

# Memorandum



**Date:** February 11, 2022

**To:** Honorable Chairman Jose “Pepe” Diaz  
and Members, Board of County Commissioners

Agenda Item No. 2(B)(1)  
June 1, 2022

**From:** Daniella Levine Cava  
Mayor

A handwritten signature in blue ink that reads "Daniella Levine Cava".

**Subject:** Report Evaluating Options for Countywide Recycling After the County’s Current Single-Stream Curbside Recycling Contract Expires in 2023 – Directive 192055

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## **Executive Summary**

On October 3, 2019, the Board of County Commissioners (Board) adopted Resolution No. R-1072-19, which I prime sponsored as then-Commissioner, directing the County Mayor or County Mayor’s designee to evaluate options for countywide recycling after the County’s current single-stream curbside recycling contract (Contract) with Waste Management, Inc. of Florida expires in 2023 and to prepare a report to the Board. As part of my operation to catch up on the backlog of items, we are bringing you reports that were pending from the previous administration. The Resolution requested that the report address the costs, feasibility, environmental impact and recycling rates achieved, comparing a continuation of the current program with other potentially innovative options. It also requested that the report include an examination of potential program costs within the context of the Department of Solid Waste Management’s (DSWM) budget, finances and bond covenants. Lastly, the report was to include program recommendations and an associated timeline with next steps that the Board could undertake in order to ensure continued recycling beyond the expiration of the current contract.

## **Recommendation**

Based on results from the attached study provided by Kessler Consulting, Inc. (KCI), a solid waste consultant that assisted with the production of the report requested in R-1072-19, and strategic planning discussions with DSWM, Private Collection / Processing of Materials, *continuing the outsourcing of recyclables collection to the private sector and allow for the public development and ownership of a new regional Material Recovery Facility (MRF) that is privately operated* proved the most viable option for the County.

At the direction of the Board, DSWM can pursue the best public-private partnership model for procuring the MRF design and construction and initiate the due diligence process on the potential site by performing a preliminary design and probable cost assessment.

## **Background**

In 1990, Miami-Dade County began providing recyclable materials curbside collection service to customers in its Waste Collection Service Area (WCSA). Today, the WCSA includes the Unincorporated Municipal Service Area (UMSA) and nine municipalities: Aventura, Cutler Bay, Doral, Miami Gardens, Miami Lakes, Palmetto Bay, Pinecrest, Sunny Isles Beach and Opa-Locka.

This original effort was a dual-stream program. Residents were provided with two 18-gallon bins, one for paper and a second for glass and plastic bottles and metal cans. These materials were collected manually by a waste collector whose responsibility it was to place the recyclable materials in one of two distinct sections of the collection vehicle and to leave non-program materials in the bins. The onboard material segregation was maintained through the collection and delivery to a

MRF. In 2007, the last year of this method of collection, the program collected more than 31,000 tons of recyclable material.

Beginning in June of 2008, this program was converted to a single-stream program that utilizes 65-gallon carts with automated, rather than manual collection. The new program was provided via contracts with three vendors. Contracts for biweekly curbside collection were established with Coastal Waste & Recycling (formerly World Waste Recycling) and Waste Connections, Inc. A contract was established with Waste Management, Inc. (WMI) to address the processing and marketing of the materials taking place at the WMI MRF. This new single-stream program provides residents with the greater convenience of placing all recyclable materials in a single wheeled, lidded container. It also provides the option of using either a smaller (35-gallon) or a larger (96-gallon) cart. This program accepts paper, metal cans, cartons, cardboard and plastic and glass narrow-necked bottles. The conversion was well-received and nearly 60,000 tons were collected in the first full year of operation.

The one-time option to renew the materials processing and marketing Contract with WMI was exercised in 2015 with a termination date of March 2023. During this renewal, agreed upon efforts were made to curtail contamination. These efforts included educational outreach, recycling contamination abatement through enforcement, and continued periodic audits of the materials collected that have been conducted by a third-party consultant to determine the composition of the incoming stream arriving at the facility. Single-stream recycling composition studies conducted in 2020, 2018, and 2015 have determined that the program has undesirable levels of contamination. The 2020 study determined that the contamination rate was 48.8 percent, a figure that exceeded the results of both the 2018 study (39.7 percent) and 2015 study (28.3 percent) and a national average of 25 percent, according to the Environmental Protection Agency. This rate of contamination, compounded by difficulties in the recyclable materials markets, has impacted the County’s program provider. This was a likely factor in the MRF operator’s decision in August of 2019, to provide advance notice that they would be unable to continue the contract beyond the 2023 termination date. This set of circumstances requires that the County now consider options for the future of its recycling efforts.

### **Changing Market Conditions**

For well over 30 years, China was importing hundreds of millions of tons of recyclable materials from around the world, playing a large role in paper and plastics. This was beneficial because the United States and other countries had vast supplies of recyclable materials that could be exported, while China had the workers available to separate, clean and recycle these materials into a variety of new products. For many years, western countries benefited from China’s tolerance for a highly contaminated stream. Recent changes in Chinese policy concerning recyclable material imports reflect efforts to move China away from activities perceived as low value, low tech and potentially polluting, and towards a more profitable, more high-tech economy.

This policy change was articulated in a series of waste import restrictions announced in July 2017 and implemented in January of 2018. These restrictions included a complete ban on 24 types of solid waste and recyclables as well as a maximum contamination rate of 0.5 percent for all imported material types. As a result of these new restrictions, waste plastic exports to China plummeted by 99.1 percent in 2018 as compared to 2017 while fiber imports dropped by over one-third in the same period. A subsequent analysis of the first quarters of 2017, 2018 and 2019 exports indicated that recovered fiber exports to China continued to do poorly with paper exports down over 55 percent and plastics down over 90 percent. Additionally, the decline in pricing continued into the latter part

of 2019. According to the Northeast Recycling Council, blended prices for a mix of recyclables declined by an additional 24 percent between the 2<sup>nd</sup> and 3<sup>rd</sup> quarters of 2019.

This significant market adjustment has had a dramatic impact on the revenues derived from the sale of the collected materials that many communities rely on to help support their recycling operations. Overall, curbside recycling programs are averaging an approximately 50 percent reduction in revenues. Examples of price declines include mixed paper going from \$88.13 per ton in February of 2017 to negative \$2.50 in February of 2019, while corrugated cardboard went from \$135.31 to \$59.06 in the same period. Layered over pre-existing problems with glass recycling related to contamination, breakage and significant transportation costs due to weight, curbside programs are facing difficulties dealing with marketing of several material types. As an example, Philadelphia’s program went from being paid \$67 per ton of material collected in 2012 to dealing with a bid to pay \$170 per ton collected by early 2018. When faced with these new realities, several cities turned to landfilling or incinerating the materials collected in their recycling programs or simply ending curbside service.

Across the country, jurisdictions have also sought to redesign their programs in order to continue operations. Some actions undertaken include reducing material types, changing collection strategies (up to and including eliminating curbside collection entirely), enhancing educational and/or enforcement efforts and increasing fees to cover increased costs. Some examples include:

- Akron, Ohio stopped collecting glass for recycling (January 2019)
- Fairfax County, Virginia converted glass from curbside collection to drop-off collection (October 2019)
- Fremont, California imposed a \$1.50 monthly fee
- Hoboken, New Jersey converted program to dual stream/alternate day collection (September 2019)
- Jackson, Mississippi ended curbside recycling (September 2019)
- Madison County (Huntsville), Alabama converted from a weekly 18-gallon bin to a (free) subscription-based 95-gallon cart-based monthly collection (August 2019)
- Nevada City, California charges a fee to those receiving multiple recycling contamination violations
- Prince William County, Virginia eliminated glass and some plastics from curbside and made drop-off available for glass (March 2019)
- Surprise, Arizona announced that it would “temporarily divert recyclable materials to the landfill as the city researches cost-effective solutions to mitigate the impacts of increased recycling operational costs”
- Tacoma, Washington ended plastic bag and shredded paper recycling, converted glass to drop-off and began a \$2.82 monthly surcharge to continue the program (October 2019)
- Twin Falls, Idaho reduced materials to cardboard and cans only (October 2019)

Closer to home, municipalities in Florida have been taking similar actions:

- Deerfield Beach, after suspending its curbside collection in early 2018, relaunched its program later that same year
- Deltona suspended curbside recycling collection (February 2019)
- Lake Worth converted from single-stream curbside collection to dual-stream collection, meaning paper in one bin and containers in the second (October 2018)

- Melbourne instituted an intensive cart checking/educational outreach program (August 2018)
- Miami began paying \$85 per ton for processing and marketing of recyclable materials (October 2018)
- Ormond Beach eliminated glass from the curbside program (February 2019)
- Pasco County eliminated glass from its curbside recycling program and permitted haulers to charge an additional \$1.76 per month fee to continue service (June 2019)
- Sunrise began taking the materials collected in its curbside recycling program to a waste-to-energy plant in 2018.

### **DSWM Activities**

In response to Resolution No. R-1072-19, and in furtherance of its goal to complete a plan for continued recycling in a vastly altered market, the DSWM has undertaken the following activities:

- Conducted research into the contamination issue and strategies employed by other jurisdictions to improve recycling performance
- Had an engineering firm conduct a study of the composition of the recyclable materials collected curbside in March 2020.
- Initiated an Expedited Purchasing Program procurement (EPP-RFP) and contracted with Kessler Consulting, Inc., a solid waste consultant to assist with production of the report requested in R-1072-19, namely the evaluation of options (marketability, different innovative recycling options being used elsewhere, comparative costs and environmental benefits/repercussions with each option, considering legally available funds and bond covenants, and recommendations to the Board) for County-Wide recycling after the County’s current single-stream recycling contract ends in 2023. It is the intent of the DSWM to have consultant provide a presentation to the Board on the results of the study.
- Conducted a cart set-out rate study, between January and March 2020. The study, conducted over multiple dates in multiple areas throughout the service area, indicates set-out rates in the range of 44 percent and 77 percent
- Consulted with the Recycling Partnership, a national nonprofit that works with the public and private sector to improve recycling programs
- Consulted with the FIU Metropolitan Center regarding the possibility of a Public Opinion Survey to assess resident’s views on recycling
- Conducting a Recycling Contamination Abatement Program; this consists of tagging and non-servicing of carts containing excessive contamination along with the provision of educational materials to determine the impact on contamination levels (March 2020).
- Initiating the development of an RFP for a Future Curbside Recycling Program. This solicitation will serve as a bridge until a replacement agreement is in place or further direction from the Board is received.
- On December 17, 2021, members of my team and I joined Chairman Diaz on a tour of the Palm Beach County’s Solid Waste Authority’s Waste-to-Energy Plant (REF2). The tour highlighted the benefits of a modern, mass-burn facility. The Solid Waste Authority’s 2015 facility is the last modern waste-to-energy facility built in the United States.

It is the goal of my administration to look into building a replacement waste-to-energy facility that encompasses a sustainable campus inclusive of a modern waste-to-energy facility with the best state-of-the-art proven technology, and a MRF, among other sustainable features.

Honorable Chairman Jose "Pepe" Diaz  
and Members, Board of County Commissioners  
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Should you require additional information, please contact Director Michael J. Fernandez,  
Department of Solid Waste Management, at 305-514-6609.

Per Ordinance No. 14-65, this report shall be placed on the next available Board meeting agenda.

Attachment

c: Geri Bonzon-Keenan, County Attorney  
Gerald Sanchez, First Assistant County Attorney  
Jess McCarty, Executive Assistant County Attorney  
Office of the Mayor Senior Staff  
Michael J. Fernandez, Director, DSWM  
Yinka Majekodunmi, Commission Auditor  
Jennifer Moon, Chief, Office of Policy and Budgetary Affairs  
Melissa Adames, Director, Clerk of the Board  
Eugene Love, Agenda Coordinator



# FINAL REPORT

Recycling Analysis and Program Planning

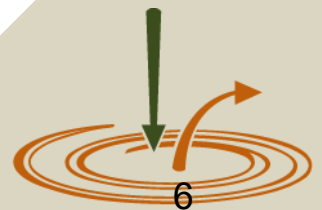
July 2021

## PREPARED FOR

Miami-Dade County  
Department of Solid Waste Management  
2525 NW 62<sup>nd</sup> Street Ste 5100  
Miami, FL 33147

## SUBMITTED BY

Kessler Consulting, Inc.  
*innovative waste solutions*  
14620 N Nebraska Ave, Bldg. D  
Tampa, FL 33613



**kessler consulting inc.**  
innovative waste solutions

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## Purpose of the Analysis and Report

Recycling programs are influenced by many drivers throughout the recovery supply chain. Collection practices, processing technology and commodity markets continuously change, requiring strategic planning to stay current and to ensure continued program viability, as well as cost effectiveness.

On October 3, 2019, the Miami-Dade County (County) Board of Commissioners (Board) passed Resolution R-1072-19 calling for an evaluation of options for County-wide recycling after the County's current single stream recycling processing contract expires on March 30, 2023. This Recycling Analysis and Program Planning Report (Report) presents findings and options the County may consider. It includes long-term collections and processing options, as well the interim alternatives that may prove necessary to bridge services.

### Resolution Components

- Feasibility and Cost of the Current Approach
- Feasibility and Cost of Innovative Options
- Comparison of the Cost Associated with Options
- Financial Analysis
- Benefits and Repercussions of Options
- Recommendations and a Timeline for Next Steps

## Recycling Programs: All Waste is Local

There is no single solution or set of benchmarks that defines a successful recycling program. Policies and market conditions are specific to each community and drive overall structure and success. As the County moves forward in considering the most appropriate scenario *Kessler Consulting, Inc. recommends the Department of Solid Waste Management (DSWM) define overarching policy objectives related to the processing of recyclable materials. Resulting policies and procurement processes can be structured to minimize risks, costs, and guide successful programs whether operations are public or privatized.*

### Current Recycling Collection System

Miami-Dade County currently provides biweekly, single stream recycling collection service through contractual agreements to approximately 350,000 households in the unincorporated county, nine municipalities included in the solid waste service area, and an additional nine municipalities through Interlocal Agreements (ILAs): El Portal, Florida City, Medley, Miami Beach, Miami Springs, North Bay Village, South Miami, Virginia Gardens, and West Miami. The collection contracts commenced in 2008 and were extended per the original agreement for an additional seven-year period (14 years total). They are set to terminate on September 30, 2022 but may be extended for 180 days.

## Current Recyclables Processing

Currently, the County contracts with Waste Management Incorporated (WMI) at their Reuter Recycling Facility in Pembroke Pines, FL for the processing of recyclable materials. This contract is set to expire on March 30, 2023.

## Issues and Challenges

Multiple issues and challenges within the County’s recycling program, as well as general market drivers, were the impetus behind this analysis. Concerns over participation rates with estimations of 50% uncaptured recyclables in the garbage stream,<sup>1</sup> increasing recycling contamination rates, and increasing private sector collection and processing costs are all factors that led to this request for an evaluation of recycling options at the end of the current processing contract.

