and Recommended Next Steps

The Sustainable Materials Management Complex would advance Miami-Dade County's Zero Waste Master Plan by co-locating reuse, repair, CHaRM, C&D recovery, education, and shared infrastructure to increase diversion, preserve landfill capacity, and improve resident access to responsible materials management.

For planning purposes, the complex should be carried forward as an approximately 10-acre campus, with a 6-to-13-acre range to be refined based on site conditions, capacity, circulation, buffers, and shared infrastructure opportunities.

Benchmark examples indicate that public-facing reuse and hard-to-recycle facilities can require several million dollars, while adaptive reuse may lower upfront costs. Final cost estimates should be refined through site-specific engineering, phasing, and operating-cost analysis.

To advance the Sustainable Materials Management Complex from conceptual planning to implementation, Miami-Dade County should complete targeted due diligence that confirms facility scale, site requirements, funding feasibility, operating responsibilities, and phasing. Recommended next steps include:

- **Confirm facility scope and performance objectives.** Define the specific functions, target materials, diversion goals, service areas, customer groups, and performance measures for the CHaRM, reusable building materials warehouse, C&D recovery facility, Environmental Education Center, and shared infrastructure.
- **Conduct site screening and feasibility analysis.** Evaluate candidate sites for acreage, access, zoning, utilities, stormwater, buffers, traffic circulation, environmental constraints, compatibility with nearby uses, and opportunities to reuse existing buildings or infrastructure.
- **Refine final size and cost estimates.** Advance the current planning assumption of an approximately 10-acre campus, with a 6-to-13-acre planning range, into a site-specific capital cost estimate that accounts for land conditions, building square footage, circulation, queuing, stormwater, utilities, shared infrastructure, equipment, permitting, contingencies, and phasing.
- **Develop a funding and delivery strategy.** Identify potential grants, County capital funding, bond financing, user fees, avoided disposal savings, commodity revenue, sponsorships, philanthropic support, public-private partnerships, and operator agreements.
- **Evaluate operating models and partnerships.** Determine whether each component should be County-operated, contracted, nonprofit-led, privately operated, or managed through a hybrid partnership model.
- **Advance phased implementation.** Prioritize lower-cost, public-facing uses such as CHaRM, reuse warehousing, education, and pilot partnerships before committing to larger C&D recovery and shared infrastructure investments.