## Report and Analysis Structure

The assessment conducted under this scope evaluated options for three different components to a recycling program:



In evaluating the viability for options under each of these components, KCI analyzed the financial implications, pros and cons as related to DSWM programming, marketplace viability, and programmatic impacts.

Analysis conducted during this study included projecting household tonnage for three different streams being collected across Miami-Dade County: garbage, trash, and recycling. Utilizing these projections, KCI was able to develop potential future financial impacts and tonnage estimations for recycling program options.

As depicted in Table 1, the baseline and projected material flow reveals the population served by DSWM recycling services will continue to increase if current recovery rates hold. Results

<sup>1</sup> DSWM “2014 Miami-Dade County Solid Waste Master Plan”

from a Waste Composition Study conducted for the 2014 Miami-Dade County Solid Waste Master Plan revealed half of the County’s garbage consists of potentially recyclable materials.<sup>2</sup>





**Table 1: DSWM Single Family Collected Solid Waste Material Projections (2020-2040)**

	2019	2020	2025	2030	2035	2040
<b>Population (Served by DSWM)</b>	886,372	929,749	986,090	1,033,493	1,074,860	1,108,952
<b>Housing Units</b>	339,531	356,147	377,729	395,877	411,733	424,792
<b>Curbside Recyclables (tons)</b>	58,120	60,964	64,659	67,767	70,479	72,715
<b>Curbside Garbage (tons)</b>	523,240	548,846	582,105	610,088	634,508	654,632
<b>Curbside Trash (tons)</b>	130,324	136,702	144,986	151,955	158,038	163,050
<b>Trash &amp; Recycling Centers (TCS) (tons)</b>	150,099	157,444	166,985	175,013	182,018	187,791

Note: KCI waste flow projection models are a function of generation rates times the population. Models were built upon gross tonnage data provided by DSWM and County population projections from the Bureau of Economic and Business Research (BEBR). Tonnage projections are based on current capture rates and do not reflect potential increases in recycling tonnage with program improvements.

## How Is It Done? *Recycling Program Structure*

The approach and method for collecting recyclable materials within a community can influence recycling participation, reduce contamination, and increase recovery within the program. These options define “how” a program could be structured. KCI evaluated the following four potential collection methods that could be employed: *Note: Not applicable to Scenario E.*

			
<b>Single Stream</b> Automated Every Other Week Current Scenario	<b>Dual Stream</b> Automated Every Other Week Split Carts	<b>Dual Stream</b> Automated Weekly Alternating Stream in Carts	<b>Dual Stream</b> Manual Weekly Bins

## Key Findings

A well-designed and implemented single stream collection system can achieve high capture and low contamination rates while providing lower unit costs across the entire recovery system and provide greater return on infrastructure investments. See Section 3 for detailed findings on each option.

<sup>2</sup> DSWM “2014 Miami-Dade County Solid Waste Master Plan”

## Who Does It? *Potential Ownership and Operational Scenarios*

These options define the “who” in how materials are collected and processed. The following five scenarios were evaluated: (See Section 4 for detailed analysis.)

- **Scenario A: Current Scenario Private Collection / Private Processing**  
*Contract recyclables collection and processing to the private sector*
- **Scenario B: DSWM Collection / DSWM Processing**  
*Provide in-house recyclables collection by expanding DSWM collection services and publicly develop and own a new regional Materials Recovery Facility (MRF) that is privately operated.*
- **Scenario C: Private Collection / DSWM Processing**  
*Contract recyclables collection to the private sector and publicly develop and own a new regional MRF that is privately operated.*
- **Scenario D: DSWM Collection / Private Processing**  
*Provide in-house recyclables collection and contract processing to the private sector.*
- **Scenario E: No Source Separation (No Curbside Recycling)**  
*Eliminate the curbside recycling program and send materials to the Resources Recovery Facility (RRF) or publicly develop and own Mixed Waste Processing facilities that are privately operated.*

## Recommended Option

Based upon results from the analysis and strategic planning discussions with DSWM management staff *Scenario C proved the most viable option for the County.*

Implementation of Scenario C will continue the out-sourcing of recyclables collection services to the private sector and allow for the public development and ownership of a new regional MRF that is privately operated.

KCI recommends the County leverage support for development and operations of a new facility from the private sector through public-private partnerships. Siting of the new facility could be on public acreage across from the RRF, fostering a unique DSWM material processing campus. The new facility’s electric consumption may potentially be offset by power generated by the RRF (allowing the new facility to be defined as carbon neutral). This concept supports multiple sustainability and resiliency goals of the Resilient 305 Plan.

## Implementation Plan and Timeline

KCI worked with DSWM management staff to define potential actions for maintaining a recycling program while constructing new capital infrastructure. The guiding principles included actions that would lead to greater program success, fiscal responsibility, and that leveraged existing resources and policies. Recommended interim or bridge actions, while construction of a new facility is completed, are included. However, KCI has assisted other jurisdictions with efficiencies that if applied, may reduce construction time, and allow for

commissioning a new facility prior to the end of the current processing contract. See Section 5 for additional details and a charted timeline.

Potential Actions	Start Date	End Date
<b>Recyclables Collection Services</b>		
1. Meet with collection contractors to determine viability for extending current terms and conditions three years beyond existing contract.	Sep-21	Jan-22
2. If viable, finalize contractual terms for extension of service.	Jan-22	Jan-22
3. If not viable, conduct County's procurement process (RFP) and initiate transition of service.	Jan-22	Sep-22
4. If applicable, bring resulting contract to BCC for approval. (Extension: June 2022 / New Contract: December 2022)	Jun-22	Dec-22
5. Engage WMI regarding viability of short-term, interim processing contract.	Sep-21	Jan-22
6. If viable, bring resulting contract amendment to BCC for approval.	Jan-22	Jan-22
7. Delivery of recyclables will either continue to WMI facility or shift to the RRF.	Apr-23	Apr-23
8. Delivery of recyclables will transition to new MRF.	Jun-26	Jun-26
<b>Recyclables Processing</b>		
1. Board to approve most appropriate model for procuring new MRF and designate internal staff team for project oversight.	Oct-21	Oct-21
2. Select project manager and recycling development consultant to represent County's interest in the development process.	Oct-21	Mar-22
3. Perform due diligence on potential site for new MRF and ensure the viability of creating a DSWM material processing campus. This will include preliminary design and a probable cost assessment of funding options and the selection of an appropriate funding mechanism.	Nov-21	Mar-22
4. Develop conceptual design and programming criteria.	Mar-22	Jul-22
5. Procure Design Build team or Customized Partnership team.	Jul-22	Dec-22
6. Procure MRF operations partner.	Jan-23	Jun-23
7. Design development and BCC approval.	Jun-23	May-24
8. Construction (Required time may be less with CPM efficiencies).	Jun-24	May-26
9. Commissioning and facility start-up.	Jun-26	Jun-26

## Recommended Next Steps

It is recommended the County utilize results from this analysis to define policies that best meet the needs of their community. KCI will work with the DSWM management team to present project findings and the recommended Implementation Plan to the Board. Once a determination has been made to move forward, the County will need to decide on the best public-private partnership model for procuring the MRF design and construction and initiate the due diligence process on the potential site by performing a preliminary design and probable cost assessment.

Additionally, it is recommended the County meet with collection contractors to determine a potential bridge extension. If not viable, a new recyclables collection procurement will need to begin. At the County's request, KCI may offer industry knowledge and technical support on these actions from our extensive procurement and MRF development experience.

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# Section 1

## Introduction

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### 1.1 Purpose

On October 3, 2019, the Miami-Dade County (County) Board of Commissioners (Board) passed Resolution R-1072-19 calling for an evaluation of options for County-wide recycling after the County's current single stream recycling processing contract expires on March 30, 2023. This resolution outlined specific parameters for the County's Department of Solid Waste Management (DSWM) to evaluate due to the rising cost of processing and marketing of recyclable materials.

Miami-Dade County currently provides single stream recycling collection service to approximately 350,000 household in the unincorporated county, nine municipalities included in the solid waste service area, and an additional nine municipalities through Interlocal Agreements (ILAs). Recyclables collection services are contracted with World Waste Recycling and Coastal Waste and Recycling and are set to terminate on September 30, 2022 with a potential 180-day extension. Processing of recyclable materials is contracted with Waste Management Incorporated (WMI). The processing contract terminates on March 30, 2023 with no renewal option.

### 1.2 Report Structure

This Recycling Analysis and Program Planning Report (Report) documents findings from the study related to recycling program options the County may consider. The following provides an overview of each section:

- **Section 2: Current Recycling System**  
*Establishes the baseline of infrastructure and material flow within the current system and includes the issues and challenges that brought about this research.*
- **Section 3: Options for the Recycling Program Structure**  
*Defines the options researched during the analysis and establishes the framework for the collection and processing scenarios that have been evaluated to include recommended supporting policies and programs.*
- **Section 4: Potential Ownership and Operational Scenarios**  
*Summarizes the findings of the study based upon five potential future scenarios for the County's recycling program.*
- **Section 5: Implementation Plan and Next Steps**  
*Provides the recommended scenario and an implementation plan with timeline and next steps the County may consider for their recycling program.*

# Section 2

## Current Recycling System

### 2.1 Material Flow and Generator Overview

Miami-Dade County currently provides an integrated solid waste management system that includes curbside residential services, residential drop off centers, home chemical collection centers, regional transfer stations, a waste-to-energy facility (RRF) and its adjacent ash monofill landfill, and two landfills.

Analysis conducted during this study included developing household tonnage projections for three different streams being collected across Miami-Dade County: garbage, trash, and recycling. These were further divided based upon single family units collected by DSWM, single family units collected by other haulers, multi-family units collected by other haulers, and commercial units collected by other haulers. Utilizing these projections, Kessler Consulting, Inc. (KCI) was able to develop potential future financial impacts and tonnage estimations for recycling program options.

As depicted in Table 1, the baseline and projected material flow reveals the population served by DSWM recycling services will continue to increase if current recovery rates hold. Results from a Waste Composition Study (WCS) conducted for the 2014 Miami-Dade County Solid Waste Master Plan revealed half of the County’s garbage consists of potentially recyclable materials.<sup>3</sup>

**Table 1: DSWM Single Family Collected Solid Waste Material Projections (2020-2040)**

	2019	2020	2025	2030	2035	2040
<b>Population (Served by DSWM)</b>	886,372	929,749	986,090	1,033,493	1,074,860	1,108,952
<b>Housing Units</b>	339,531	356,147	377,729	395,877	411,733	424,792
<b>Curbside Recyclables (tons)</b>	58,120	60,964	64,659	67,767	70,479	72,715
<b>Curbside Garbage (tons)</b>	523,240	548,846	582,105	610,088	634,508	654,632
<b>Curbside Trash (tons)</b>	130,324	136,702	144,986	151,955	158,038	163,050
<b>Trash and Recycling Centers (TRC) (tons)</b>	150,099	157,444	166,985	175,013	182,018	187,791

Note: KCI waste flow projection models are a function of generation rates times the population. Models were built upon gross tonnage data provided by DSWM and County population projections from the Bureau of Economic and Business Research (BEBR).

### 2.2 Recyclable Materials Composition

DSWM currently has underway a WCS. This statistically valid method, along with a Recycling Composition Study (RCS,) can assist a community in identifying the average composition of a

<sup>3</sup> DSWM “2014 Miami-Dade County Solid Waste Master Plan”

community's waste and recyclables stream. Different sorting methods and material definitions can yield very different results.

KCI recommends that the best results for a community come from having a clear definition on what is a contaminant and calculating contamination on materials before they become aggregated with materials at the facility (on inbound loads). This ensures that only the composition for that jurisdiction is calculated.

In addition, a County managed RCS will provide greater accuracy of the percentage of designated materials being processed, as well as detailed insight into the types of contaminants that can be used for cart tagging and other outreach programming.

The 2014 Miami-Dade County Solid Waste Master Plan and planning process included performing a WCS and RCS. Results of these studies exceed a five-year window and are not recommended for accurately understanding the current composition of recyclable materials. It is important to note, an RCS was conducted in 2020 by WMI, DSWM's current recycling processor. Results from this study indicated a 20% increase in contamination rates since 2015 to 48.8%. As stated above, different sorting methods and material definitions can lead to different results. Only in rare instances has KCI noted this scale of contamination. Thus, to obtain an accurate assessment of all materials within their system, it is recommended DSWM consider conducting a County-managed RCS prior to the construction of a new processing facility.

**Figure 1: Example Waste Composition Study**



Source: Recent KCI composition study fieldwork

## 2.3 Policies and Programs

Miami-Dade County has operated a recycling program since 1990, continuing to evolve the overall program as technology and market conditions change. Current programming and policies can be broken down into the sections identified below.

### Designated Program Recyclables

Program Recyclables designated in current collection and processing contracts are identified in Table 2. These were initially defined in contract 545B between Miami-Dade County and WMI. According to recyclable commodity estimations, removal of certain materials may impact the revenue stream of recyclable materials and result in significant impacts on contamination. As discussed further in Section 3, common recyclables being removed by jurisdictions are glass and mixed paper due to their lower value and frequent designation as a contaminant or

residue, as well as plastics #3-#7 due to their significant impact on contamination and minimal impact on tonnage. (See Appendix B.)

**Table 2: DSWM Designated Program Recyclables**

List of Recyclable Materials	
Aluminum food and beverage containers	Plastics #3-#7 (narrow neck and screw top)
Glass food and beverage containers (brown, clear, green)	Mixed residential paper:
Ferrous (iron) cans	<ul style="list-style-type: none"> <li>• Newsprint</li> <li>• Old, corrugated cardboard</li> <li>• Magazines</li> <li>• Catalogs</li> <li>• Cereal boxes</li> <li>• Telephone books</li> <li>• Printer paper</li> <li>• Copier paper</li> <li>• Mail</li> <li>• All other office paper without wax liners</li> </ul>
PET plastics #1 (narrow neck only)	
HDPE natural plastics #2 (narrow neck only)	
HDPE color plastics #2 (narrow neck only)	
Aseptic containers (gabled top cartons)	
<p>* All glass containers and cans must be empty and free of metal caps and rings and contain less than 5% food debris.</p> <p>* All Aerosol cans must have less than 5% content.</p> <p>* All plastic containers must be empty, have their caps removed and contain less than 5% food debris.</p> <p>* All fiber must be dry and free of food debris or other contamination.</p>	

Source: Miami-Dade County / WMI Contract No. 545B Attachment 2 to Appendix A.

## Education and Outreach

DSWM currently provides a residential and multi-family recycling awareness campaign in three languages centered on the single stream system. Printed and online media platforms are utilized as outreach tools. Materials are comprehensive and address accepted materials, set-out procedures, and collection days. Customer feedback is received via phone, email, customer surveys, a 311 Contact Center, through a website portal, phone apps, letters, as well as email correspondence. Additionally, outreach has included pilot projects for cart tagging on contamination awareness. Code enforcement officers canvas neighborhoods to ensure residents, business owners, private haulers and recyclers comply with waste management rules outlined in Chapter 15 of the County Code.

## Neighborhood Trash and Recycling Centers

DSWM operates thirteen drop off centers, known as Neighborhood Trash and Recycling Centers (TRCs). Residents may drop off household trash, tree and yard waste (small landscapers have access), white goods, and up to three cubic yards of construction and demolition (C&D) debris at the TRCs. Certain centers also accept additional items and household hazardous wastes such as used oil and electronics. All TRCs accept materials Monday through Sunday from 7:00am to 5:30pm. Centers and their locations are presented in Table 3. Currently, two Home Chemical Collection Centers (NW 58 Street Operations Center and the South Dade Landfill) offer free and safe disposal for motor oil, household paints, pesticides, batteries, and fluorescent bulbs for residential use only.

*Note: Transport services from TRCs are provided under a combination of DSWM trucks and private contractors.*

**Table 3: DSWM Neighborhood Trash and Recycling Centers**

Name	Location
Chapman Field Trash and Recycling Center	13600 Old Cutler Road Coral Gables, FL 33158
Eureka Drive Trash and Recycling Center	9401 SW 184th Street Palmetto Bay, FL 33157
Golden Glades Trash and Recycling Center	140 NW 160th Street Miami, FL 33169
Moody Drive Trash and Recycling Center	12970 SW 268th Street Homestead, FL 33032
North Dade Trash and Recycling Center	21500 NW 47th Avenue Opa-locka, FL 33055
Norwood Trash and Recycling Center	19901 NW 7th Avenue Miami Gardens, FL 33169
Palm Springs North Trash and Recycling Center	7870 NW 178th Street Hialeah, FL 33015
Richmond Heights Trash and Recycling Center	14050 Boggs Drive Miami, FL 33176
Snapper Creek Trash and Recycling Center	2200 SW 117th Avenue Miami, FL 33165
South Miami Heights Trash and Recycling Center	20800 SW 117th Court Miami, FL 33177
Sunset Kendall Trash and Recycling Center	8000 SW 107th Avenue Miami, FL 33173
West Little River Trash and Recycling Center	1830 NW 79th Street Miami, FL 33147
West Perrine Trash and Recycling Center	16651 SW 107th Avenue Miami, FL 33157

## 2.4 Recyclables Collection System

In June 2008, the residential recycling collection program for the County transitioned from dual stream to a single stream system. It currently provides curbside recycling service to approximately 350,000 households in the unincorporated county, nine municipalities included in the solid waste service area, and an additional nine municipalities through ILAs (El Portal, Florida City, Medley, Miami Beach, Miami Springs, North Bay Village, South Miami, Virginia Gardens, and West Miami). As stated in Section 1, this service is provided through contractual agreements with World Waste Recycling and Coastal Waste and Recycling. Contracts are set to terminate on September 30, 2022 with a potential 180-day extension. *Note: A limited number of customers receive weekly single stream service in two 18-gallon bins rather than every other week automated wheeled cart service.*

Multi-family recycling is mandated by ordinance. Collections are provided by permitted haulers through an open market system. Property owners and condominium associations are

required to provide a recycling program for their residents. Penalties for non-compliance include fines ranging from \$300 - \$950, assessed daily until compliance is met.

## 2.5 Recyclables Processing

DSWM currently contracts with the private sector for the processing of recyclable materials with WMI at the Waste Management Reuters Recycling Facility in Pembroke Pines, FL. The processing contract terminates on March 30, 2023 with no renewal option.

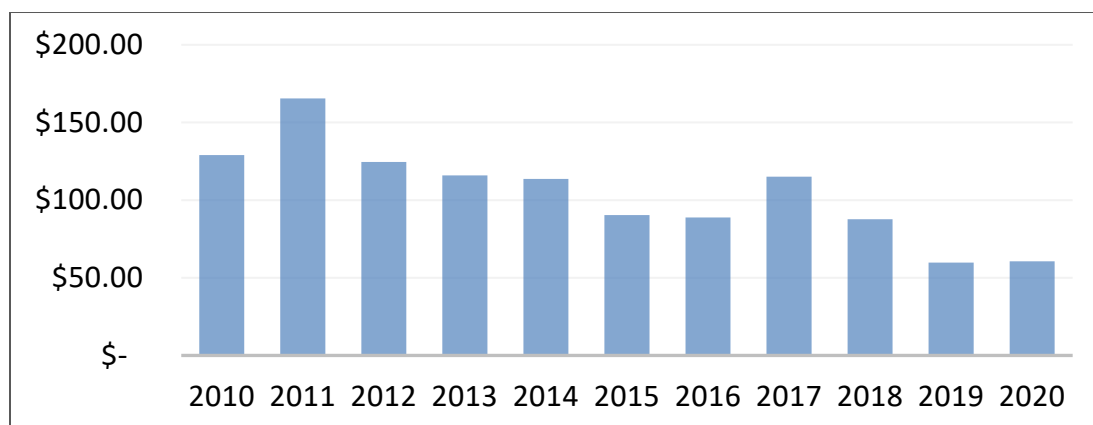
## 2.6 Current Issues and Challenges

### Market Drivers

Markets for recyclable materials are influenced by many drivers throughout the recovery supply chain. General drivers include the intrinsic value of raw materials used to manufacture products and packaging, the supply-demand balance, the relative health of domestic and international economies, ability to meet market specifications, and the prevailing costs of solid waste management. In addition, markets for each recyclable material can be influenced by specific drivers unique to that material, such as export demand, seasonal fluctuations, operating rates, inventories at manufacturing facilities, and COVID-19 global shifts.

Communities like Miami-Dade whose contracts were established when commodity values were high and when overseas markets accepted lower quality materials, are now seeing higher tip fees and more stringent contamination standards when they rebid. As depicted in Figure 2, the Average Market Value (AMV) of commodities has declined by \$100 per ton since a high point in 2011. Contractual agreements that were defined when commodity values were high are proving inadequate for providing sustainable partnerships in the current climate.

**Figure 2: Average Market Value (AMV) Trend 2010 - 2020**



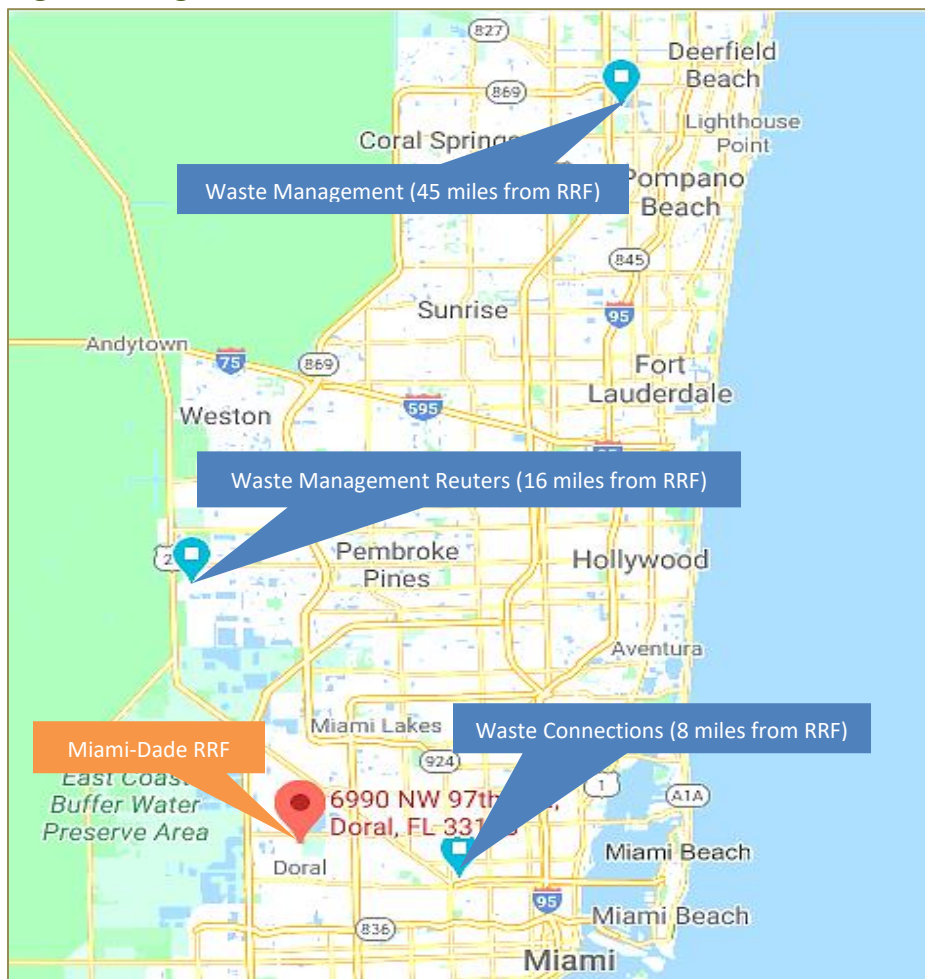
Note: Prices based on a composition conducted in September 2020 for a major metropolitan county in the Southeast US using the first published monthly average index prices for the Southeast US from recyclingmarkets.net.



## Limited Recyclables Processing Capacity

Currently, there are three privately operated single stream Material Recovery Facilities (MRFs) within the region as seen in Figure 3. Collection and transport of recyclable materials for processing remains an important factor in understanding the cost effectiveness of a recycling program. Of the three facilities identified in Figure 3, only two are located within a practical distance to the Resources Recovery Facility (RRF) for processing DSWM materials. *Note: RRF selected to represent a central countywide delivery location.*

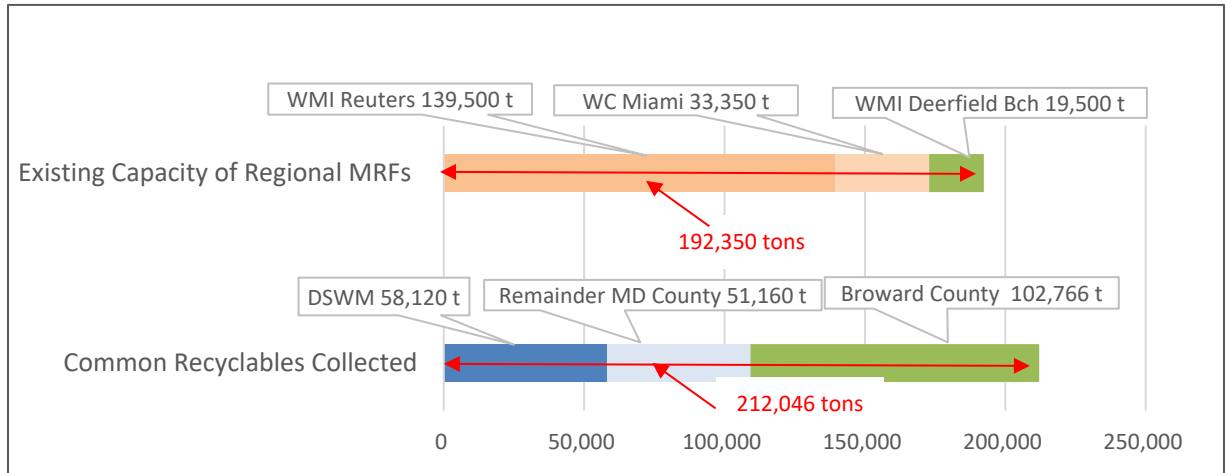
**Figure 3: Regional MRF Facilities**



Based on Florida Department of Environmental Protection (FDEP) Annual Reports, regional collection estimates in 2019 for curbside recyclable materials totaled 212,046 tons. This tonnage includes DSWM and non-DSWM program tonnage in the County, as well as tonnage from neighboring Broward County due to WMI Reuters serving as their primary processor. The regional estimated processing capacity is 192,350 tons per year, as further defined in Figure 4. This capacity remains limited due to the regional nature of the WMI Reuters facility, which serves as a primary processor for recycling tonnage brought from other jurisdictions and

private haulers throughout south Florida. *Note: WMI Reuters is the primary processor but not the only one for Broward County. This accounts for the difference in tonnage.*

**Figure 4: Regional Tonnages and Processing Capacities in Fiscal Year 2019**



Sources: MRF tonnage capacities based upon facility design. Curbside recyclables tonnage calculated by population and average household generation rates and data provided through the 2019 FDEP Annual Report based on all sources of paper and containers typically included in curbside programs.

### Low Performing Single Stream System

In addition to a shifting marketplace, the County is also challenged by a poor functioning single stream collection system. Key findings during this study revealed the opportunity to improve capture rates and lower contamination rates.<sup>4</sup> Household recyclable material collected through the DSWM program averages 342 pounds per household per year.<sup>5</sup> According to data collected through KCI, common national capture rates for communities with similar demographics to the County range from 350 to 400 pounds per household per year with contamination rates ranging from 15% to 30%.

Fluctuations in waste generation and recycling is common for jurisdictions. Influencing factors on the County’s recycling rates can include the economy, changes in consumer habits, changes in product packaging, complacency, and changes in FDEP’s recycling reporting requirements. *Note: The average pounds per household reflect all materials collected and do not account for contamination rates. Nationally, campaigns to increase these capture rates are underway. COVID-19 concerns have impacted initiatives.*

<sup>4</sup> KCI recommends rates be verified by a more reliable WCS and RCS analysis.

<sup>5</sup> Calculation based on KCI modeling from DSWM provided data.



# Section 3

## Options for the Recycling Program Structure

The following section identifies options the County may consider to improve recycling participation, reduce contamination, and increase recovery within the program. These options define “how” a program could be structured and may be applied to all scenarios presented in Section 4 that utilize a curbside collection program.

### 3.1 Collection Approach and Method

KCI evaluated the following four potential collection methods that could be employed. Findings for each method are presented below. They include advantages and disadvantages, the infrastructure impact to DSWM, and the potential impact to recycling recovery rates for the County. It is important to note, the right approach and method for collection for one community may not be appropriate for another. Thus, it remains important to consider specific factors related to Miami-Dade County.

#### 3.1.1 Single Stream – Automated / Every Other Week

*Current Scenario – Requires single stream MRF processing.*

This is the current method and collection frequency utilized by the DSWM residential curbside recycling program, as seen in Figure 5. Under this approach, all residential curbside recyclable materials are collected and processed through one input stream. Advantages to this approach are known throughout the industry. Single stream systems increase tonnage capture rates as compared to dual stream bin systems. According to a study released in 2020, cart-based programs captured an estimated median of 28% more recyclables than those utilizing bins.<sup>6</sup> The larger volume of the carts and ease of customer use allows for an increase of materials.

Utilizing a frequency of every other week reduces fuel costs, environmental impacts, maintenance, and overtime labor costs. However, it should be noted, collection efficiency is directly impacted by the set-out rate (*how often carts are set-out*) and weight per set-out (*how much each cart weighs when set-out*).

Key findings during this study to improve the recycling program revealed the opportunity to improve capture rates and lower contamination rates.<sup>7</sup> Many comparable counties have much lower contamination than rates reported for the

**Figure 5: Single Stream Curbside**



<sup>6</sup> The Recycling Partnership, “2020 State of Curbside Recycling Report”

<sup>7</sup> KCI recommends rate be verified by a more reliable analysis.

County in the 2020 WMI RCS. As stated in Section 2, KCI recommends the County conduct a County-managed RCS prior to construction of a new processing facility.

Recent concerns over contamination in single stream systems have led to an interest in alternative approaches to collecting recyclable materials and the consideration of returning to a dual stream system where fibers and containers are separated. The advantages and disadvantages remain specific to each jurisdiction.

Since the County is considering the option of new processing infrastructure, it should be noted that newly designed state-of-the-art facilities allow for a range of technological innovations that focus on efficient sortation and contaminant removal. These are designed to target the material needs of each community to maximize recovery rates and increase commodity outputs. Integrating these single stream facility advances with targeted outreach tagging and non-pick-up campaigns would reduce contamination and improve commodity revenues.

### 3.1.2 Dual Stream – Automated / Biweekly / Split Carts

*Requires dual stream MRF processing.*

Split cart collection systems were designed to integrate the user-friendly benefits of automated, cart collection with the advantage of reduced contamination rates common in dual stream systems. They face many technical problems. Division of carts into an even 50-50 split does not accommodate larger materials like cardboard, as seen in Figure 6. Additionally, non-even splits prove extremely difficult during collection into a split body fleet. The required split body fleet for an automated dual stream averages \$16,000 to \$25,000 more per truck and may increase bid rates if contracted or increase operational costs if integrated into DSWM services and requires the retooling of existing carts.

**Figure 6: Dual Stream Split Cart**



While these systems are a relatively new collection method, recent studies from communities implementing an automated dual stream system revealed a 10% average reduction rate in contamination as compared to a single stream automated system.<sup>8</sup> However, it is important to note these studies do not account for the increase in education and outreach during the program transition. The Recycling Partnership has conducted several studies that demonstrate a 30% or more reduction in contamination resulting from an effective monitoring and education program without any other system changes.<sup>9</sup>

A key finding from this evaluation revealed that if the County were to collect dual stream, it would still be processed as single stream and assessed by the same contamination standards. Currently, no dual stream MRF operates in south Florida. As the County considers a new

<sup>8</sup> SWANA, “Curbside Recycling Collection Options” 2020

<sup>9</sup> Resource Recycling, “Start at the Cart” March 2018

processing facility, dual stream may be considered. If the County were to pursue this option, all tonnage accepted into the facility must be separated between fibers and containers. Within the County no communities collect recyclables under a dual stream system. DSWM currently provides single stream residential collection service through ILAs with multiple jurisdictions. Converting to dual stream would require the political and public support of these communities.

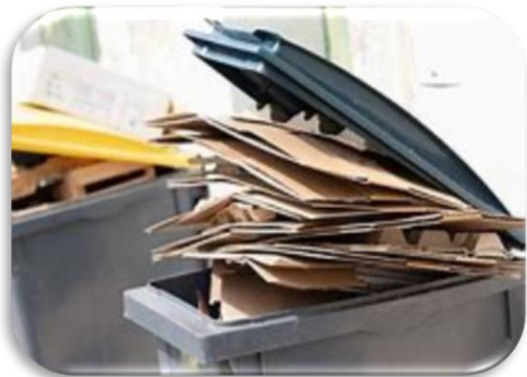
Additionally, if the County seeks to develop a publicly owned MRF and accept tonnage from commercial collectors or other jurisdictions to increase revenue and offset expenditures, materials will need to be separated or processing lines must be designed with the capability to accept separated batches of fiber and container materials (batch mode) on a single line, decreasing efficiency. This may limit potential regional options for processing materials.

### 3.1.3 Dual Stream – Automated / Weekly

*Alternating Fiber and Containers – Requires dual stream MRF processing.*

If the County determines a dual stream facility in their best interest, another method for collection is alternating automated weekly service, as seen in Figure 7. This system Under this system, recycling collections would rotate. One week, fibers would be collected, and the following week containers. This method requires no split body fleet but does warrant the purchase (and customer storage) of two recycling carts rather than one. Success under this method of collection relies on an extensive outreach campaign and public support. Case studies remain limited to small jurisdictions that do not service 350,000 households. As noted above, converting to dual stream would require political and public buy-in of all communities to ensure processing tonnage needs are met.

**Figure 7: Dual Stream Alternating Carts**

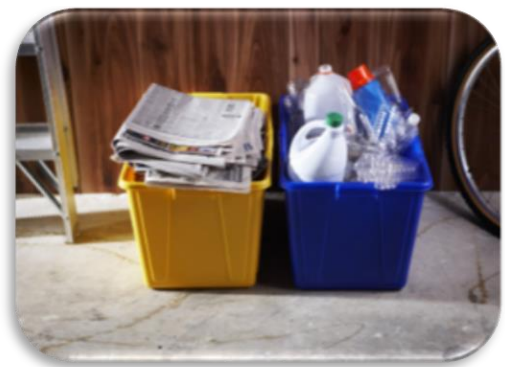


### 3.1.4 Dual Stream – Manual / Weekly

*Requires dual stream MRF processing.*

This option was the original curbside recyclables collection system in the County in 2008. As seen in Figure 8, two 18-gallon bins, one collecting fibers and the other containers, are placed curbside, and manually emptied into trucks. Transitioning to a manual, dual stream system requires two staff per vehicle and increases liability concerns. While this system is known for reduced contamination and higher commodity values, the overall tonnage of collected recyclable

**Figure 8: Dual Stream Bins**



materials is less. It should be noted that transitioning 350,000 households to a dual stream manual, weekly model from the current automated every-other-week system will require significant staffing, operational, and outreach changes. These will need to be made whether services are provided through private contractors or by DSWM. Private sector interest in this type of collection is minimal due to high costs and increased liability.

## 3.2 Processing Approach and Method

KCI analyzed three different approaches the County may consider for managing their recyclables. These are presented below with advantages and disadvantages. *Note: To accurately reflect considerations for the full program scenario, financial and material flow impacts, as well as market viability, procurement processes and potential interim needs are provided in Section 4.*

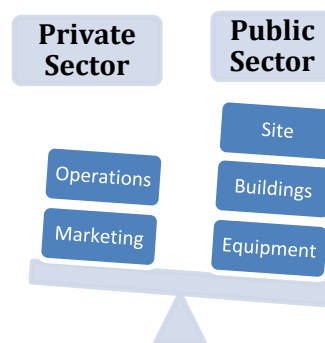
### 3.2.1 Privately Owned and Operated Processing

This approach for private ownership and operations for a MRF is commonly referred to as a merchant facility with choices being limited to what the market is willing to provide. As presented and further discussed in Section 2.6, the County is currently limited to three potential contractors for processing recyclable materials. Additionally, facility design and processing capacity remain critical for identifying potential future contractors and their ability to meet service needs.

### 3.2.2 Public Owned Processing with Potential Private Partner

A publicly owned MRF provides greater flexibility and control in processing recyclables. It can be designed where a jurisdiction builds, controls, and operates the facility or can be designed to leverage private sector industry experience to mitigate portions of the responsibility. Based on KCI's experience and industry knowledge, common partnership structures are based on five different categories to design-build-own-operate as broken down in Figure 9. In this example the public sector provides for the site, necessary buildings, and equipment while the private sector can leverage their expertise on operations and marketing of material.

**Figure 9: An Example of Balancing MRF Public-Private Partnerships**



There are multiple regional MRF facilities currently operating under a public-private structure best suited for their needs. Table 4 presents five of these MRFs and the different ownership and operational structures currently in place. It is important to note that over time, contractual terms and partners will evolve to meet the changing processing needs of a community.

**Table 4: Current Public Sector Regional Facilities**

	Solid Waste Authority Palm Beach, FL	Lee County, FL	Mecklenburg County, NC	Charleston County, SC	Emerald Coast Utilities Authority, FL
<b>Site</b>	Public	Public	Public	Public	Public
<b>Building</b>	Public	Public	Public	Public	Public
<b>Equipment</b>	Public	Public	Public	Public	Public
<b>Operations</b>	Private	Private	Private	Private	Public
<b>Marketing</b>	Public	Private	Private	Private	Public

Source: KCI database of existing public sector regional MRFs.

### 3.2.3 No Curbside Collection Program

To provide an exhaustive list of options for the County to consider, KCI also evaluated the elimination of the residential curbside collection program. Since DSWM currently provides garbage and trash collection services, these options would require no separate collection contract nor public collection method of recyclable materials. The following two potential methods were considered.

#### Miami-Dade Resources Recovery Facility (RRF)

Under this approach, all or a designated portion of garbage would be sent to the RRF for recovery and energy generation. As discussed further in Section 4.5, KCI did not identify this as the most viable option for the County due to the need for significant capital improvements for short-term operations and required new infrastructure capital costs for any long-term use.

#### Mixed Waste Processing (MWP) Facility

As with an MRF, a MWP facility could be designed to process all or a portion of DSWM’s garbage before being either sent to the RRF or landfill for disposal. No MWP facility currently exists in south Florida and no private sector interest in this type of infrastructure is foreseen. Attempts in recent years to develop and operate MWP facilities in the eastern U.S. have faced numerous challenges. Top among them is the need for policy directives such as material bans and mandates, as well as higher disposal fees that make it more feasible to justify high operating costs.



## 3.3 Supporting Policies, Programs, and Innovations

During this analysis KCI identified supporting policies, programs, and innovations the County may consider during program implementation. Overall results from a thorough review of these options indicate the need for an incremental approach to improving the recycling program. Initial focus may be on increased outreach and education in coordination with cart monitoring to measure impacts on capture rates and contamination. The importance of an updated Waste and Recycling Composition Study was also identified.

### 3.3.1 Recyclables Collection

#### *Perform a Waste Composition Study and Recycling Composition Study.*

Composition studies are a statistically valid method for identifying the average composition of a community's waste and recyclables stream. Different sorting methods and material definitions can yield very different results. In 2020, HDR was retained by DSWM to perform an RCS. Results indicated a 20% increase in contamination rates since 2015 to 48.8%. Only in rare samples has KCI noted this scale of contamination.

KCI recommends that the best results for a community come from calculating contamination on materials before they become aggregated with materials at the facility (on inbound loads) and having a clear definition on what is a contaminant. This ensures that only the composition for that jurisdiction is calculated. In addition, a

County managed RCS will provide greater accuracy of the percentage of designated materials being processed, as well as detailed insight into the types of contaminants that can be used for cart tagging and other outreach programming. If the County seeks to continue processing recyclables through a private contractor (or private operator of a public facility), a clear understanding of the material composition being delivered to the facility will strengthen contractual terms and ensure more equitable pricing. Contractual terms can also reflect performance standards that protect the quality and integrity of recyclables.

RCS results may be linked within contractual terms to ensure greater accuracy in contamination rates, revenues, and resulting processing fees. If linked to contractual pricing terms it is recommended to include a provision for conducting a new RCS every two to three years or at the public's request.

KCI understands that prior to COVID-19, DSWM was initiating a WCS and it is recommended this continue at the conclusion of COVID-19 concerns.

**Figure 10: WCS Sorting Event**



Source: Recent KCI composition study fieldwork

### *Modify list of Designated Recyclables.*

According to recyclable commodity estimations, removal of certain materials may impact the revenue stream of recyclable materials and result in significant impacts on contamination. Common recyclables being removed by jurisdictions are glass and mixed paper due to their lower value and frequent designation as a contaminant or residue, as well as plastics #3-#7 due to their significant impact on contamination and minimal impact on tonnage. As stated earlier, it is important to note that construction of any new facility can include advanced automated sorting technologies designed to target materials with higher commodity values. See Appendix B for further information on market impacts on specific recyclable materials.

### *Opt-In Option: Implement online residential recycling subscription system.*

This innovative behavioral change tool is being utilized by some jurisdictions to reduce contamination. It allows for households and commercial units to elect for recycling and only receive a recycling cart after registration. According to The Recycling Partnership “2020 State of Curbside Recycling Report” requiring households to opt-in to a curbside recycling collection program rather than offering it as a universal service significantly reduces material capture by a median of almost 170 pounds per household annually.<sup>10</sup> In relation, DSWM averaged 342 pounds of recyclables per household in 2019. While exact impacts if the County were to implement an opt-in system are unknown, results from this report and surveys indicate a likely decrease in the capture of material.

Whether private or public processing, the decrease of recyclable materials has negative implications for the County. In private processing, increased, high quality tonnages equate to better revenue shares and a reduced cost per ton. If DSWM invests in new MRF infrastructure increased tonnages will increase the public sector’s Return On Investment (ROI) and public perceptions. Programmatic goals should focus on the increase of capture rates and producing a higher quality material.

### *Require universal recycling services to multi-family and commercial accounts for a uniform system.*

Recyclable materials being collected across the County are not the same. Creating uniformity eliminates confusion and reduces the potential for “wish cycling,” resulting in lower contamination rates, increased participation, and greater commodity revenues. While this may be a challenge with multiple jurisdictions serviced through ILAs, DSWM should evaluate methods to realistically enforce mandatory multi-family and commercial recycling requirements.

### *Implement Pilot Projects to explore viability of program alternatives.*

Pilot projects can be a viable method for testing program alternatives. Any contractual agreement for collection or processing should include the provision to allow for County defined pilot projects that improve the recycling rate and commodity value of materials. However, it should be noted that adequate data and policy directives should serve as drivers for any pilot project (e.g., separate organics collection).

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<sup>10</sup> The Recycling Partnership, “2020 State of Curbside Recycling Report”

### 3.3.2 Outreach and Education (O&E)

#### *Ensure program uniformity of Designated Recyclables.*

After the County considers and finalizes any modifications to their Designated Recyclables, it is important to ensure uniformity between the list of recyclable materials utilized for outreach and those defined within the Solid Waste Ordinance and processing contracts. This will allow for accurate accounting for the materials in contractual terms and help reduce contamination by making sure all O&E programming are uniform.

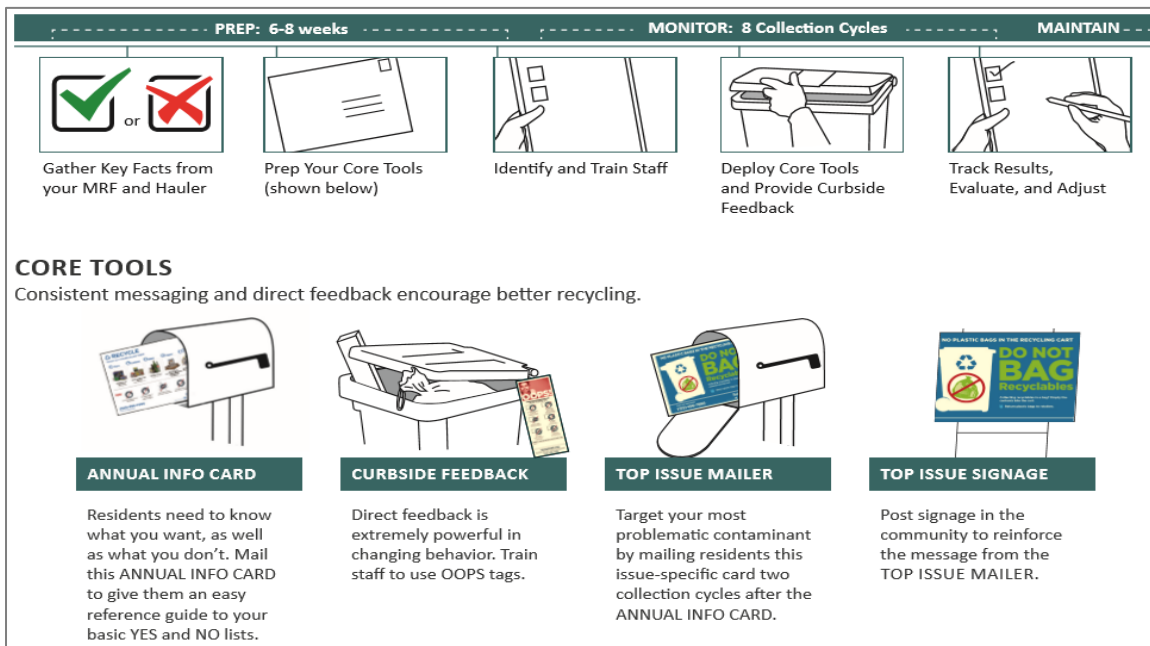
#### *Implement contamination enforcement measures.*

DSWM has identified high contamination routes in their 2020 Cart Tagging Survey. Targeting these areas and tracking results may assist in increasing education and reducing overall contamination. Progressive education and enforcement can be implemented under a carrot and stick approach. This may include fines and cart removal for repeated contamination. This measure is best utilized in coordination with an O&E campaign to push for quality at the curb. Implementation of enforcement measures may require policy changes and will require political support.

#### *Structure O&E campaign to push for quality at the curb.*

Utilization of multiple education tools available through The Recycling Partnership for cart inspections, tagging and removal may help the County to close the feedback loop and foster behavioral change. Consistently, recovery rates within the industry mirror the level of recycling O&E being performed. The Recycling Partnership has developed the “Anti-Contamination Recycling Kit” as seen in Figure 11.

**Figure 11: The Recycling Partnership Anti-Contamination Recycling Kit**



Source: The Recycling Partnership “Anti-Contamination Recycling Kit”



The complete toolkit may be downloaded at <https://recyclingpartnership.org/contamination-kit/>. This step-by-step guide provides outreach and metric tools to assist jurisdictions in educating consumers, as well as working in partnership with private collectors and processors.

*Ensure future RCS or audits utilize contractual Designated Recyclables material categories.*

The matching of categories is vital in understanding contamination rates, residue rates and potential areas for improvement in an O&E campaign.

### 3.3.3 Contractual Agreements

*Separate Collections and Processing Contracts.*

KCI recommends continued separation of procurement processes and agreements for the collection of solid waste and recyclable materials and recyclables processing. This allows greater program control over material flow and provides greater transparency in pricing. This may not be viable for all jurisdictions, however, within Miami-Dade County it is recommended these contracts be separated to increase competition and provide more transparency in collection service bid pricing.

*Utilize Best Practices in Contractual Agreements – Address Florida Legislative Requirements (HB73)*

Clearly defined contractual terms for the collection and processing of recyclable materials are key to developing transparent, win-win partnerships. These include utilizing clear definitions for key terms such as contamination, rejects, residue, recyclables, and recovered materials. This will assist DSWM in not only meeting HB73 legislative requirements but result in defining boundaries for an equitable and transparent pricing structure.

*Include Fleet Technology Requirements to Reduce Contamination.*

Requiring certain vehicle technology can help track contamination sources and ensure proper handling of collected materials. These include vehicle tracking and service verification software and hopper monitoring cameras linked to real-time monitoring platforms.

*Structure collections and processing contracts to allow for pilot projects.*

As the County identifies appropriate methods for improving the recycling program, pilot projects may prove vital before launching broad scale modifications. Including this provision within any future contractual terms will allow DSWM the flexibility to implement program innovations to increase recovery rates.

*Establish a compensation structure that allows contractors to realize the financial benefits for service improvements that lead to reduced contamination rates.*

Data to support this compensation structure may be gathered through cart monitoring and tagging programs. As described under Outreach and Education, The Recycling Partnership's "Anti-Contamination Recycling Kit" may assist DSWM in enhancing their cart monitoring and tagging program.

*Establish compensation structure that provides performance bonuses tied to service performance.*

Within contractual agreements for recyclables collection and processing, the compensation structure may be linked to performance bonuses. These may include increased efficiency, reduced contamination rates, or avoided disposal fees.

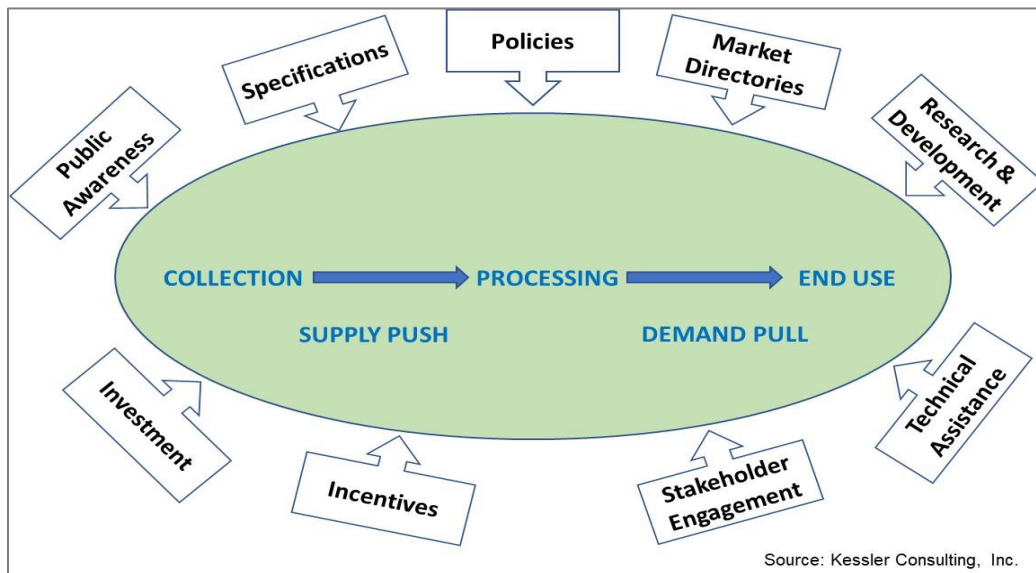
### 3.3.4 Policy Drivers

The public sector can implement policies and take actions to influence recycled commodity markets. These drivers can be broadly categorized as supply drivers and demand drivers. Recycling goals, recycling mandates, disposal bans, and public awareness are examples of supply drivers. These public policies and programs can boost the supply of recovered materials, which in turn can impact the supply-demand balance, medium-term market prices, and long-term investment in demand capacity.

Policy investment demand drivers (i.e., market development efforts) include research and development of new product or packaging applications, recycled infrastructure investment incentives, standardization of commodity specifications, and technical assistance to recycled commodity consumers. All have the goals of expanding existing markets and creating new markets for recycled commodities. Government agencies are major buyers of products and Environmentally Preferable Purchasing programs also help drive demand.

In aggregate, the public sector can utilize a comprehensive “toolbox” to facilitate markets for recycled commodities as seen in Figure 12. The current analysis focuses primarily on supply drivers, but demand drivers are equally important, especially for commodities with limited end-use markets.

**Figure 12: Public Sector “Tools” to Enhance Supply and Demand for Recycled Materials**



# Section 4

## Potential Ownership and Operational Scenarios

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Recycling program options presented in Section 3 were utilized to develop scenarios for how the County may structure their program after the expiration of contractual terms for collection and processing services. The following five potential ownership and operation scenarios were evaluated. (See Appendix A: *Scenario Options Matrix* for a tabular summary.)

There is no single solution or set of benchmarks that defines a successful recycling program. Policies and market conditions are specific to each community and drive overall structure and success. As the County moves forward in considering the most appropriate scenario, KCI recommends DSWM define overarching policy objectives for partnering with the private sector. *Resulting policies and procurement processes can be structured to minimize risks, costs, and guide successful programs whether operations are public or privatized.*

### 4.1 Scenario A: Current Scenario

#### Private Collection / Private Processing (Private/Private)

*Description:* Scenario A relies on contractual arrangements with the private sector for providing both the collection and processing of recyclable materials. Currently, the recycling program operates under this privatized service model. As discussed in Section 2.6, multiple issues and challenges within the current marketplace were the impetus behind this analysis.

*Key Findings:*

- Limited recyclables processing capacity at private MRFs within the region.
- No private sector interest foreseen in building new infrastructure.

*Financial Summary:*

- WMI has stated they will not continue providing services once the current contract terminates. The cost of processing recyclables will increase.
- Commodity markets have impacted pricing for municipalities.
- The procurement process is the only way to accurately identify potential increases.

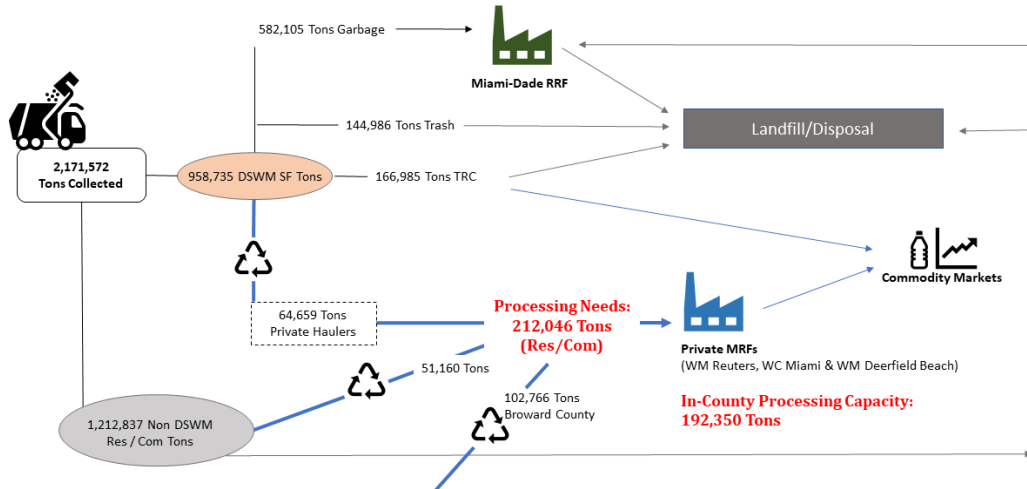
*Sustainability and Resilience Assessment:*

- Recycling is a known strategy for managing waste and a sustainable method for protecting natural resources through reduced resource extraction, as well as water and energy consumption that directly impact climate change. It is not recommended the County eliminate the program and due to private sector processing capacity, Scenario A cannot support the program in the long-term.
- Objective 6 of the Resilient 305 Strategy calls for cultivating financial stability. Currently the open market for processing recyclables in the region is driven by private sector pricing and commodity demand. It does not meet Action 57 to leverage the power of purchasing.

## Understanding Material Flow

KCI projected material flow through the DSWM solid waste system based upon the proposed scenarios. Results for 2025 projections of Scenario A are presented in Figure 13. Potential demand for processing capacity exceeds supply which is likely to increase costs.

**Figure 13: 2025 Projected Material Flow Map – Scenario A: (Private/Private)**



Source: Kessler Consulting, Inc.

Note: Recyclable tonnage projections based on current recovery rates and do not account for program improvements.

## Financial Implications

Commodity markets are nationally impacting recycling costs for jurisdictions contracted with the private sector. Communities like Miami-Dade whose contracts were established when commodity values were high and when overseas markets accepted lower quality materials, are now seeing higher tip fees and more stringent contamination standards. However, all solid waste is local. *In this scenario clearly defining contractual terms to ensure transparency and accountability can provide more control over processing costs and revenue from commodity sales.*

## Implementation Considerations

### Procurement Process

The design and structure of a collection procurement released to the private sector can greatly impact the number of qualified respondents, increase competition, and provide for the best possible price. The most successful procurement documents are user friendly, transparent with clear contractual terms, and have an adequate timeline for transitioning services. If the County seeks to continue to contract out recyclables collection, there are multiple strategies that may assist in ensuring high performance standards at a fair price. This includes utilizing clear definitions for key terms such as contamination, rejects, residue, recyclables, and recovered materials. This will assist DSWM in not only meeting HB73 legislative requirements but result in defining boundaries for an equitable and transparent pricing structure.

### Marketplace Viability

It is important to note that larger contractor companies tend to bid on procurements that include the collection of all material streams or the collection of recyclables beyond that of single family to include franchising commercial and multi-family. Political interest and policy objectives for this would need to consider marketplace impacts in transitioning from a currently open market for commercial and multi-family to a franchised approach. As presented in Section 3, both single stream and dual stream collection methods were analyzed during this study. Under Scenario A, single stream is the most practical collection option for the County due to no private dual stream facility.

### Potential Interim Needs

There would be no interim needs for Scenario A. However, KCI recommends it is in the best interest of the County to ensure an adequate timeline for defining appropriate procurement strategies, procuring the most qualified contractors, and allotting for the transition of services.

## 4.2 Scenario B: The Public Model

### DSWM Collection / DSWM Processing (Public/Public)

*Description:* Under Scenario B, the collection and processing of recyclable materials would be provided by DSWM. This public model is frequently sought if policy objectives cannot be adequately met by privatized service. Before selecting public service as a viable option, some jurisdictions choose to enter a procurement process, evaluate received bids, and conduct a feasibility study for performing in-house services. These can all provide an adequate assessment of the pros and cons specific to a local community.

#### *Key Findings:*

- Provides the greatest risk protection during market fluctuations and insulates the County from changing priorities of the private sector.
- May stress staffing and budgets within the Waste Enterprise Fund with two capital projects simultaneously.

#### *Financial Summary:*

- Requires an estimated \$45 - \$48 million in capital costs for collection infrastructure and construction of a new MRF.

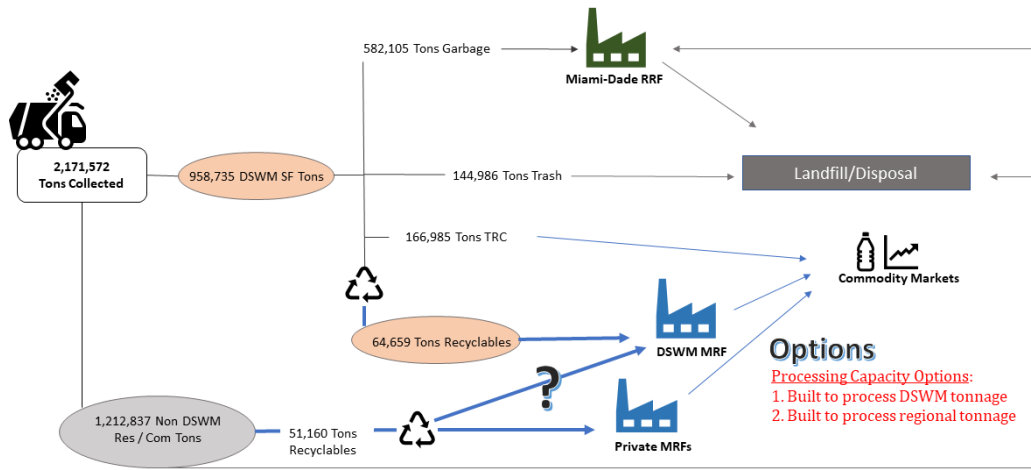
#### *Sustainability and Resilience Assessment:*

- Scenario B fosters long-term financial stability for the County's recycling program, meeting Objective 6 of the Resilient 305 Strategy. This would allow the County to meet Action 57 to leverage the power of purchasing, as well as meet the Commission's goals for improving infrastructure and increasing sustainability.
- Design concepts for a new MRF could expand the use of renewable energy, (Objective 4 - Action 16) by utilizing available land adjacent to the existing RRF and energy supplies produced by the RRF (supports County's goal for innovative solutions to climate change).

## Understanding Material Flow

Figure 14 presents the material flow of Scenario B. The processing capacity of collected recyclables would be contingent upon future MRF design and operation. New infrastructure could be built to process projected DSWM tonnage or be designed through the implementation of a second operational shift or larger capacity to process regional tonnage projections.

**Figure 14: 2025 Projected Material Flow Map – Scenario B: (Public/Public)**



Source: Kessler Consulting, Inc.

Note: Recyclable tonnage projections based on current recovery rates and do not account for program improvements.

## Implementation Considerations

### Recyclables Processing

While Scenario B defines a public model for processing recyclables, the ownership and operational structures of a MRF may vary, allowing for multiple types of private partnerships. Based on KCI’s experience and industry knowledge, a publicly developed MRF is most successful at meeting recycling goals and controlling costs when the public sector engages and manages a team with specific expertise in the distinct phases of planning, architectural and engineering services, construction, processing system design and installation, and operational management (i.e., Customized Partnership Model or “team of experts”).

A fully private or merchant facility as defined in Scenario A, results in the least control over processing costs and revenue share. However, if the facility and all operational components are public, a jurisdiction holds a massive infrastructure responsibility. *The proper balance of ownership and operations for DSWM would have to be determined as presented in Section 3.2.* Clear contractual agreements can make this public model a win-win for both parties and allow the public sector greater control and return on their investment in processing recyclable materials.

## Financial Implications

### Recyclables Collection

The business of collecting recyclable materials can be simplified to three needs: staff, trucks, and a site to store the trucks. These are all policy directives that the County should determine before selecting a scenario. In fiscal year (FY) 2019-2020, DSWM reported expenditures of \$9,498,000 for residential curbside recycling through private contractors.<sup>11</sup> As seen in Table 5, KCI utilized the current program parameters to conduct a macro-analysis on different models that may be considered for collection of recyclables. *Note: A collection rate analysis was not part of this scope. Resulting cost estimations for planning purposes only.*

**Table 5: DSWM Recycling Collection Cost Assessment**

Single Stream Recyclables Collection	DSWM EOW	DSWM Weekly	Private EOW *DSWM provides carts	Private EOW *Contractor provides carts
<b>Annual Capital Expenses</b>	\$1,988,900	\$3,963,100	\$1,988,900	\$4,471,000
<b>Operational Expenses (Labor, O&amp;M, Tip Fees)</b>	\$6,058,800	\$9,765,200	\$6,058,000	\$6,058,800
<b>Indirect<sup>1</sup> (General &amp; Admin)</b>	\$1,493,600	\$2,976,200	\$2,650,000	\$3,395,000
<b>Total Net Annual Cost</b>	<b>\$9,541,400</b>	<b>\$16,704,500<sup>2</sup></b>	<b>\$10,698,000<sup>3</sup></b>	<b>\$13,925,000</b>
<b>Avg Cost/ HH/Month</b>	<b>\$2</b>	<b>\$4</b>	<b>\$3</b>	<b>\$3</b>

Notes: <sup>1</sup>DSWM indirect calculation utilized a 40% rate based on data from 2019 CAFR. Private sector rate based on industry standards. <sup>2</sup>Increase of cost from EOW to weekly service may be offset by transitioning from twice weekly garbage service to weekly. <sup>3</sup>Projected private contract cost based on current system (carts and cart maintenance not included).

While potential cost projections on private versus public are presented in Table 5, until a procurement is conducted and bid, it is difficult to accurately reflect private sector pricing. *As stated earlier, policy objectives and procurement results can help to define if public collection service will allow for the program control and material flow sought by DSWM.* This may prove critical as the recyclables market continues to fluctuate and private sector interest in processing materials continues to wane, resulting in increasing costs and contamination standards. Implementation of contamination reduction programming (e.g., contamination outreach, cart tagging and removal, etc.) may prove easier to track and manage when collected by DSWM.

Maintaining single stream collection with targeted strategies to increase capture rates and reduce contamination will increase the overall tonnage of materials recycled and provide greater return on infrastructure investments.

### Recyclables Processing

KCI conducted a macro-level assessment for capital and operational expenditures of both a single stream and dual stream MRF. This assessment included the examination of different sizes and types of processing for a facility developed under a publicly involved approach. These

<sup>11</sup> DSWM “2019 Comprehensive Annual Financial Report (CAFR)”



numbers are based on the “team of experts” approach outlined earlier rather than a design-build model, which can increase costs by 25-30%.

New publicly developed MRF infrastructure could be *built to process projected DSWM tonnage or be designed to achieve economies of scale by handling regional tonnage through additional operating hours or higher throughput*. Additionally, new construction would allow for a state-of-the-art design specifically tailored to the recovery of materials designated in the DSWM program stream. Findings from this analysis are presented in Table 6 and reveal the costs per ton for recycling is less than pricing currently contracted. *Note: A MRF feasibility study was not part of this scope. Resulting cost estimations presented in Table 6 were developed for planning purposes only.*

**Table 6: Miami-Dade MRF Options and Financial Estimates**

	Single stream		Dual stream	
	DSWM	Regional	DSWM	Regional
<b>Design Capacity (40 tph)<sup>1</sup></b>	72,800 t/yr <i>1 shift, 5 days/wk</i>	135,200 t/yr <i>2 shifts, 5 days/week</i>	72,800 t/yr <i>1 shift, 5 days/wk</i>	135,200 t/yr <i>2 shifts, 5 days/week</i>
<b>Acres</b>	10	10	10	10
<b>Capital Costs<sup>2</sup></b>	\$35 - \$38 m	\$35 - \$38 m	\$32 - \$34 m	\$32 - \$34 m
<b>Annual Capital Costs</b>	\$2 m	\$2 m	\$2 m	\$2 m
<b>Annual Operating Cost</b>	\$4 m	\$8 m	\$3 m	\$6 m
<b>Total Annual Cost<sup>3</sup></b>	\$6 m	\$10 m	\$5 m	\$8 m
<b>Cost Per Ton</b>	\$81 - \$87	\$71 - \$76	\$68 - \$73	\$59 - \$63
<b>Net Revenue Share<sup>4</sup></b>	\$2 m	\$4 m	\$2 m	\$4 m
<b>Cost Per Ton (w Revenue)</b>	\$53 - \$59	\$43 - \$48	\$40 - \$45	\$31 - \$35
<b>Net Annual Cost</b>	\$4 m	\$6 m	\$3 m	\$4 m

Notes: <sup>1</sup>Design capacity based on tonnage. <sup>2</sup>Capital costs include building and equipment and does not include land acquisition, as well as generic site development cost. Estimates are in current dollars and do not factor inflation. <sup>3</sup>Total annual cost includes labor and residue disposal, as well as other direct and indirect expenses and profit for private operator. <sup>4</sup>Net revenue share based on ten-year average commodity pricing and 50% revenue share. Disposal costs based on DSWM 2021 tip fees. Residue rates based on industry standard averages. Model built utilizing “team of experts” approach.

## Potential Interim Needs

Interim strategies may be necessary if a transition to DSWM provided service is not coordinated with the expiration of existing contracts. KCI recommends it is in the best interest of the County to allow for adequate planning for implementation of Scenario B. In the event contracts expire prior to implementation of Scenario B, the County may need to allow for a new procurement of services with more limited terms until operations are in place.



## 4.3 Scenario C: Private Collection / DSWM Processing (Private / Public)

*Description:* As the County evaluates multiple options for collection and processing of recyclable materials, it is important to note that a combination of private curbside collection and public processing should be considered. Assessment results found for private collection of recyclable materials (see Scenario A) and those for public processing (see Scenario B) are not repeated in this section. Instead, this section examines the advantages and disadvantages of combining the two models. *Key among the advantages is that DSWM would not need to undertake two major planning and capital projects at the same time.*

If the County remains satisfied with the collection service performance through their current contractor, they may seek advisement on the potential for negotiating a new contract or extension of service. This would allow for no DSWM collection infrastructure change and development work could focus on the construction and operation of a new MRF. In the event a new solicitation would need to be released and a new contractor secured, this would still allow for infrastructure changes to center on the design and build of a new processing facility. See Tables 5 and 6 for cost estimations of utilizing a private collector and public processor.

*Key Findings:*

- Increases risk protection from fluctuations in open market processing, while centering on only one major capital project.

*Financial Summary:*

- Requires an estimated range of \$32 - \$38 million in capital costs for construction of a new MRF as defined in Table 6.

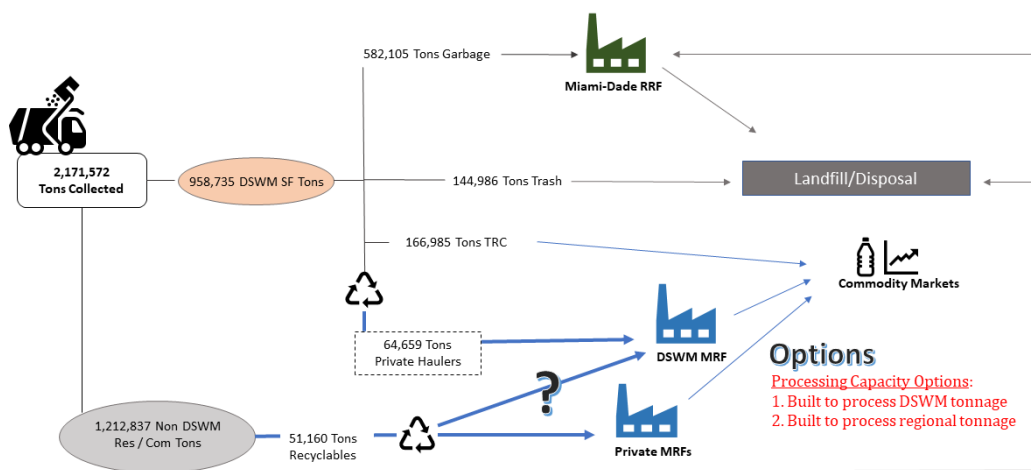
*Sustainability and Resilience Assessment:*

- Scenario C fosters long-term financial stability for the County's recycling program, meeting Objective 6 of the Resilient 305 Strategy. This would allow the County to meet Action 57 to leverage the power of purchasing, as well as meet the Commission's goals for improving infrastructure and increasing sustainability.
- Design concepts for a new MRF could expand renewable energy, (Objective 4 - Action 16) by utilizing available land adjacent to the existing RRF and utilize energy supplies produced by the RRF. This would support the County's goal for innovative solutions to climate change.
- Scenario C would allow the County to build upon initiatives for Plastic Free Beaches by designing a modern, state-of-the-art processing facility that could target multiple material types, while fostering regional job growth and infrastructure innovation.

### Understanding Material Flow

As presented in Figure 15, the flow of material through DSWM would be a combination of those identified in Scenario A and Scenario B.

**Figure 15: 2025 Projected Material Flow Map – Scenario C: (Private/Public)**



Source: Kessler Consulting, Inc.

Note: Recyclable tonnage projections based on current recovery rates and do not account for program improvements.

## Implementation Considerations

If the County remains satisfied with the collection service performance through their current contractor, they may seek advisement on the potential for negotiating a new contract or extension of service. This would allow for no DSWM collection infrastructure change and development work could focus on the construction and operation of a new MRF. In the event a new solicitation would need to be released and a new contractor secured, this would still allow for infrastructure changes to center on the design and build of a new processing facility.

## Financial Implications

See Tables 5 and 6 for cost estimations of utilizing a private collector and public processor.

## 4.4 Scenario D: DSWM Collection / Private Processing (Public / Private)

**Key Findings:** This scenario was identified as a possibility. However, current market trends in south Florida do not reveal an interest in new private sector recyclables processing infrastructure. Thus, unless unforeseen changes in the industry were to occur, *this scenario would not be a viable long-range option.*

## 4.5 Scenario E: No Source Separation (No Curbside Recycling)

**Description:** The implementation of Scenario E would eliminate the separation of garbage and recyclable materials. Since DSWM currently provides garbage and trash collection services,

these options would require no separate collection contract nor public collection method of recyclable materials. While there are advantages to Scenario E, *KCI's assessment reviewed two potential options for eliminating curbside recycling and did not identify this scenario as the most viable for the County.*

*Key Finding:*

- Analysis on infrastructure costs for a Mixed Waste Processing facility estimated capital costs between \$62 - \$67 million for one facility, accommodating only one-third of DSWM's projected tonnage for 2025. Three facilities would need to be created to process all tonnage.

## Two Options for No Curbside Recycling

The first option assessed sending materials to the Miami-Dade RRF facility. According to the Master Plan Update released in 2020, this option requires significant capital improvements to the existing facility for continued operations (\$27.9 million to extend through 2023) and (\$52 million to extend through 2028). Long-term planning for managing waste through an RRF would require new infrastructure at an estimated capital cost of over \$1 billion.<sup>12</sup> According to the plan, these cost projections were built on a model of diverting 48% of DSWM disposed waste. If no materials were sent to an RRF, remaining capacity of the North Dade Landfill would be reduced to nine years and South Dade Landfill to eight years.

Thus, under Scenario E, KCI and the project team assessed sending materials to a Mixed Waste Processing (MWP) facility for processing before being either sent to the Miami-Dade RRF or for landfill disposal. No MWP facility currently exists in south Florida and no private sector interest in this type of infrastructure is foreseen. Attempts in recent years to develop and operate MWP facilities in the eastern U.S. have faced numerous challenges. Top among them is the need for policy directives such as material bans and mandates, as well as higher disposal fees that make it more feasible to justify high operating costs.

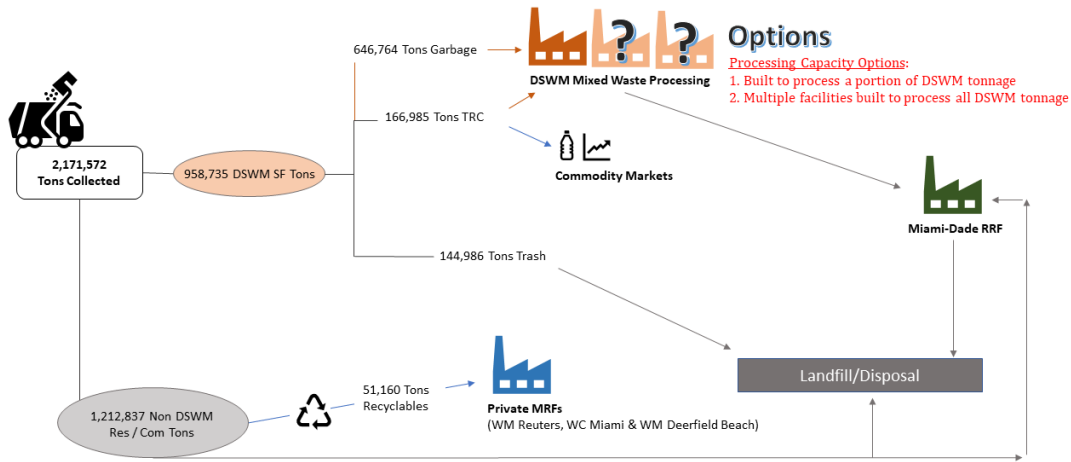
## Understanding Material Flow

As seen in Figure 16, the material flow for Scenario E would be significantly different than other scenarios. Elimination of residential curbside recycling will increase annual garbage tonnage. Material projections in this scenario for the year 2025 reveal a need for MWP facilities to handle approximately 650,000 tons. If the County were to seek to process all tonnage to minimize landfill disposal impacts, a minimum of three facilities would be required. Capacity options for new MWP facilities would have to be evaluated to ensure material diversion rates meet DSWM landfill and disposal plans.

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<sup>12</sup> Miami -Dade County Solid Waste Management Master Plan Update released February 1, 2020.

**Figure 16: 2025 Projected Material Flow Map – Scenario E: (No Curbside Recycling)**



Source: Kessler Consulting, Inc.

Note: Mixed Waste Processing facility designed to accept only DSWM collected tonnage. Multiple facilities will be required to process all projected tonnage.

## Implementation Considerations

Average recovery rates of recyclable materials vary with MWP. Facilities designed to produce a fuel product see an average recovery rate of 50% but results are contingent upon marketing the final product. Currently, southeast facilities face difficulties in finding economically viable markets. Based on 2014 composition data and a common recyclables average capture rate of 35% the County could recover an estimated 70,000 tons per year of recyclables if one facility was designed to process 200,000 tons. While this does offer the County a small increase over current recovery rates, the County must consider the implications of cost and reduced quality of processed materials impacting commodity value in the marketplace. In addition to political concerns for these expenditures, public perceptions of the dissolving of the curbside recycling program would need to be evaluated.

## Financial Implications

Table 7 presents a macro-level assessment of the capital and operational expenses that would be required for developing one average sized MWP facility. *As stated earlier, the County would need to build multiple facilities to process all projected tonnage or designate a portion of the tonnage for MWP.* Note: A MWP feasibility study was not part of this scope. Resulting cost estimations presented in Table 7 were developed for planning purposes only.

**Table 7: Miami-Dade MWP Financial Estimations Per Facility**

Financial Area Assessed	
<b>Design Capacity<sup>1</sup></b>	200,000 tpy
<b>Acres</b>	12
<b>Capital Costs<sup>2</sup></b>	\$62 - \$67 m
<b>Annual Capital Cost</b>	\$4 m
<b>Annual Operating Cost</b>	\$8 m
<b>Total Annual Cost<sup>3</sup></b>	\$12 – \$13 m
<b>Cost Per Ton</b>	\$59 - \$66
<b>Net Revenue</b>	\$5 m
<b>Cost Per Ton (w Revenue)</b>	\$35 - \$42
<b>Net Annual Cost</b>	\$7 - \$8 m

Notes: <sup>1</sup>Design capacity is based on one and half shifts at five days per week and includes building and equipment for one facility. <sup>2</sup>Capital costs does not include land acquisition nor costs associated with waste disposal and recycling residue. Estimates are in current dollars and do not factor inflation. <sup>3</sup>Total annual cost based per facility and includes only residue disposal cost for comparison with MRF estimations (not total disposal costs). Processing total tonnage requires three facilities.

### Potential Interim Needs

Infrastructure development for a MWP facility would need to be coordinated with the termination of current processing contracts. While not recommended, the County could consider an evaluation of processing and disposal capacities for the RRF and landfills to supplement interim needs.

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# Section 5

## Implementation Plan and Next Steps

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### 5.1 Recommended Option

Based upon strategic planning discussions with DSWM senior management staff, KCI recommends it in the County's best interest to continue a single stream curbside collection recycling program. *Based upon these discussions and results from the analysis, Scenario C (Private Collection / DSWM Processing) proved the most viable option for the County.*

Implementation of Scenario C will continue the out-sourcing of recyclables collection services to the private sector and allow for the public development and ownership of a new regional MRF that is privately operated.

KCI recommends the County leverage support for development and operations of a new facility from the private sector through public-private partnerships. Siting of the new facility could be on public acreage across from the RRF, fostering a unique DSWM material processing campus and allow for the facility to potentially be carbon neutral. This concept supports multiple sustainability and resiliency goals of the Resilient 305 Plan.

In developing potential actions for implementation, KCI followed a set of guiding principles. These included actions that would lead to greater program success, fiscal responsibility, and that leveraged existing resources and policies. Selected actions are presented below.

### 5.2 Proposed Implementation Plan and Timeline

The following potential actions are recommended to assist the County in maintaining a recycling program while constructing new capital infrastructure (see Table 8 for summary).

#### Recommended Actions: Recyclables Collection Services

It is recommended the County focus financial and staff resources on the construction of new infrastructure and continue to privatize collection of residential recyclables. Current collection contracts expire on September 30, 2022 and have the potential for a 180-day extension. Two potential options the County may consider are:

1. Initiate a new procurement process and secure new contractors for collection services.
2. Extend current contracts an additional three years if existing terms are mutually agreed upon by the County and contractors. Any service issues would be addressed.

The Board retains the legal jurisdiction to extend contracts through a non-competitive process. This would allow all DSWM resources to be focused on developing a processing facility rather than conducting a new collection procurement process.

As stated earlier, the contract for processing recyclable materials expires March 30, 2023 with no possible extension. Potentially, a new MRF could be developed and operational prior to the end of this contract. However, this is contingent on many variables. Therefore, the County will need to determine where materials should be delivered and processed if there is an interim period.

It is recommended the County engage WMI to determine if a short-term, interim contract with agreeable terms can be reached. In the event this is not viable, the County may consider a period where recyclables are delivered to the RRF for processing (through tonnage reallocations in the County's disposal system). This option would only be implemented as a last resort, after all other potential interim options were exhausted. The justification of this last resort option would be to keep residents in the habit of recycling, avoid cost and efficiency implications of removing carts, providing their storage, and then having to redistribute.

Both options will ensure no disruption of service to residents and allow DSWM to perform sufficient outreach and education to promote the new facility and implement contamination reduction measures.

#### *Action Items and Potential Timeline:*

- *October 2021 – January 2022: Meet with collection contractors to determine the viability for extending current terms and conditions three years, addressing any service concerns.*
- *January 2022: If viable, finalize contractual terms for extension of service.*
- *June 2022 – December 2022: If not viable, conduct County's procurement process to secure new collection contractors and initiate transition of service. (If extension, secure by June 2022. If new contract, secure by December 2022.)*
- *September 2021 – January 2022: Engage WMI regarding viability of a short-term, interim processing contract.*
- *January 2022: If viable, bring resulting contract amendment to BCC for approval.*
- *April 1, 2023: Delivery of recyclable materials will either continue to the WMI Reuters facility or shift to the RRF as an interim Designated Facility.*
- *June 2026 (Tentative Date): Delivery of recyclable materials will transition to the new MRF.*

### Recommended Actions: Recyclables Processing

Potential actions and timelines for the development of a new MRF vary depending upon what the County identifies as most appropriate for their needs. To assist, KCI has identified two potential options (as described in Section 3.2.2) and included primary advantages and disadvantages to each. The potential options include:

1. Design and construct the new MRF through a Design Build Model (DBM).

#### Advantages:

- Typically requires only one procurement process to secure design-build team.



Disadvantages:

- Typically costs an average of 25% - 30% more.
- DBM not recommended for MRF construction due to the difficulty in defining the specifications for the quality of mechanical equipment in the procurement.
- Often results in less design control, technology selection to optimize operations, and facility.

2. Design and construct the new MRF utilizing a Customized Partnership Model (CPM) (i.e., team of experts approach as described in Section 4.2).

Advantages:

- More cost effective and fiscally sound than a DBM.
- Allows for greater control and oversight on the design of the new facility.
- Leverages skillsets of multiple experts in the design and construction to ensure the best life cycle costs for full operations and not simply the guaranteed maximum construction budget.
- Can result in quicker turnaround from conception to operation.
- Staff time more efficient due to management approach required for a CPM.
- If County has existing contracts with a consultant firm, general contractor, and engineer the process can be streamlined without additional procurement burdens.

In KCI's experience, a CPM model provides greater long-term operational success, fiscal return, and greater time efficiency in the development and construction phase. While the County must determine the most appropriate model, KCI recommends the County consider a CPM.

It should be noted, the timeline for implementing recommended actions may be impacted by the County's procurement process and may require modification upon a final decision for the path forward. Some potential variables include the method the County selects for procuring services, the availability of the site, contractors already under contract with the County, and the success of negotiations with current collection contractors and processor.

*Action Items and Potential Timeline:*

- *October 2021: Board to approve the most appropriate model for procuring the new MRF and designate an internal staff team for project oversight.*
- *October 2021 – March 2022: Select project manager and recycling development consultant to represent County's interest in the development process.*
- *November 2021 – March 2022: Perform due diligence on potential site for new MRF and ensure the viability of creating a DSWM material processing campus. This will include a preliminary design and probable cost assessment of funding options and the selection of an appropriate funding mechanism.*
- *March 2022 – July 2022: Develop conceptual design and programming criteria.*
- *July 2022 – December 2022: Procure DBM team or CPM team. (Note: Timeline dependent upon County procurement process.)*
- *January 2023 – June 2023: Procure MRF operations partner.*
- *June 2023 – May 2024: Design development and BCC approval.*
- *June 2024 – May 2026: Construction. (Required time may be less with CPM efficiencies.)*
- *June 2026: Commissioning and facility start-up.*

**Table 8: Recommended Implementation Plan and Timeline**

Potential Actions	Start Date	End Date
<b>Recyclables Collection Services</b>		
1. Meet with collection contractors to determine viability for extending current terms and conditions three years beyond existing contract.	Sep-21	Jan-22
2. If viable, finalize contractual terms for extension of service.	Jan-22	Jan-22
3. If not viable, conduct County's procurement process (RFP) and initiate transition of service.	Jan-22	Sep-22
4. If applicable, bring resulting contract to BCC for approval. (Extension: June 2022 / New Contract: December 2022)	Jun-22	Dec-22
5. Engage WMI regarding viability of short-term, interim processing contract.	Sep-21	Jan-22
6. If viable, bring resulting contract amendment to BCC for approval.	Jan-22	Jan-22
7. Delivery of recyclables will either continue to WMI facility or shift to the RRF.	Apr-23	Apr-23
8. Delivery of recyclables will transition to new MRF.	Jun-26	Jun-26
<b>Recyclables Processing</b>		
1. Board to approve most appropriate model for procuring new MRF and designate internal staff team for project oversight.	Oct-21	Oct-21
2. Select project manager and recycling development consultant to represent County's interest in the development process.	Oct-21	Mar-22
3. Perform due diligence on potential site for new MRF and ensure the viability of creating a DSM material processing campus. This will include preliminary design and a probable cost assessment of funding options and the selection of an appropriate funding mechanism.	Nov-21	Mar-22
4. Develop conceptual design and programming criteria.	Mar-22	Jul-22
5. Procure Design Build team or Customized Partnership team.	Jul-22	Dec-22
6. Procure MRF operations partner.	Jan-23	Jun-23
7. Design development and BCC approval.	Jun-23	May-24
8. Construction (Required time may be less with CPM efficiencies).	Jun-24	Jun-26
9. Commissioning and facility start-up.	Jun-26	Jun-26

Note: Timeline is estimated and may be influenced by many contingencies. KCI has assisted other jurisdictions with maximizing efficiencies and foresees the potential to commission a new MRF prior to the end of the County's current processing contract.

## 5.3 Next Steps

In determining next steps, it is important to remember all waste and policy decisions are local. Successful policies, programs, and partnerships in one jurisdiction may not be replicated with the same benefit for another. As stated in the Executive Summary, there is no single solution or set of benchmarks that defines a successful recycling program.

KCI will work with the DSWM management team to present project findings and the recommended Implementation Plan to the Board. Once a determination has been made to move forward, the County will need to decide on the best public-private partnership model for procuring the MRF design and construction (See Table 8, Recyclables Processing/Action 1) and initiate the due diligence process on the potential site by performing preliminary design and probable cost assessment (See Table 8, Recyclables Processing/Action 2).

Additionally, the County will need to meet with collection contractors to determine a potential bridge extension (See Table 8, Recyclables Collection/Action 1). If not viable, a new recyclables collection procurement will need to begin.

# Appendices

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A: Scenario Options Matrix

B: Market Drivers on Recyclable Materials

C: Program Observations – Future Considerations

## Appendix A: Scenario Options Matrix

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Miami-Dade County Recycling Analysis Scenario Options Matrix		
Who Does It? How is it Done?		
<p>The following section identifies scenarios the County may consider to address County-wide recycling after the current processing contract expires on March 30, 2023. Additionally, each scenario identifies collection and processing options the County may consider to improve recycling participation, reduce contamination and increase recovery within the program.</p>		
Scenario A: Current Scenario Private Collection / Private Processing (Private / Private)		
Collection Options	Single Stream (SS) Options	Dual Stream (DS) Options
<p><b>Collection Options</b></p> <ul style="list-style-type: none"> <li>- Automated / Frequency (Wk or EOW) / Cart Size (65 or 96 gal)</li> </ul>		<ul style="list-style-type: none"> <li>- No DS MRF.</li> <li>- Absence of private DS MRF negates benefits of DS collection.</li> </ul>
<p><b>MRF Options</b></p> <ul style="list-style-type: none"> <li>- WMI Reuters</li> <li>- Waste Connections</li> </ul>		<ul style="list-style-type: none"> <li>- None.</li> </ul>
<p><b>Key Findings</b></p> <ol style="list-style-type: none"> <li>1. Current scenario not viable long-term. Limited processing capacity for tonnage projections. (No new private infrastructure foreseen in south Florida.)</li> <li>2. MRF market trends show increased tip fees and more stringent contamination standards.</li> <li>3. Design and structure of procurement can impact the number of qualified respondents, increase competition, and provide for the best possible price.</li> <li>4. Clearly defined contractual terms to ensure transparency and accountability can provide more control over processing costs and revenue.</li> </ol>		
Scenario B: DSWM Collection / DSWM Processing (Public / Public)		
	Single Stream (SS) Options	Dual Stream (DS) Options
<p><b>Collection Options</b></p> <ul style="list-style-type: none"> <li>- Automated / EOW / Cart Size (96 gal)</li> <li>- Projected Net Annual Cost: \$9,541,400</li> <li>- Avg Cost/HH/Month: \$2</li> </ul>	<ul style="list-style-type: none"> <li>- Automated / Wkly / Cart Size (96 gal)</li> <li>- Projected Net Annual Cost: \$16,704,500</li> <li>- Avg Cost/HH/Month: \$4</li> </ul>	<ul style="list-style-type: none"> <li>- Automated Split Cart / Frequency (Wkly or EOW) / Cart Size (96 gal)</li> <li>- Automated Alternating Streams / Frequency (Wkly) / 2 Carts Size (96 gal)</li> <li>- Manual / Frequency (Wkly) Two Bin (18 gal)</li> </ul>
<p><b>MRF Options</b></p> <p>Design Capacity: 40 tpy / 72,800 tpy-1</p>	<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1-Increased cost from EOW to weekly service may be offset by transitioning from twice weekly garbage to weekly.</li> <li>2-Projected costs include general overhead and admin. Calculation based on data from 2019 CAFR.</li> </ol>	
<p><b>Key Financials</b></p> <p>DSWM</p>	<p>Regional</p>	<p>DSWM</p>
<p><b>Capital Costs - 2</b></p> <p>\$35 - \$38 m</p>	<p>\$35 - \$38 m</p>	<p>\$32 - \$34 m</p>
<p><b>Annual Capital Cost</b></p> <p>\$2 m</p>	<p>\$2 m</p>	<p>\$2 m</p>
<p><b>Annual Operating Cost</b></p> <p>\$4 m</p>	<p>\$8 m</p>	<p>\$3 m</p>
<p><b>Total Annual Cost-3</b></p> <p>\$6 m</p>	<p>\$10 m</p>	<p>\$5 m</p>
<p><b>Cost Per Ton</b></p> <p>\$81 - \$87</p>	<p>\$71 - \$76</p>	<p>\$68 - \$73</p>
<p><b>Net Revenue Share-4</b></p> <p>\$2 m</p>	<p>\$4 m</p>	<p>\$2 m</p>
<p><b>Net Annual Cost</b></p> <p>\$4 m</p>	<p>\$6 m</p>	<p>\$3 m</p>
<p><b>Cost Per Ton (w Revenue)</b></p> <p>\$53 - \$59</p>	<p>\$43 - \$48</p>	<p>\$40 - \$45</p>
<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1-Design capacity based on tonnage.</li> <li>2-Capital costs include building and equipment and does not include land acquisition, as well as generic site development cost. Estimates are in current dollars and do not factor inflation.</li> <li>3-Total annual cost includes labor and residue disposal, as well as other direct and indirect expenses and profit for private operator.</li> <li>4-Net revenue share based on ten-year average commodity pricing and 50% revenue share.</li> <li>5-Cost estimations based on a Customized Partnership Model (team of experts) approach rather than Design Build Model.</li> </ol>		

**Miami-Dade County Recycling Analysis  
 Scenario Options Matrix (Continued)**

<p><b>Key Findings</b></p>	<p>1. Scenario B allows for greatest program control over material flow and processing costs and greater control over contamination.                  2. MRF design can be same for meeting DSWM or regional processing needs by adding a second shift.                  3. Cost per ton is cheaper than current rates and competitive with disposal costs.                  4. Dual stream is less capital cost, but requires intensive transition to dual stream collection. (May impact ILAs. Regional tonnage is not currently collected dual stream.)                  5. DSWM would undertake two major planning and capital projects at the same time (in-house recyclables collection and MRF).                  6. May require extension of current contract if new MRF not operational before April 2023.</p>
<p><b>Public-Private Partnership Options</b></p>	<p>Potential partnership configurations (may be adjusted based on DSWM needs):                  Public Sector: Site / Buildings / Equipment                  Private Sector: Operations / Marketing</p>
<p><b>Scenario C: Private Collection / DSWM Processing</b>                  (Private / Public) (See Scenario A Collection Options and Scenario B MRF Options)</p>	
<p><b>Key Findings</b></p>	<p>1. DSWM would not undertake two major planning and capital projects at the same time.                  2. Current collection system would have to be modified if dual stream processing design selected for the MRF.</p>
<p><b>Scenario D: DSWM Collection / Private Processing</b>                  (Public / Private)</p>	
<p><b>Key Findings</b></p>	<p>1. Limited processing capacity for tonnage projections.                  2. No private sector interest in new merchant MRFs. Thus, not a viable long-range option.</p>
<p><b>Scenario E: No Source Separation (No Curbside Recycling)</b></p>	
<p><b>Collection Options</b></p>	<p>Automated Garbage / Frequency (WK or 2WK) / Cart Size (96 gal)</p>
<p><b>MWP Options</b>                  Design Capacity 200,000 tpy-1</p>	<p>1. Part of DSWM Tonnage: Process a portion of DSWM tonnage                  2. Total DSWM Tonnage: Process all DSWM tonnage / Will require multiple facilities</p>
<p><b>Key Financials</b></p>	<p>Part of DSWM Tonnage (1 Facility / 200,000 tons / 1.5 shifts, 5 days per wk)</p>
<p><b>Capital Cost</b></p>	<p>\$62 - \$67 m</p>
<p><b>Annual Capital Cost-2</b></p>	<p>\$4 m</p>
<p><b>Annual Operating Cost</b></p>	<p>\$8 m</p>
<p><b>Total Annual Costs</b></p>	<p>\$12 - \$13 m</p>
<p><b>Cost Per Ton</b></p>	<p>\$59 - \$66</p>
<p><b>Net Revenue Share</b></p>	<p>\$5 m</p>
<p><b>Net Annual Cost</b></p>	<p>\$7 - \$8 m</p>
<p><b>Cost Per Ton (w Proj. Revenue)</b></p>	<p>\$35 - \$42</p>
<p><b>Notes:</b></p>	<p>1- Design capacity is based on one and half shifts at five days per week and includes building and equipment for one facility.                  2- Capital cost does not include land acquisition nor costs associated with waste disposal and recycling residue. Estimates are in current dollars and do not factor inflation.</p>
<p><b>Key Findings</b></p>	<p>1. High capital costs and difficulty marketing commodities.                  2. Multiple facilities would be required to process all DSWM tons.</p>
<p><b>Public-Private Partnership Options</b></p>	<p>Potential partnership configurations (may be adjusted based on DSWM needs):                  Public Sector: Site / Buildings / Equipment                  Private Sector: Operations / Marketing</p>



## Appendix B: Market Drivers on Recyclable Materials

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### Paper

Since 2018, when China’s National Sword initiative dramatically reduced its demand for both OCC and mixed paper causing major price drops and market disruptions, the global recovered paper markets have recalibrated in many ways. Most notably, domestic mill capacity and demand has increased for OCC and mixed paper. Since that time, 28 mill development projects that increase consumption of recovered paper have been announced of which nine have been completed.<sup>13</sup> In addition, other overseas development projects are moving in to “soak up” the displaced Chinese consumption. Regardless of short-term conditions, international mills will continue to demand U.S. recovered paper.

It is important to note that throughout the past decade (before, during, and after National Sword), domestic markets have consumed a significant percentage of recovered paper grades. For example, in 2018 domestic mills consumed 64% of OCC and 46% of newspaper and mixed paper.<sup>14</sup> The shift away from China and export, as domestic recovered paper mill capacity comes online, is widely considered to be a good, stabilizing force on supply, demand, and commodity price markets. As of this writing (2021Q1), prices for OCC, newspaper and mixed paper are in line with historical averages.

Changes in recovered paper generation are also dramatically impacting markets. The growth of e-commerce compounded by COVID-19 is changing the characteristics and generation of OCC. OCC generation is shifting towards the residential sector and is comprised of smaller boxes than what are found in commercial waste. OCC demand for producing packaging is growing but less OCC is available from traditional sources in the commercial sector. With generation moving from the commercial to the residential sector, some of the OCC that was previously low-hanging fruit is becoming high-hanging fruit. This is having the net effect of constraining supply and quality and placing upward pressure on domestic OCC prices.

Lastly, as with all commodity markets, quality is a key driver. Even in the depths of the National Sword market, MRFs that produced high quality were able to move their recovered paper because domestic mills still needed raw material.

### Glass

Due to its weight and value, recycled glass markets are regional. Recycled container glass produced by MRFs must go through further processing (called beneficiation) to remove contaminants and produce consistent feedstock that meets end-user specifications. New glass containers and fiberglass insulation manufacturing represent the majority of demand for beneficiated recycled container glass.

Because recycled glass is a relatively heavy and low-value commodity, transportation costs are a primary factor affecting demand. For many recycling programs, the distance and cost to haul recycled glass to a beneficiation facility can be greater than its value, which can represent an economic barrier and create an incentive to develop alternative uses for the recycled glass such as alternative daily landfill cover and other civil engineering applications. In response to

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<sup>13</sup> Northeast Recycling Council, *Domestic Recycled Paper Capacity Increases – Updated*, January 2021.

<sup>14</sup> American Forest & Paper Association, *Annual Statistical Summary of Recovered Paper Utilization*, June 2019.

limited demand and tip fees charged by beneficiation facilities for heavily contaminated glass, some MRFs are investing in glass clean-up systems to improve marketability by removing contaminants and producing glass cullet that meets quality specifications.

### *Steel Cans, Aluminum Cans, and Bulk Metals*

Recycled ferrous and non-ferrous metals have well-established domestic and international markets. Both industries are highly reliant on recycled feedstocks in the manufacturing process. Steel and aluminum cans are primarily recovered through municipal recycling, while the majority of bulk ferrous and aluminum scrap come from commercial/industrial sources.

Markets for ferrous and non-ferrous metals are well-established with consistent domestic and international demand. The intrinsic value of recycled metals is based on the fact that steel and aluminum are infinitely recyclable and cost-effective compared to virgin ores, so steel furnaces and aluminum smelters use recycled metals as a major source of raw material.

The construction, machinery, and transportation sectors together account for approximately 79% and 54% of steel and aluminum domestic consumption, respectively. Comparing this to consumer containers and packaging, which account for 4 percent and 18 percent respectively of steel and aluminum consumption, it is clear that trends in the construction and transportation sector can have a major impact on demand and pricing for scrap metals.

### *PET, HDPE, and Mixed Plastic Containers*

The majority of post-consumer PET and HDPE containers come from residential recovery programs. Domestically, the majority of demand is for the production of recycled resins that are then used to manufacture products and packaging. Domestic markets consume more than 80 percent of recycled PET and HDPE with remainder being exported. For mixed plastic containers, domestic markets consume approximately 65 percent.<sup>15</sup>

Post-consumer plastics produced by MRFs need to go through additional processing before they can be used to manufacture new products. Plastic reclaimers fill this niche in the recovery supply chain – sorting, cleaning, and producing flakes or pellets to meet specific end-user applications. Domestically, recycled PET is used predominantly to produce fiber, sheet, film, and bottles while recycled HDPE is used primarily for non-food containers, pipe, and outdoor products.

Virgin resin accounts for the majority of total PET and HDPE resin production, so recycled resin demand is tied to the price of virgin resins derived from fossil fuels. Virgin production capacity is another market driver. In particular, global PET resin production capacity (both domestic and internationally) exceeds demand. Combined with low fossil fuel prices, current virgin resin prices are low compared to historical market averages and thus prices for recycled PET are depressed as well.

In the past few years, demand for recycled PP has increased. PP accounts for a much smaller percentage of residential recyclables than PET and HDPE. However, some MRFs are now sorting PP in response to market drivers. In the past few years, demand and prices for recycled PP have increased. At the same time, mixed plastic markets and prices have declined. Industry trade groups are also working to promote and expand PP recovery.

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<sup>15</sup> Sources: NAPCOR's *Report on Post-consumer PET Container Recycling Activity in 2016* and APC's *2016 US National Postconsumer Plastic Bottle Recycling Report*.

The price and demand for mixed plastic containers have been negatively impacted by China's National Sword initiative. Domestic reclaiming capacity for mixed plastic containers and non-bottle rigids is less than supply. Planned investments in new domestic capacity in response to oversupply and low price have been reported.

## Appendix C: Program Observations – Future Considerations

The recycling analysis conducted under this study centered on programmatic and contractual options related to curbside recycling collection in response to Resolution R-1072-19 calling for an evaluation of options for County-wide recycling after the County's current single stream recycling processing contract expires on March 30, 2023.

During the study, KCI noted additional opportunities and options the County may consider for increasing recycling rates and managing material flows within the solid waste system. These have been consolidated and are presented in the chart below.

*Note: Estimated recycling rate and waste stream impacts could be projected after understanding programmatic objectives for the County and the completion of an updated Waste Composition Study. Potential strategies identified below are not a complete and exhaustive list. They are intended only to provide the County with future considerations.*

### Additional Options to Increase the Recovery Rate of Solid Waste in Miami-Dade County

#### **Organics: Yard Trash and Food Waste**

Potential strategies could be voluntary or mandatory.

They may include the construction of yard trash and composting facilities (public or private) and supporting programs and policies (e.g., require separation of yard trash from bulky waste, foster infrastructure for commercial and residential food waste collection, develop an implementation program with standards, reporting, monitoring, and enforcement, etc.).

#### **Construction and Demolition (C&D) Debris and Bulky Waste**

Potential strategies could be voluntary or mandatory.

They may include fostering C&D/Bulky Waste processing facilities (public or private) and implementing supporting programs and policies (e.g., policies requiring processing prior to disposal, incentive programs with expedited permitting or reduced permit fees, outreach and education programming, etc.).